Advances in Intelligent Systems and Computing 621

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Computer Supported Qualitative Research

Second International Symposium on Qualitative Research (ISQR 2017)

Springer

Advances in Intelligent Systems and Computing

Volume 621

Series editor

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ISSN 2194-5357 ISSN 2194-5365 (electronic)
Advances in Intelligent Systems and Computing
ISBN 978-3-319-61120-4 ISBN 978-3-319-61121-1 (eBook)
DOI 10.1007/978-3-319-61121-1

Library of Congress Control Number: 2017943847

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This book contains a selection of the articles accepted for presentation and discussion at the second International Symposium on Qualitative Research (ISQR2017) as part of the 6th Iberian-American Congress on Qualitative Research, which will be held in Salamanca, Spain, on July 12–14, 2017. CIAIQ/ISQR 2017 was organized by Ludomedia and University of Aveiro/CIDTFF. The conference organization had also the collaboration and/or sponsoring of several universities, research institutes, and companies, including University of Minho, University of Zagreb, University of Salamanca, Federal University of Goiás, University of Porto, Polytechnic Institute of Leiria, Polytechnic of Porto, Lusófona University of Porto, Tallinn University, Catholic University of Maule, University of Tiradentes, University of Extremadura, ISLA, LIACC, CiberDid@tic, webQDA, MicroIO, AISTI, among several others.

CIAIQ/ISQR2017 builds upon several successful events, including CIAIQ/ISQR2016 held at Porto, Portugal, CIAIQ2015 held at Aracaju, Brazil, CIAIQ2014 held at Badajoz, Spain, and CLBIQ2013 held at Aveiro, Portugal. The conference's focus was on Qualitative Research with emphasis on methodological aspects and their relationship with research questions, theories, and results. This book is mainly focused on the use of Computer-Assisted Qualitative Data Analysis Software (CAQDAS) for assisting researchers in using correct methodological approaches for Qualitative Research projects.

ISQR2017 featured four main application fields (Education, Health, Social Sciences, Engineering and Technology) and seven main subjects: Rationale and Paradigms of Qualitative Research (theoretical studies, critical reflection about epistemological, ontological, and axiological dimensions); Systematization of approaches with Qualitative Studies (literature review, integrating results, aggregation studies, meta-analysis, meta-analysis of qualitative meta-synthesis, meta-ethnography); Qualitative and Mixed Methods Research (emphasis on research processes that build on mixed methodologies but with priority to qualitative approaches); Data Analysis Types (content analysis, discourse analysis, thematic analysis, narrative analysis, etc.); Innovative processes of Qualitative Data

Analysis (design analysis, articulation and triangulation of different sources of data—images, audio, video); Qualitative Research in Web Context (eResearch, virtual ethnography, interaction analysis, internet latent corpora, etc.); Qualitative Analysis with the Support of Specific Software (usability studies, user experience, the impact of software on the quality of research and analysis).

In total, after a careful review process with at least three independent reviews for each paper, a total of 32 high-quality papers from CIAIQ/ISQR were selected for publication, with a total number of authors over 105, from eight countries, including Australia, Brazil, Germany, Italy, Poland, Portugal, Spain, and UK. The volume also features five invited papers from distinguished researchers, keynote speakers from previous ISQR/CIAIQ conferences.

We would also like to take this opportunity to thank the rest of the CIAIQ/ISQR2017 organization members (María Cruz Sánchez, Ana Pinto Llorente, María Victoria M. Cilleros, Pedro Corcho, Dayse Neri de Souza, Rodrigo A. Saavedra, Paulo Alexandre Castro, Susana Oliveira e Sá, Ellen F. Oliveira, Jaime Ribeiro, Catarina Brandão, Simone Tuzzo, Brígida Mónica Faria, Sónia Mendes, Conceição Ferreira, Estela Barreto Costa, Eva Torrecilla, Fábio Freitas, Juan Pablo Hernández, and Patricia Torrijos) for their hard and fine work on the scientific management, local arrangements, publicity, publication, and financial issues. We also express our gratitude to all the members of CIAIQ/ISQR Program Committees and to the additional reviewers, as they were crucial for ensuring the high scientific quality of the event. We would also like to acknowledge all the authors and delegates whose research work and participation made this event a success. Last but not least, we acknowledge and thank all Springer staff for their help on the production of this volume.

April 2017

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Contents

CAQDAS at a Crossroads: Choices, Controversies and Challenges

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Abstract. The field of Computer Assisted Qualitative Data AnalysiS (CAQDAS) is characterised by choices, controversies and challenges. This chapter first briefly outlines the history of the field and discusses choices between and within programs. It goes on to discuss persisting controversies around the appropriateness of using technology for qualitative data analysis. It then outlines challenges arising from these choices and controversies. The chapter concludes by discussing how the Five-Level QDA™ method, a CAQDAS pedagogy that transcends methodologies, software programs and teaching modes, addresses one of the key challenges: how to appropriately enable researchers with varied needs to harness CAQDAS packages powerfully.

Keywords: Five-Level QDA™ method · CAQDAS packages

1 Introduction

This chapter reflects on the current state of Computer Assisted Qualitative Data AnalysiS (CAQDAS)[1] and the issues the field faces in an increasingly digital future. As a community of practice we are at an important crossroads, faced with significant choices, controversies, and challenges. The chapter begins with a brief overview of the history of the field and the current state of the art, illustrating that we have more choices than ever before as to the tactics we choose to fulfil our analytic strategies. However it is not

[1] The acronym CAQDAS was coined by Raymond Lee and Nigel Fielding in their 1991 book *Using Computers in Qualitative Research*, which was published following the first conference on qualitative software that they convened in 1989, the *Surrey Research Methods Conference* (Fielding & Lee, 1991). In 1994 Fielding and Lee went on to establish the CAQDAS Networking Project (CNP) at the University of Surrey, UK, which became an internationally reputed and independent source for practical support, training, information and debate in the use of these technologies. The establishment of the CNP had the effect of 'fixing' the acronym. However, other authors (e.g., Bazeley & Jackson, 2013; di Gregorio & Davidson, 2008) refer to this group of software programs as QDAS (Qualitative Data Analysis Software). However, this acronym can be misunderstood to mean software that performs analysis, which none of the writers who use the acronym intend to mean (Woolf & Silver, in press). This chapter uses the term CAQDAS.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_1

a given that researchers use dedicated CAQDAS packages, and debates concerning the appropriateness of using technology for analysis have characterized the field's history. The second part of this chapter therefore discusses CAQDAS controversies and the potential impact they have on the future of qualitative research as a community of practice. Choices and controversies bring with them challenges. The final part of the chapter focuses on one significant challenge: how to enable current and future generations of researchers to harness CAQDAS packages powerfully. One approach, the Five-Level QDA method [1–3], a CAQDAS pedagogy that is designed to address these challenges and which transcends methodologies, software programs and teaching modes is outlined.

2 CAQDAS Choices

CAQDAS packages first became available in the 1980's and since then the field has witnessed many significant developments such that researchers now have significant choices *between* and *within* CAQDAS packages.

The first CAQDAS packages – NUD*IST (later NVivo), The Ethnograph, WinMAX (later MAXQDA), HyperRESEARCH), and ATLAS.ti – initially focused on providing features for managing, coding and retrieving qualitative data, but they quickly developed additional tools to support the varied and nuanced tasks involved in qualitative data analysis [4, 5]. They focused on supporting *qualitative* approaches to *qualitative* data, meaning approaches that seek to interpret text and audio-visual data through the identification, analysis and interpretation of concepts, themes, associations, processes, contexts etc. in order to build explanations or enlarge a theory [6]. Within ten years Tesch [7] had related types of qualitative analysis to software tools and was thus a pioneer in theorizing the methodological impact of CAQDAS. Weitzman and Miles [8] built on Tesch's work, creating a taxonomy that categorized the software available at that time as *text retrievers, code-and-retrieve programs,* and *theory-building programs*. However, as a result of rapid and significant developments the boundaries between categories became blurred. These typologies have therefore lost their relevance and a somewhat fuzzy conception of which programs fall under the CAQDAS umbrella has developed [6]. Whilst CAQDAS packages are software programs that focus on providing tools that are designed to facilitate a range of *qualitative* approaches to *qualitative* data, many CAQDAS packages additionally provide tools designed to support *quantitative* approaches to *qualitative* data, *mixed* approaches to *qualitative* data and *mixed* approaches to *mixed data.* Programs that provide such tools are considered CAQDAS packages as long as they have at their core tools that are designed to facilitate qualitative approaches to qualitative data [6].

The developmental history of the CAQDAS field has seen periods of convergence and divergence in terms of the features provided by different programs. The pioneer CAQDAS packages were developed in isolation, and thus the architecture of each program, as well as the tools within them, were subtly or significantly different. As their user-bases extended and more products became available, developers inevitably became more commercial and dialogue between methodologists, users and developers – via

conferences and in the methodological literature – gathered pace. This resulted in an increasing convergence in the tools provided by individual CAQDAS packages. However, some programs were developed specifically to support certain types of analysis, as developers sought to fill a gap they identified in existing provision. This helps explain the variety of programs that became available. For example Transana initially focussed on providing tools to support the transcription and analysis of audiovisual data, QDA Miner and Dedoose were explicitly designed to support mixed methods approaches to analysis, MiMeG and DRS were developed to provide tools to support multimodal collaborative visual analysis, and webQDA and Quirkos were designed to be easy to learn and to facilitate collaborative working. There are now many dedicated CAQDAS packages, specifically designed to support qualitative and/or mixed methods analysis. The timeline of their release is mapped in Fig. 1.

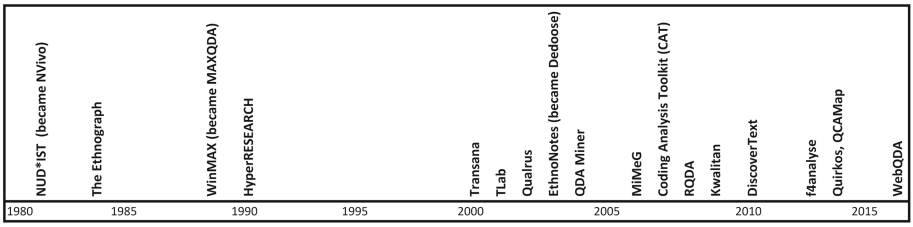

Fig. 1. Timeline of release of dedicated CAQDAS packages

As well as dedicated CAQDAS packages there are an increasing number of non-dedicated digital tools that can be harnessed for analytic purposes [18]. These developments have been accelerated by Web 2.0 and 3.0 technology [9]. We are thus currently witnessing a period of increasing divergence between dedicated CAQDAS packages and the full range of digital tools that can be used for qualitative analysis. The pace of technological developments and the variety in choice may explain the lack of updated typologies since Weitzman & Miles [8].

Nevertheless it is useful to reflect on the historical development of the field. Davidson & di Gregorio [5] consider the relationship between changing technology and changing methodological currents of qualitative research by mapping developments in CAQDAS to the eight critical moments in the chronology of qualitative research described by Denzin & Lincoln [10, 11]. In doing so they emphasize that the use of technology in qualitative analysis did not begin with the emergence of CAQDAS packages and their categorization of CAQDAS developmental stages provides a framework for reflecting in concrete terms the dynamic and evolving relationship between methodology and technology. Figure 2 maps the release of dedicated CAQDAS packages on Davidson & di Gregorio's [5] integration of *critical moments in qualitative research* and *stages in CAQDAS development.*

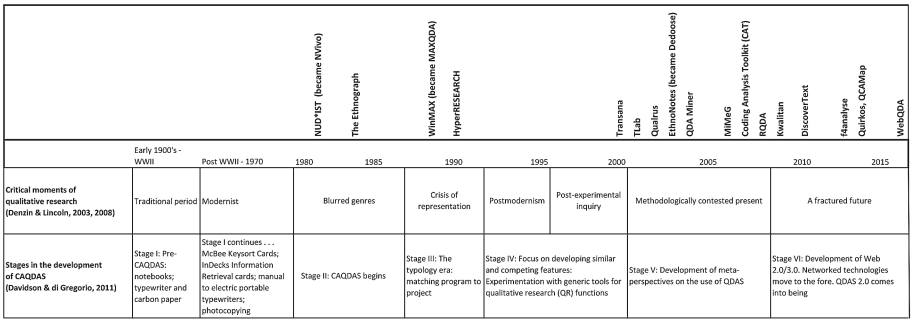

Fig. 2. The release of CAQDAS packages in relation to critical moments of qualitative research and stages in the development of CAQDAS (Adapted from Davidson & di Gregorio (2011))

In addition to the choices *between* dedicated CAQDAS and other digital tools that can be harnessed for analytic purposes are choices *within* these applications. A wide range of project types can be undertaken, for example differing in research design in terms of data type, analytic focus and practical needs, and dedicated CAQDAS packages provide tools to enable the unique and idiosyncratic analytic tasks of individual projects to be accomplished. Each program has its own distinctive tools that can be harnessed for different purposes, and therefore researchers have choices as to how to accomplish individual analytic tasks within their chosen program. The specific analytic tasks involved in undertaking any analysis are innumerable and are iteratively designed as a project progresses in relation to the overall objectives [3]. This means that every analysis is unique, requiring a combination of particular tools at different stages of a project. Despite the variety in qualitative and mixed-methods analysis, the individual tasks that are designed to accomplish an analysis broadly fall into five major kinds of analytic activity [6]:

- ***integration*** (bringing together the elements that make up a research project and thinking about how they relate to one another)
- ***organization*** (creating structures that reflect meaningful aspects of the data in relation to project objectives)
- ***exploration*** (considering the inherent nature of data)
- ***reflection*** (recording analytic insights and what is going on in the project)
- ***interrogation*** (asking questions about data and the work done so far)

These high-level activities reflect in broad terms the types of analytic work that are common across qualitative and mixed-methods strategies. Each activity has two or three dimensions, and as Fig. 3 illustrates, analytic activities are not discrete but connections exist among them. The diagram is not a flow chart indicating a sequence of activities, as each project engages in these activities in different ways, to different extents, and in different sequences depending on the methodology [3].

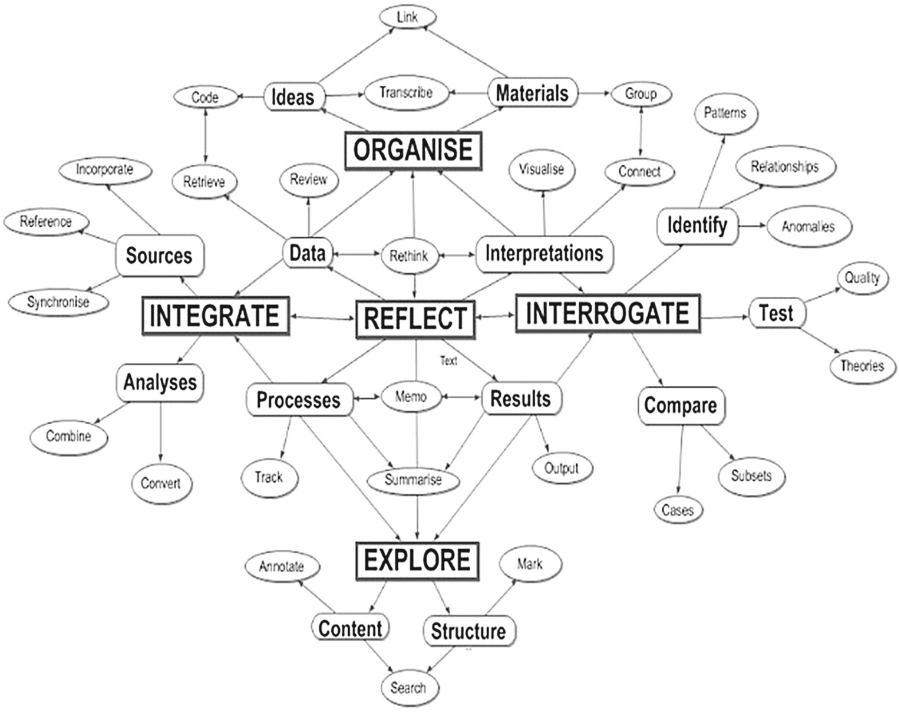

Fig. 3. Common analytic activities supported by dedicated CAQDAS packages [6]

It is not possible to map software tools onto analytic activities because analytic activities are fluid and overlapping, and the tools within dedicated CAQDAS packages can be harnessed for different analytic activities and tasks. Even if it were possible it would not be helpful, as to do so would be to suggest an *ideal* or *correct* way of harnessing CAQDAS packages, and there is no such way.

The wide choice between and within programs reflects the variety in qualitative and mixed-methods research and methodology, as well as personal preferences about technological solutions. That there continues to be space for so many programs in the market and that no one program has emerged as the "CAQDAS standard" underlines that there is no one "best" software [4]. This fact is not new. The lack of an industry standard is to be expected given the array of methodological and practical requirements across the diverse field of qualitative and mixed methods analysis. Although it may be thought to be in developers' interest to develop tools that can be harnessed for a range of analytic purposes, it is unrealistic and undesirable to expect a single CAQDAS package to provide all the tools needed for each and every type of project. The necessary size and complexity of a "one-size-fits-all" program would be too great to be an attractive choice for many, especially new users who may already perceive CAQDAS programs as complex and daunting and thus a struggle to learn [12, 13]. However the "Rotterdam Exchange Initiative", an outcome of the 2016 Kwalon Conference, is currently working on a common CAQDAS exchange format that may render redundant the desire for one

program to provide all the tools needed for a specific project. This initiative is an independently co-ordinated collaboration between the developers of several leading CAQDAS packages to create an open source exchange format that enables projects created in one package to be transferred into another ([40]). If successful, it will enable users to accomplish analytic tasks not possible in their software of choice, by transferring their work into another program.

The qualitative and mixed-methods community of practice is privileged to have so much choice in digital technologies to support their analytic work. We have choice *between* dedicated CAQDAS packages that are specifically designed to support the analytic activities that we engage in. We have choice *within* our chosen CAQDAS package to fulfil our particular analytic tasks in a variety of ways [3]. We have the choice to use non-dedicated technological solutions, or to undertake analysis manually. We have the choice to use a combination of tactics to fulfil our analytic strategies.

Since their emergence, dedicated CAQDAS packages have for many researchers become essential in undertaking robust and transparent analysis, and recent research into patterns of use has grown since 2000 [14–16]. However adoption is by no means universal, and scepticism about their role persists, despite the length of time CAQDAS packages have been available, the significant developments the field has witnessed, and the wide range of available choices.

3 CAQDAS Controversies

Discussion about the role of CAQDAS in qualitative research practice and its impact on methodology has as long a history as the technologies themselves, with the issues debated at conferences and in the literature among developers, methodologists and users. Researchers fall into three groups: those who advocate the use of CAQDAS packages; those who are concerned about or criticise its role and impact and therefore resist its use; and those that are unaware of the existence of dedicated software designed to facilitate qualitative and mixed methods analysis.

Within the first group, the CAQDAS advocates, are *digital immigrants* and *digital natives* [17, 18]. Digital immigrants began their qualitative careers undertaking analysis manually but have adopted technological advances and incorporated the use of CAQDAS, thus changing the way they go about their analytic practice [19]. Digital natives have grown up with technology being part of everyday life and therefore take its use for granted, typically not questioning whether software should be used to undertake qualitative analysis [12]. Whether digital immigrants or natives, CAQDAS advocates are not un-equivocal in their advocacy. For example, researchers discuss the relative utility of different programs for certain types of analysis and provide feedback to developers who are keen to know how their products are perceived and used so they can refine tools and develop new ones. Developers attend conferences where researchers discuss the role of CAQDAS and other digital tools and engage in scholarly debate about the implications of their products. Since its inception the CAQDAS field has been dynamic, with the relationship between methodology and technology in constant dialogue. For example, John Seidel, the developer of The Ethnograph, famously

reflected on the role of his own program in its software manual, expressing concern that text search tools may lead to a sacrifice of 'resolution' over 'scope' [20]. As Silver and Lewins [6] state, "his essays and thoughtful software manual recount how hours of in-depth examination of small sections of data revealed phenomena in midwifery care which would have been missed by faster methods of exploration and identification. He saw the value of analysis coming from careful immersion in relatively small qualitative datasets, and was concerned that this would be lost in the face of software developments which allow shallower exploration on larger and larger datasets" (2014, p. 336).

A second group of researchers express stronger concerns that the use of computers will somehow undermine the interpretive process continue to resonate with critics. Four key issues recur: that computers distance researchers from their data; that computers foster the dominance of code and retrieve as a strategy for analysis; that computers lead to the mechanisation of analysis; and a misperception that computers provide a method of analysis or dictate use of a particular approach. CAQDAS advocates refute these concerns ([6, 19, 21]). For example, whereas critics may say that CAQDAS distances one from data, advocates say its use brings us closer to our data. Whereas critics may say that the use of CAQDAS homogenises analytic methods, advocates say they are flexible and adaptable. Whereas critics may say that the use of CAQDAS encourages inappropriate quantification, advocates say it encourages transparency in process and that the numbers CAQDAS can produce need not be used in an analysis. Whereas critics may worry that the use of CAQDAS mechanises analysis, taking control away from the researcher, advocates stress that they remain always in control of what is done, why, to what extent and for what purpose, because they are the ones operating the tool.

As Jackson [22] argues, discourses regarding digital tools for qualitative research are polarizing and threaten our scholarship. Similarly, di Gregorio and Davidson [23] state that "the current divide between QDAS users and non-QDAS users (often the most experienced analysts) means that our most significant commentators on methodological issues are failing to engage in the discussion of the new affordances and also pitfalls that QDAS offers. QDAS should not be seen as something that can be added on in a chapter on qualitative methodology. It needs to be integrated in the whole discussion on methodological practice" (2008 p. 14).

It is also important to recognize that whilst many researchers choose not to use dedicated CAQDAS packages, their non-use is not always based on particular criticisms of these packages. Some researchers just prefer the tactile experience of working with paper, highlighter pens and scissors. Others have developed this, and CAQDAS advocates have not necessarily thrown away their highlighter pens!

Finally, many researchers remain unaware of the existence of dedicated CAQDAS packages. For example, within this third group of researchers are a striking number of students who attend software training courses at the CAQDAS Networking Project as a result of their peers informing them about software, rather than hearing about these packages from their supervisors or lecturers. As a community of practice we therefore have a responsibility to raise awareness of the role and potential of dedicated CAQDAS packages, and to appropriately equip those who decide to use them with the means to do so powerfully. Addressing this situation is the focus of the final section of this chapter.

4 CAQDAS Challenges

These choices and controversies leave the CAQDAS community facing three key challenges:

1. How we can transcend polarizing discourses in order that the qualitative research community does not become fractured
2. How we will respond to continued technological and methodological developments on our field
3. How we will adequately equip the next generation of researchers to be equipped to make informed choices between and within technologies

The first challenge is discussed by Jackson [22] and Jackson, Paulus & Woolf [21] and the second challenge is discussed by Silver & Bulloch [24]. The third challenge is the focus of the remainder of this chapter.

Given the expanding range of digital tools designed to support all phases of the research cycle and the expectation amongst digitally native students to use them, teachers have a responsibility to adequately prepare current and future generations of researchers, because for them working within digital contexts is their reality rather than their choice [12]. Although uptake of dedicated CAQDAS packages continues to increase [14–16], there is little evidence that their use is widely embedded into university curricula. There may be several explanations for this situation [16]. One reason is the difficulty of attending to diverse learner needs which are affected by learners' methodological awareness, analytic adeptness and technological proficiency [12]. Similarly, Salmona & Kaczynski [13] identified two significant barriers confronted by students that require competent foundation in qualitative research in order to transition through: aligning perceptions of ease of use and usefulness in overcoming resistance to technological change; and transparency into the research process through technology promotes insights into methodological challenges.

Such issues highlight the importance of developing effective ways of embedding CAQDAS teaching into university curricula. This has been long debated and it is widely agreed that the appropriate use of digital technologies must be taught within methodological contexts ([2, 12, 25–39]). However, these writers provide varying degrees of detail about their instructional design, and their discussions are contextually specific, for example focusing on the use of a particular CAQDAS program, a disciplinary domain, and/or a particular analytic framework. Their transferability and pedagogical value may therefore be limited where there is an intention to use different methodologies, analytic techniques and software programs.

There are clearly challenges and a lack of guidance in the literature for concurrently teaching qualitative methodology, analytic technique, and technology. Although the challenges are real they are not insurmountable. A pedagogy that transcends methodologies, analytic techniques, software packages and teaching modes could prompt a step-change in the way qualitative research in the digital environment is taught [2]. One approach is the Five-Level QDA method [1–3], a CAQDAS pedagogy explicitly designed to address these challenges. It involves learning to "harness CAQDAS packages powerfully", meaning using the chosen CAQDAS package from start to finish

while *remaining true throughout to the iterative and emergent spirit of qualitative and mixed methods research.* This method of harnessing CAQDAS packages addresses all the continuing concerns with and critiques of these packages discussed earlier. The Five-Level QDA method explicates the unconscious practices of expert CAQDAS users, and is developed from the authors' two decades experience of using, teaching, observing and researching these software programs. The method involves a different way of harnessing computer software from a taken-for-granted or common sense approach of simply observing the features on a computer screen and looking for ways of using them.

There are five principles to the Five-Level QDA method [3]:

1. Strategies and tactics are distinct.
2. Analytic strategies and software tactics are contradictory by nature.
3. Avoidance or compromise are problematic ways to manage the contraction.
4. Transcending the contradiction keeps analytic strategies distinct from software tactics by translating between them.
5. Each iteration of the heuristic process of translation is always driven by analytic strategies but may be informed by software tactics.

The first principle underlies the whole method: strategies – *what we plan to do* – and tactics – *how we plan to do it* – are distinct. As uncontroversial as this sounds, strategies and tactics in everyday language and in research literature are commonly treated as synonyms or near-synonyms. For example, in discussing the integration of qualitative and quantitative research, Bryman states, "An alternative search strategy is to select a sample of journals and to search for articles…this tactic was employed…" (p. 101). Conflating strategies and tactics in this way unconsciously leads to adopting CAQDAS use as a single process of *what we plan to do and how we plan to do it,* in other words that the QDA methodology and the use of the CAQDAS package's features are considered together as a single process. A consequence of this is that the features of the software drive the analytic process, either to a small or to a large degree.

The second principle – that analytic strategies and software tactics are contradictory by nature – means recognizing that whilst qualitative data analysis is to varying degrees iterative and emergent, computer software is predetermined and cut-and-dried. When this is not consciously recognized, either the strategy is privileged, with the consequence that the software is not used to its full potential throughout a project, or the tactics are privileged, with the consequence that the iterative and emergent aspects of an analysis are suppressed to some degree. However, when the contradiction is consciously recognized, it can be managed.

The third principle – that avoidance or compromise are problematic ways to manage the contraction – recognizes that there are different ways of managing the contradiction between analytic strategies and software tactics. One approach is to avoid the issue by assuming that the contradiction cannot be managed and choosing not to use a CAQDAS package at all. Another approach is through a compromise or trade-off, in which the *analytic tasks* of a project are raised to a more general level and expressed as a generic model of data analysis in order to more easily match the tasks to the observed features of CAQDAS packages. (Terms in italics have a specific meaning in Five-Level QDA).

The Five-Level QDA method, following Luttwak's [41] five level model of military strategy, takes a different approach to reconciling the contradiction between strategies and tactics by placing it in a larger context in order to transcend the contradiction. This is the fourth principle – *that transcending the contradiction keeps analytic strategies distinct from software tactics by translating between them*. Regardless of research design and methodology, there are two levels of strategy in a qualitative research project – the methodology and objectives (Level 1), and the analytic plan (Level 2) that arises from those objectives. There are similarly two levels of tactics – the straightforward use of software *tools* (Level 4) and the sophisticated use of *tools* (Level 5). In the Five-Level QDA method the term *tools* is used in a particular way: not referring to software features, but to ways of acting on software *components*, the "things" in the software that can be acted upon. Whereas CAQDAS packages have hundreds of features, they have far fewer *components*, typically around 15–20. Level 3 of the Five-Level QDA method is the critical middle level between the strategies and tactics, and is the process of *translation*. Rather than raise the level of *analytic tasks* to the level of software features, the level of *analytic tasks* is lowered to the level of its *units*, which are then matched, or *translated,* to the *components* of the CAQDAS package. Translation is a heuristic process that is explicated as five steps for the purposes of learning and mastering the skill [3]. However once learned the process quickly becomes unconscious so that the chosen CAQDAS package can be harnessed powerfully.

The fifth principle – *that each iteration of the heuristic process of translation is always driven by analytic strategies but may be informed by software tactics* – prioritizes analytic strategies over software tactics in making appropriate choices in the use of CAQDAS packages. The strategies therefore drive the analytic process, not the available features of the chosen software package, although the affordances of the software do play a role.

Figure 4 provides an introduction to each level of the Five-Level QDA method. However the process is in no way linear, as this chart may imply. Figure 5 displays the method as a diagram which illustrates the iterative, cyclical nature of the process as it is undertaken in practice.

Two Levels Of Strategy >>>>> Translated To >>>>> Two Levels Of Tactics				
Level 1	*Level 2*	*Level 3*	*Level 4*	*Level 5*
Objectives	Analytic plan	Translation	Selected tools	Constructed tools
The purpose and context of a project, usually expressed as research questions and a methodology	The conceptual framework and resulting analytic tasks	Translating from analytic tasks to software tools, and translating the results back again	Straightforward choice of individual software operations	Sophisticated use of software by combining operations or performing them in a custom way

Fig. 4. Five-Level QDA chart [3]

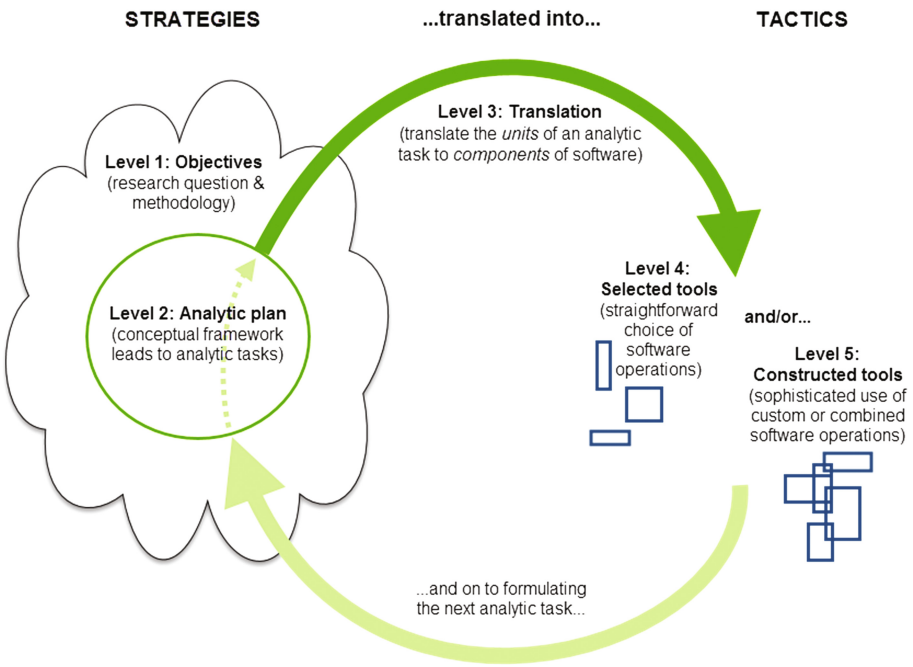

Fig. 5. Five-Level QDA diagram [3]

Because *translation* operates at the level of individual *analytic tasks,* the method is relevant across methodologies and software programs and teaching the process is adaptable to a range of instructional designs. The Five-Level QDA method pre-supposes that it is not possible to adequately teach technology out of the context of research methodology, and the method provides a framework through which qualitative and mixed methods research and analysis can be taught in conjunction with the use of CAQDAS packages (e.g. Davidson et al. [37], Bourque [30], Leitch [31]). As digital environments develop it is also increasingly less acceptable to students to teach methodology without technology. The Five-level QDA method intentionally gives a separate emphasis to analytic strategies and software tactics within a single framework which enables the teaching of methodology and technology concurrently within an instructional design that is adaptable to local contexts, as well as serving as a method to harness CAQDAS for researchers' own projects.

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Qualitative Research and the Challenges of Complexity

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Abstract. Will the research agendas of this 21st century be able to handle with rigor the complexity and uncertainty of our world? Will they accommodate the leaps into the unknown of today's creative and innovative processes? Should we care about it? Our answer is yes, because the social, economic, and political problems we confront today are becoming increasingly complex and nondeterministic. As this happens, and even their formulation becomes elusive, our traditional theories, methods, and instruments fail. We argue that the qualitative approaches inspired by the design disciplines are ideal to handle these situations, provided we carefully take into account some principles of the philosophy of science. We believe that the researchers willing to confront the growing complexity of our day, in all its richness and diversity, will have much advantage in following these approaches.

Keywords: Complexity · Creativity · Design · Ethics · Explanatory research · Qualitative research · Projective research · Relevance · Rigor · Wicked problems

1 Introduction

This chapter concentrates on the challenges to scientific research in a world where complexity plays an increasingly predominant role [1]. It starts by debating the extent to which today's uncertainty and sociotechnical strains are changing the nature of the problems we deal with, namely their dependence on multiple social factors and their loss of determinism and linearity [2]. On a different key, it also stresses the changing nature of research in contemporary contexts, where the interests of most stakeholders, and not just a few, must be carefully accounted for [3, 4]. With this background established, the chapter visits Herbert Simon's proposals for the creation, beyond the traditions of the natural sciences, of a new category of sciences, the *design sciences*, or *sciences of the artificial*, devoted to the study of the creations of man [5–7]. This distinction is then used to argue in favor of the distinction between two kinds of research: *explanatory research* and *projective research*.

Recognizing the close relationship between Simon's proposals and the traditions of the design discipline, the chapter recalls a debate occurred some decades ago in the designers' community, where a vision of design as a science-based discipline was opposed to a vision of design as a independent discipline, distinct from science and capable of solving problems that traditional science was unable to tackle [8–10]. This latter vision, which now

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_2

prevails in the designers' community, has been retained in this chapter. To explore further the role of design in research, the chapter inquires into the nature of the design *process*, in its cyclical and evolutionary fashion, which is so radically distinct from the chains of reasoning that characterize the traditional science process [7, 11]. Then, to highlight the apparently overlooked relationship between research and the design process, it stresses that Kurt Lewin's proposal of action-research as a form of qualitative research, in the mid 1940s [12], was based on the adoption of an identical cyclical process, which points to Lewin as the probable pioneer of the use of the traditions of design in scientific research.

To inquire more deeply into the epistemological strengths of the design process, when put at the service of research, the chapter then delves into the principles of the philosophy of science [7, 11, 13] and analyzes the potential value of their exploration in connection with Popper's critical rationalism [14, 15]. Drawing on the abductive nature of design, which facilitates the incorporation of intuitive hunches, creative leaps and accidental discoveries into the design process [16–19], the chapter explores this analogy to bring identical features to the research process.

The chapter then proposes a two-dimensional complexity space [20] where the opportunities for research inspired in the traditional sciences and of research inspired in the design process can be placed, where quantitative and qualitative research can be positioned in regions of this space, and where one can gain insight on when to handle a problematic situation as a problem or when to pursue it, instead, as an investigation of possible outcomes or emergent solutions.

The chapter continues with an analysis of the rigor, relevance and validity of the research carried out using the proposed design-inspired approaches. It discusses the rigor *vs* relevance debate [21] in the context of this kind of research, addresses the issues of error elimination through criticism [14], proposes eight tactics to harness rigor, stresses the critical importance of the ethical dimension, and closes with some general considerations about validity. The chapter concludes with a summary of its main arguments and claims.

2 New Problems, New Knowledge, New Research

Just before the turn of the century, leading physicist Stephen Hawking predicted that the 21st century would be the century of complexity [1]. Globalization, the increasing power of computers, the exploding number of human and technological systems, the rising dependence between such systems, the escalating speed of communications, the changing competitive environments and organizational needs, and, above all, the human and social dimensions of all these issues, are generating, indeed, an explosion of independent variables that interact in unpredictable ways, sometimes on the verge of chaos. This reality has dramatic implications on the nature of the problems we must deal with, on the core of the knowledge we must create, and on the essence of the scientific research we must develop.

2.1 Extending Research to Problem Spaces of Complexity

All scientific research occurs in a problem space, a space of possibility where the problems are experienced and research is carried out to solve them. Most of the problem spaces of our time are populated: they are inhabited by people whose life is affected either by the problems being researched or by the results of that research. In the past, the role played by people in research processes was negligible. Today, as pointed out by the science and technology studies movements since the early 1970s [3, 4], most research projects must include representatives of the stakeholders affected. This is prominent in the environmental sciences and biotechnology, and slightly less obvious in the social sciences, but even in technology research the interests of politics and the games of power play a critical, albeit invisible, role on the definition and unfolding of the research projects.

Besides the disagreement between the people involved, the problem spaces of research can also be characterized by uncertainty, either for natural reasons, or for reasons relating to the growing complexity and unpredictability of the social, economic, and political worlds we live in. A typical situation of uncertainty is illustrated by the so-called *wicked problems*, or problems that, because of their complexity and close dependence of multiple social factors, cannot be formulated [2]. The problem of the refugees is an example of a wicked problem. The process of solving wicked problems, which are increasingly common in contemporary organizations and societies, coincides with the process of understanding their nature: problem understanding and problem resolution are concomitant, with the information needed to understand a problem depending on the ideas that emerge for solving it. In this chapter, we will concentrate on complex problem spaces characterized by these two variables: disagreement and uncertainty.

2.2 From Explanatory Research to Projective Research

The acceptance of the distinction between the natural sciences and the design sciences, originally proposed by Simon in *The Sciences of the Artificial* [5], led to a distinction between two opposed, though complementary, kinds of research: explanations-oriented research and solutions-oriented research. For Simon, just as the natural sciences have been created to study nature, a new category of sciences, which he described as the *design sciences*, was needed to study the creations of man. In his elaborations on Simon's proposals, Jean-Louis LeMoine gave the name of 'projective knowledge' to the knowledge obtained through the design sciences [22]. He did so to stress the teleological character of this knowledge, which, unlike the 'objective knowledge' of traditional science, is better characterized by its 'project' than by its 'object'. The carved flint attributed to the prehistoric man had received its sharp contour 'in order to' cut or slice, and the computer was designed by contemporary man 'in order to' manipulate symbol systems [22]. To incorporate this dimension of meaning in our reasonings, we will refer to the two above kinds of research as *explanatory research* and *projective research*.

Explanatory research is the traditional kind of research. It produces laws, models, and theories that explain the world [6]. It has the aim of finding out why things are as

they are and of predicting how things will be. Quite differently, the aim of projective research is to produce artifacts to serve human needs and to find out how things ought to be [5]. Thanks to projective research, the process of developing a new – physical, intellectual, or institutional – artifact can be, today, a rigorous research project. The artifact may be anything that can be imagined and implemented by man: a curriculum model, a teaching approach, a medical practice, a healthcare system, a new device, a piece of software, an information system, an organization, a methodology. Projective research not only produces artifacts, but also advances knowledge and empowers its actors to intervene in contexts identical to those where the artifacts are developed.

The importance of the design sciences and of projective research has increased dramatically in the last decades, thanks to the pressure of agendas that are now driven, not just by the search of first principles, but also by economic and social needs [7, 23]. In traditional explanatory research, the criterion to assess the quality of research was scientific excellence, as judged by disciplinary peers. In solutions-oriented research, besides the inescapable requirement of scientific excellence, other criteria are taken into account, such as efficiency, usefulness, and the ability to fulfill the expectations of multiple stakeholders [7, 23]. This is particularly visible today in a substantial proportion of the public funding systems, which, besides the criterion of scientific excellence, impose several additional criteria that reflect social and economic priorities.

2.3 From Science-Generated Knowledge to Design-Generated Knowledge

In the 1970s, a vigorous debate on the nature of research broke out in the design professionals and researchers community. Since the 'modern movement of design' of the early 1920s, the design discipline had been converging towards the values of objectivity and rationality that characterized science. It was within this spirit that Le Corbusier declared in his 1923 manifesto *Vers Une Architecture* that "a house is a machine for living in" [24]. This aspiration to 'scientize' design was further strengthened in the 1960s, with the emergence of the 'design methods movement', which extended from products to methods the convergence between design and science [10]. Then, in the 1970s, a sudden backlash emerged, in what J. C. Jones described as a reaction to "the machine language, the behaviorism, the continual attempt to fix the whole of life into a logical framework" [9]. In 1981, some of the participants in this debate declared an open rupture with the traditions of science, stating that "the epistemology of science was (…) in disarray and (…) had little to offer an epistemology of design" [10].

Bruce Archer, a leading voice in this debate, stressed the differences between science and design. In the sciences, he pointed out, "there is no insistent demand that subjects for scientific enquiry should be confined to particular categories or that findings should be useful" [8]. On the contrary, "Design is directed towards meeting a particular need, producing a practicable result and embodying a set of technological, economic, marketing, aesthetic, ecological, cultural and ethical values determined by its functional, commercial and social context" [8]. And he added: "In contrast to the overriding importance of orthodox methodology in the conduct of science, the conduct of design is validated by its efficacy rather than the rigor of its methods" [8]. In the same text, Archer favored "a designerly approach, rather than a scientific approach" [8], in what marked

the distinction between two rigorous ways of knowing: *scientific knowing* and *designerly knowing*. In subsequent years, this distinction would be further stressed and clarified by other authors, namely Nigel Cross, who published in 2007 a whole book devoted to the subject [25].

This consolidation of an alternative way of building knowledge, besides the traditional ways of science, converges with the distinction between explanatory research and projective research. As will become evident throughout this chapter, designerly research, or design-generated research, is synonymous with projective research.

2.4 From Chains of Reasoning to Spirals of Evolutionary Learning

When we consider the design disciplines in the sense attached to the word *disegno* in the Italian Renaissance, from the Latin verb *designare* (to designate, assign a meaning to, destine, imagine a destiny for), we may describe them, historically and linguistically, as the disciplines of the conception of new systems, artifacts and solutions [11]. Unlike the traditional scientific disciplines, which rely heavily on the assumptions of certainty and determinism, the design disciplines, in their tradition of creating the future through tentative approximations, are particularly appropriate to handle ill-defined problems in situations characterized by high levels of uncertainty and disagreement. This is the reason why 'design thinking' is today so popular in organizational management and politics to handle problems of great complexity and uncertainty.

The aptitude of the design disciplines to reformulate problems adaptively, taking into account the tentative results obtained, was strongly present in the act of sketching that characterized the design activities in the early Renaissance days. The sketch, drawn at hand, was then the first outline of a world being imagined and created, which could, through a process of successive improvements, become a masterpiece. This spiral process of improvement in successive cycles is in sharp contrast with the linear, or chain process, of positivist science, where all realities, even the most complex, can be decomposed in "long chains of reasons, all simple and easy", so that, provided "one always kept to the order necessary to deduce one thing from another, there would not be anything so far distant that one could not finally reach it, nor so hidden that one could not discover it" [26].

The likely first connection between spiral processes and qualitative research was established by Kurt Lewin in the seminal paper that marked the foundation of action-research, which he described as "proceeding in a spiral of steps, each of which is composed of planning, action and the evaluation of the result of action" [12]. The epistemological richness of Lewin's action research spiral is that it breaks with the linear chains of reasoning typical of traditional science to embrace the recurrent dynamics of the design disciplines, where the construction of knowledge emerges as a form of emergent evolutionary learning [27].

3 The Philosophical Implications of Design-Generated Research

Since Kurt Lewin's adoption of a design-generated, interactive, multiple-cycle research approach [12], many other scientists have followed him, not only in connection with the

practice of action-research [11, 28, 29], but also by creating and putting into practice additional qualitative approaches to research, such as design science research [30–32], design research [33], design-based research [34], design experiments research [35], and other variations of these approaches. In order to explore further the innovative value of the combination between design and research, we will now analyze it from the point of view of the philosophy of science and inquire into the epistemological opportunities offered by exploring its layered structure in association with Karl Popper's critical rationalism.

3.1 The Four Key Questions of the Philosophy of Science

The epistemological strength of design-generated research can be better appreciated if we watch it in light of the four key questions of the philosophy of science [7, 13]: the ontological, epistemological, methodological, and axiological questions. The ontological question inquires into *what reality can be known* when we carry out research in this alternative way. The epistemological question looks into *what is knowledge* or *what knowledge we can get* in this way. The methodological question inquires into *how we can build that knowledge*. The axiological question asks *what is the worth, or value, of the knowledge we build* in this way.

From the ontological point of view, a design-generated approach fulfills the phenomenological hypothesis, according to which "we know the world by interacting with it in an emergent process that changes knowledge as we keep interacting" [7, 22]. This is radically different from the realist hypothesis that supports traditional science, which sates that "the reality we deal with is external to us, independent from us, and driven by immutable laws" [7, 22]. In other words, in traditional science, reality is out there waiting for us to uncover it. In design-generated approaches, we build reality as we progress.

From the epistemological point of view, a design-generated approach follows the teleological hypothesis, according to which "knowledge is what gets us to an intended result" [7, 22]. Again, this is very different from the deterministic hypothesis that supports traditional science, for which "knowledge is what we learn by exploring the causes of the problems we face" [7, 22]. In other words, in traditional science, knowledge clarifies the relationships between causes and effects and formulates them as theories and general principles. In design-generated research, knowledge materializes in the creation of physical, intellectual, or institutional artifacts.

From the methodological point of view, a design-generated approach follows two principles [7]: the principle of complexity and the principle of intelligent action. The principle of complexity states that "we build knowledge by recognizing the world as complex and in constant flux, embodying stability, change, chaos, and order, the whole exceeding the sum of the parts and the parts interacting in the shared, emergent and largely unpredictable construction of reality" [7]. The principle of intelligent action states that "human reason can transform intelligible representations of the dissonances to which it is confronted by creating responses in the form of 'intelligent actions' adapted to reduce these dissonances" [7, 22]. These two methodological principles differ radically from the two methodological principles of traditional science: the principle of analytical modeling and the principle of sufficient reason [7, 22]. The principle of

analytical modeling states that "to explain reality we must divide each difficulty into as many parts as possible and necessary to resolve it better" [7, 22]. The principle of sufficient reason asserts that "there is no effect without a cause and no change without a reason for change" [7, 22].

From the axiological point of view, a design-generated approach follows the principle of value inclusion and the principle of intrinsic ethics [7]. The principle of value inclusion states that "values have an essential role to play in the emergent process of knowledge construction" [7, 36]. The principle of intrinsic ethics asserts that "ethical behavior is constructed by each researcher in the persistent search for the collective good" [7]. Contrariwise, traditional science does not attach specific attention to the axiological dimension. As affirmed by Guba and Lincoln, traditional science sees ethical considerations as "confounding variables that cannot be allowed a role in putatively objective inquiry" [36], on the assumption that "ethical behavior is formally policed by external mechanisms, such as professional codes of conduct and human subjects committees" [36], so it does not need to be accounted for.

3.2 How Layered Research Accommodates Creativity and Accidental Discovery

The layered nature of design-generated research, where problem and solution are revisited recurrently, in successive approximations, offers a wealth of opportunities for research when combined with Karl Popper's critical rationalism [15], which rests on the recognition that "the growth of knowledge always consists in correcting earlier knowledge" and that the only one way of learning to unravel a problem "is to try to solve it and to fail" [14]. This means that, unlike the chains of strict cause and consequence of traditional science, that require every step of the chain to be exhaustively confirmed as correct before proceeding to the subsequent steps, the recurrent visitations of problem and solution in design-generated research tolerate the occurrence of failures in some of its intermediate steps. In fact, they assume them as natural ways of generating the divergence that sparks creativity and makes innovative solutions possible.

This tolerance of unexpected events and failure throughout the layered process is something designers have been valuing for ages: "to indulge in, or even provoke, opportunities for creative leaps that have little to do with rigor, only to recover at subsequent stages the rigor that had temporarily been broken" [7]. The implications of this fact are paramount, because they offer, apparently for the first time, a systematic way of accommodating into the research process concepts of critical importance for the progress of knowledge, which the traditional science has been unable to handle up to now: creative leaps, accidental discoveries, and bursts of intuition.

The concept of abduction, as proposed by Charles Peirce, is a key notion to understand the relationship between creativity and scientific discovery. Peirce saw abduction as one of the possible ways of dealing with scientific hypotheses, which he found to be, in many cases, a better alternative to induction and deduction. To abduct was, for him, to formulate hypotheses in exploratory ways, on the basis of incomplete evidence, before moving on to the scrupulous confirmation of these hypotheses [16]. He used the term 'hypothesis' in a broad sense, essentially to mean a 'guess' [15], or, using Popper's terminology, a 'conjecture' that waited to be confirmed or refuted.

Design is considered today an eminently abductive discipline. As put by Nigel Cross, "The more useful concept that has been used by design researchers in explaining the reasoning process of designers is that design is abductive" [17]. By resorting to abductive reasoning, the designer, or anyone reasoning as a designer, can do without the traditional inductive and deductive chains of reasoning and use abduction instead to enable the exploration of creative leaps and intuition. In principle, the exploratory hypotheses – or guesses, or conjectures – put forward by the researchers are likely to originate in solid evidence. However, since their scientific soundness is only to be verified at later stages, the researchers can freely incorporate insights induced by chance events, gut feelings, and creative leaps and explore them without any risk of blotting scientific rigor, provided they scrupulously attempt to refute them in subsequent stages.

This approach also lets us explain how serendipity, the faculty of making fortunate and unexpected discoveries by accident, described as one of the strongest contributions to the progress of science [18, 19, 37], can be rigorously incorporated in the research processes. It can also explain how incorrect knowledge can play a role in the development of science, as described by Umberto Eco in one of his essays on "the force of falsity" [38], where he shows how a number of ideas that today we consider false actually changed the world. Amongst those, he recalls that the misunderstanding of Chinese writing by Leibnitz, when looking for the mathematical awareness of Fu-hsi, led him to contribute to the development of modern logic. What Leibnitz did, we can now say, was to abduct from an inspiring piece of incorrect information and work on it so meticulously that he ended up discovering new and reliable knowledge that might have been unattainable in the absence of the incorrect detour that led to it.

The combination between Popper's critical rationalism, the layered nature of design-generated research, and the abductive nature of the design discipline offers us, in this way, a valuable path towards the incorporation of creative insights and accidental discovery into the research process.

4 Mapping the Space of Complexity in Research

The debate of the relationship between complexity and research processes may be easily approached if we recall Ralph Stacey's certainty/agreement matrix [20]. According to Stacey, the degree of contingency of a social system can be easily understood if we place it on a two-dimensional map that displays *certainty* against *agreement* (Fig. 1). The origin of the axis corresponds to maximum certainty about the issues at stake and maximum agreement between the stakeholders who run the system. The horizontal axis points from maximum certainty to maximum uncertainty. The vertical axis points from maximum agreement to maximum disagreement. Maximum certainty is seen as occurring when all the causal relationships in the social system can be known. Uncertainty occurs when the causal relationships cannot be known and the situations to be handled are unique or even unimaginable. The so-called *wicked problems*, mentioned earlier in this chapter, are examples of problems involving a high degree of uncertainty.

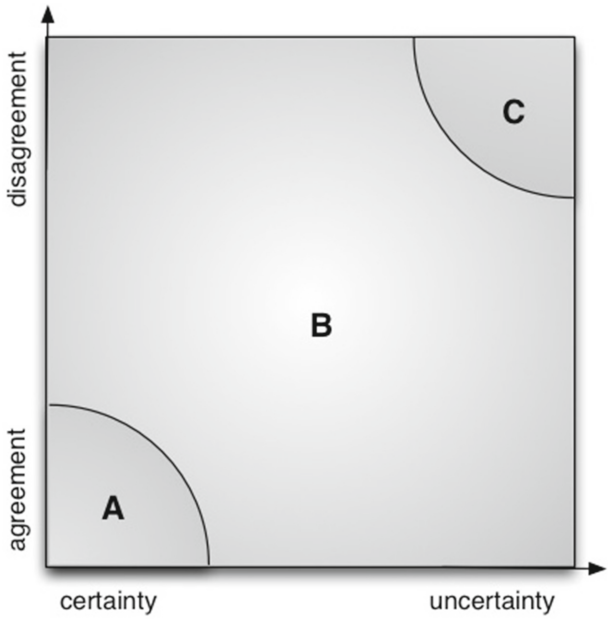

Fig. 1. Stacey's certainty/agreement matrix

In the matrix of Fig. 1, zone A, the zone close to certainty and agreement, corresponds to most of traditional research: causal relationships can be known, first principles can be established and confidently applied, and results can be safely predicted. Zone C, at the top right corner of Fig. 1, is a zone of maximum uncertainty and disagreement. It is the zone of absolute *chaos*, *anarchy*, and *breakdown*, which every organization and social system should avoid [20]. Zone B, the zone of intermediate certainty and agreement, the larger area in Fig. 1, is called the *zone of complexity* or *edge of chaos*. It is a zone where the causal principles of traditional research fail and intuition, creativity, idea sharing, and collaborative learning become essential to explore, discover, transform, co-create, and innovate. It is a zone where most of the problems are wicked, and where the search for solutions, outcomes, and opportunities requires concomitant cycles of problem solving and problem setting.

With this model in mind, we can now say that zone A, which is safely anchored in assumptions of certainty and agreement, is a domain of excellence for *quantitative research*. The uncertainty and disagreement of Zone B leaves little room for causality and uniformity, so it calls for research approaches more appropriate to complex environments, namely kinds of *qualitative research* that enable exploratory progress. This does not exclude, of course, the use of qualitative research in zone A, when the research questions at stake justify it, nor the use of quantitative research in minute neighborhoods of zone B where uncertainty and disagreement can be disregarded.

We also notice that zone A is ideal for focusing on *problems* that can be clearly formulated, while zone B is more appropriate for people to converge on *outcomes* or to discover or create *emergent solutions*. This orientation towards outcomes and solutions

rather than problems stresses the *projective* nature of the research approaches required for zone B. We can wrap-up by saying that zone A is ideal for traditional *science-generated research*, whereas zone B, as a zone of complex realities that must be grasped in their entirety rather than simplified, is more appropriate for *design-generated research*. Region C, as a zone of absolute chaos, is useless for research.

5 Rigor, Relevance and Validity in Projective Research

As the mission of traditional researchers became more and more centered on their contribution to the bodies of knowledge of their domains, their concern about the practical relevance of the knowledge they produced tended to weaken. Recognizing this paradox, Donald Schön initiated in the early 1980s a strong debate on the lack of practical relevance of much of the knowledge produced and published at the time [21]. This debate, which keeps being reignited from time to time, came to be known as the 'rigor *vs* relevance debate'.

5.1 Resolving the Rigor *vs* Relevance Dilemma

One of the interesting aspects of projective research, which results from the foundational philosophical principles described earlier, namely the principle of intrinsic ethics, is that *rigor without relevance is meaningless*. As explained before, most research projects are seen today as partnerships between scientists and stakeholders. For a partnership to be sustainable, it must lastingly fulfill the interests and motivations of all the parts [7]. With this in mind, we may define the relevance of a project as the value the project holds for its stakeholders. The key issue thus becomes, not that of deciding between rigor and relevance, but that of *making sure that all the relevance we create is created with rigor* [7].

5.2 Error Elimination Through Criticism

The rigor of projective research rests on the association between the philosophical principles stated earlier, the proposed design-inspired layered approach, and Popper's *critical rationalism*, which he synthesized in his Harvard lecture of February 1963 [14] in the following terms: "My whole view of the scientific method may be summed up by saying that it consists of these steps:

1. We select some problem – perhaps by stumbling over it.
2. We try to solve it by proposing a theory as a tentative solution.
3. Through the critical discussion of our theories our knowledge grows by the elimination of some of our errors, and in this way we learn to understand our problems, and our theories, and the need for new solutions.
4. The critical discussion of even the best theories always reveals new problems."

Of these four steps, Popper stresses that the most characteristic of science is the third one, *error-elimination through criticism* [14]. In projective research, as described in this

chapter, this requirement legitimates the adoption of emergent, cyclical, developments that combine safe steps with less rigorous abductive leaps and bonds. The only condition to be met is to make sure that error-elimination is exhaustively carried out after the less safe steps are taken [7].

Bearing in mind Popper's critical rationalism and the philosophical framework presented earlier, we may say that the eight tactics we have compiled elsewhere [7] to ensure rigor in layered research projects still hold. We reproduce them here, with adjustments for easier understanding:

1. A theoretical framework must be set at the beginning of the process. It is in light of this framework that new knowledge arising from the research will be identified.
2. The use of cycles is essential. In each cycle we should try to refute the emerging interpretation. Using several short cycles allows more opportunities for criticism. Cycles can be used within cycles, with larger ones spanning whole phases of the research program.
3. Research methodology, as well as the research questions, should be critically analyzed and refined in each cycle.
4. Data collection and interpretation should be a part of each cycle. This allows both to be challenged in latter cycles.
5. In each cycle, the researcher should focus only on agreements and disagreements, ignoring the idiosyncratic data. Apparent agreements should be tested and apparent disagreements explained.
6. Divergent data should be deliberately sought. This increases the chances that any piece of data or interpretation be challenged. Existing literature can also play an important role in this effort.
7. Multiple sources of information should be sought (or different perspectives concerning the same source) in order to create a dialectical process.
8. Results from changes introduced into the research situation should be used as additional sources of information for challenging emerging theories.

5.3 The Ethics of Obstinate Rigor

The principle of intrinsic ethics, in spite of its irrelevance for explanatory research, is crucial to safeguard the rigor of projective research. A main reason for this is that it becomes unethical not to pursue rigor to its highest standards. When writing about wicked problems, Rittel and Webber put it this way: "the planner has no right to be wrong" [2]. And they add: "(…) every implemented solution is consequential. It leaves 'traces' that cannot be undone. One cannot build a freeway to see how it works, and then easily correct it after unsatisfactory performance (…). The effects of an experimental curriculum will follow the pupils into their adult lives" [2]. It is probably no accident that the motto of Leonardo da Vinci, the greatest master of *disegno* (design) of all times, was: 'ostinato rigore' (obstinate rigor) [7].

5.4 The Issues of Validity

From the issues of rigor and relevance, we might now move to the issues of scientific validity. This is, however, an extensive topic that would not fit the space reserved for this chapter. It is interesting to notice, however, that the validity principles of most of the qualitative research approaches characterized by cyclical and evolutionary paths – such as action-research, design science research, design research, design-based research, and design experiments research – agree with the principles stated in this chapter. If we take, for example, the concept of 'pragmatic validity' asserted by van Aken for design science research [30], we notice that it fully agrees with our principles. This means that, following our principles, design science research can be safely used to address problems with high levels of complexity, unpredictability and disagreement, as well as to incorporate intuitive gut feelings, accidental discovery and creative leaps in the research process.

6 Conclusions

The main objective of this chapter was to contribute to a reflection on the nature of 21st century research that took into account the increasing complexity of our world. The chapter started by stressing the extent to which the consideration of complexity affected the nature of the problems we must deal with, the knowledge we must create, and the essence of the research we must develop. It stressed the attention we must attach today to the stakeholders involved, the growing call for projective visions of research, and the prospects of using the design disciplines as sources of inspiration for the consolidation of the new visions. It then discussed the implications of the philosophy of science on these visions, the key role of Popper's critical rationalism, and the opportunities offered by these visions to incorporate creative leaps and unexpected events in the research process. It went on by proposing a two-dimensional complexity space to help develop insights on the nature of the problems, outcomes and emergent solutions being studied and on the choice of research approaches to tackle them. Finally, it discussed the rigor, relevance and validity of the research carried out using the proposed approaches. The main threads of the arguments produced can be synthetized as follows:

- Explanatory research and projective research are two fundamentally distinct categories of research. Explanatory research explains the past and the present. Projective research creates the future. As the creation of the future invariably rests on the present and the past, explanatory and projective research generally complement each other.
- Explanatory research is limited in its ability to solve the growing number of problems that occur in complex contexts associated to uncertainty and disagreement. Projective research is particularly fit to handle these contexts.
- Explanatory research is limited in its ability to incorporate in the research process the occurrence of accidental discoveries, bursts of intuition and creative leaps. Projective research is particularly fit to explore this neglected dimension of the research process.
- Just as explanatory research is grounded on the traditions of the natural sciences, projective research is grounded on the traditions of the design disciplines.

- The rigor of projective research rests upon the epistemological opportunities offered by exploring its layered structure in association with Karl Popper's critical rationalism.
- When the abductive character of the layered research processes is explored, the advantages of their adoption extend to the incorporation into the research process of accidental discovery, intuition and creative leaps.
- If the degree of uncertainty of the issues at stake is plotted against the disagreement between the stakeholders intervening in the process, we obtain a two-dimensional space where we can gain insight on the nature of the problems, outcomes or emergent solutions under consideration as well as on our choice of research approaches to tackle them.

An overarching conclusion, aligned with this chapter's aim of clarifying how research can flourish in a world of increasing complexity, is that projective research, the design-inspired approach proposed here, is particularly appropriate to address both the ill-defined problems and the startling opportunities this world reserves for us.

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"Dilemmas" of Early Career Researchers from "Dilemmas" to Problems

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Abstract. Researchers, namely early career ones who start using qualitative research, may face what they call "dilemmas". These have different sources: uncertainties concerning the validity of their research and the reliability of the research tools they use; questions on how to review literature and systematize studies, some of them also qualitative, contextualized, and therefore, difficult to compare and aggregate; doubts about the best ways to collect, analyse data and interpret results; modes of interaction to share their research with readers; concerns about their role as researchers and their relationship with the study participants. The "dilemmas" underlying these issues converge towards the main question: what is reality? As a researcher, how do I perceive reality? In this chapter, I will try to argue that the "dilemmas" of early career researchers can be transformed into epistemological problems through reflection, in-depth study and then be solved. If "dilemmas" cannot be solved, problems can.

Keywords: Research · Qualitative · Dilemmas · Problems · Reflection

1 Introduction

Early career researchers face several "dilemmas", namely researchers on social sciences and humanities who decide to follow qualitative approaches to research. These dilemmatic situations are not only due to lack of experience of the researchers. These are mainly due to the complex and ill-structured nature of the study field. They emerge as different "dilemmas". Some relate to uncertainties concerning the validity of their research and the reliability of the research tools they use; others highlight questions on how to review literature and systematize studies (some of these are also qualitative, contextualized, and therefore difficult to compare and aggregate). A few have to do with the identification of ways to collect, analyse data and interpret results as well as modes of interaction to share their research with readers and make it visible and useful. They also evidence concerns about their role as researchers and their relationship with the study participants. All these "dilemmas" converge towards the essential question: what is reality? As a researcher, how do I perceive reality?

In July 2013, I had the opportunity to address this issue in the closing keynote of the Second Luso-Brazilian Colloquium on Qualitative Research, held at the University of Aveiro, Portugal. I realized that my message echoed in early career researchers. Some thought as if they were looking at themselves in a mirror and felt more confident about

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_3

the way to follow. Some developed concerns about the demands a researcher has to face, a feeling that can be positive and lead to a personal epistemic development. Therefore, I decided to write this text based on my keynote. I address it mainly to early career researchers. It can also be interesting to their research supervisors responsible for introducing and guiding them along the difficult tasks of scientific research.

2 From "Dilemmas" to Problems

Throughout my professional life as supervisor of research projects, namely master dissertations and doctoral theses, my post-graduation students approached me very often to ask for help because, as they said, "they were in a dilemma". Let me give you some examples: Can I use quantitative data in qualitative-oriented studies? Or can I not use it? I would like to be a participant researcher. However, should I not rather take the position of a detached researcher? In the report of my study, I hesitate between referring and ignoring those rather unethical aspects that I found in my research; what should I do?

In this context the term "dilemma" is obviously used at a common language level, meaning non-signalled crossroads leaving the traveller confused about where to go. It is the feeling of being lost, an expression very often used by the students: "Professor, please help me: I'm lost".

I will put aside the question of discussing which should be the attitude of supervisors in these situations, a matter that relates to research supervision. Although very relevant, it is out of the scope of this text. I will come back to the term "dilemma" to clarify the reason why I used inverted commas and to explain my view on these confusing situations in the development of the students' epistemic progress.

To be honest this is not the true meaning of "dilemma". The online dictionary of Portuguese language by Houaiss [1] includes the term in the field of Philosophy and describes it as a reasoning process that starts from contradictory and mutually exclusive premises and changes gradually towards a common conclusion. It implies a selection between two opposite alternatives (A and B) and ends up in a conclusion or consequence (C) that derives from A and B as well. In the same dictionary, we can read that, due to a meaning expansion, dilemma also refers to the need to choose between two contradictory and unsatisfactory alternatives. The same idea can be found in the Portuguese online dictionary [2] where the term is presented in the framework of logic, meaning a "composite argument with two solutions only, both of them difficult or inconvenient, what causes perplexity for an option". The same dictionary presents "alternative" as a synonym for dilemma.

The expression "Professor, I'm in a dilemma" should be interpreted as a difficult decision students have to make at a certain stage of their research and that they find contradictory, unsatisfactory and a source of perplexity. In order to highlight the use, or to a certain extent, the misuse of the term, I have decided to put it in inverted commas.

I would like to draw the readers' attention to my use of the phrase "at a certain stage of their research". My experience has taught me that some aspects that seem dilemmatic, difficult to decide about and almost paralyzing at a certain stage of the researcher's epistemic development, gradually change and end up as problems that can be identified

in their essence and in their constitutive elements and so, more easily solved. This was, in fact, the reason for the subtitle of my text: from "dilemmas" to problems.

A good definition of problem was more difficult to find perhaps due to the *nuances* that the word has according to the semantic field in which it is used. For example, the online Michaelis Dictionary [3] presents several definitions in fields ranging from Mathematics to chess although sharing the idea of difficulty or obstacle to be overcome through reflection, discussion and decision. If we give second thoughts to the issue, in the academic context any research starts with a problem, a gap, something one wants to know about, explain, apply or transform and ultimately overcome and solve.

Emerging from observations or from reflection on reality, the problem is formulated in the researcher's mind as inquiry questions that need answers. The more precise the identification of the problem under study, the less difficult to find the answers.

In this text I want to argue that most situations that initially seem problematic are indeed problematic situations that become clear through rigorous consideration, readings, dialogic interactions, reflection, advanced search - in a word: study. Indeed, is not a researcher a study lover?

3 A Lived Reflection

I myself have experienced that situation in 1978 when I was preparing my PhD in Education, in the United Kingdom. At that time, the academic culture assumed that any field of knowledge would only be credible if framed in the hypothetical-deductive scientific paradigm, involving identification of variables, objectivity in observations and data collection and generalized conclusions. My supervisor said that this was indeed the preferred paradigm but commented "things were changing" and suggested an article by Koehler [4] entitled "Classroom Process Research: Present and Future". This article influenced me greatly as it opened up my mind to another possible perspective, closer to reality and ecological.

I still remember my supervisor's words when we discussed the research paradigm that seemed more adequate to my objectives: "if you feel courageous enough to follow a more naturalistic, ecological, interpretative, more intensive than extensive…". Indeed, at that time a bit of courage was necessary because the examiners in doctoral *vivas* still argued for a more experimental, positivist perspective.

I brought this interaction to mind to explain that I myself experienced the same type of "dilemmas" that later on I found in my students. To overcome the feeling of being unable to decide between one or the other alternative, I tried to understand, as deeply as I could, the contours of the crossroads I faced, the epistemology underlying each approach, my position in relation to each of them and their implications for public knowledge – and for myself as well – based on the choice I had to make. What did I do? I studied a lot of research methodology. I became acquainted with different positions. I chose mine. The deeper I went in the study of the question that initially was extremely dubious, the more my apparently unsolvable "dilemma" changed into a problem with a possible solution.

As supervisor, I have very often found the same "phenomenon" in my masters and doctoral students. Nowadays the most frequent "dilemma" refers to quantitative versus qualitative research. In the end, it differs very little from mine, though it is expressed in a more up-to-date language.

4 Frequent "Dilemmas"

Based on my reflection on my experience as researcher and research supervisor I believe I can bring some contribution, some "food for thought". I can identify some of the "OR dilemmas" expressed by early career researchers and stress the idea that study, reflection and deep thinking are the way to get out of the dilemmatic situations we face. From now on, I will focus on the "dilemmas" that concern mainly the researchers who adopt qualitative studies. However, I would like to clarify that quantitative-oriented researchers share some of those as well and I will explain the reasons why. They are two. First, most studies are hybrid and we would rather talk about predominantly qualitative (or quantitative) and think of a continuous line of studies' typology, as suggested by authors like Miles [5]; Newman & Benz [6]; Niglas [7]; Silverman, [8]. (Interestingly in the discussion that followed my keynote, the expression quali-quanti was frequently used; I will come back to this later on). Second, because both situations share a common feature: being a researcher.

Let me now consider some OR-OR situations. I will begin by discussing the OR situation associated with the choice of approach expressed by the following question:

4.1 Qualitative OR Quantitative Approach?

It seems interesting to refer that in general most of my first post-graduation students (in the 1980s) chose the hypothetical-deductive quantitative-oriented paradigm, hoping to find cause-effect relationships. The following groups preferred phenomenological-interpretative approaches, mainly case studies supported by predominantly qualitative analyses. Since 2013, I have no longer supervised post-graduate research but I still keep in contact with post-graduate students in my university. I can affirm that this trend has persisted and indeed increased so much that the great majority of students takes for granted that their studies are qualitative right from the start. Moreover, this decision is so naturally made that it seems to me that researchers assume that research in the field of education has to be qualitative-oriented.

I am aware of the complex network of factors that influence human beings as well as their activity (some only known by them) and agree with Ganivet, a Spanish writer and diplomat who lived between 1865 and 1898 when he comments: "man is the most mysterious and intriguing of all objects that science discovered". I recognize how relevant it is to give voice to those "objects" now viewed as participants. However, I think it is very limited to keep to an approach since the beginning, whatever the approach, disregarding the possible alternatives that can help understand and transform the complex human world in which we live and that they have chosen as a research field. The starting point must be the problem, the question we aim to research, and the

objectives of the research ahead. Does it aim at knowing reality extensively or deeply? Does it aim at knowing only or does it involve intervention and evaluation?

I query myself about what I could name as a reductive philosophical and methodological simplification and leave the readers some questions for consideration.

Has one already taken for granted that the qualitative approach is the most adequate in the field of education? Does a new researcher know the perspectives and rationale of the quantitative and qualitative approaches? I would say no and with no surprise. He or she needs to study to enlarge his/her epistemic knowledge. Through study, he/she clarifies his/her "dilemma" and begins to understand that instead of a dichotomy there is a continuum in the approaches. Through study, he/she becomes aware that it is the mode under which the researcher questions reality that determines the objectives of the study and which methodology to follow.

Before the decision, many questions are raised. One of those questions is:

4.2 Is the Qualitative Approach Valued as Scientific OR Not?

In order to change this "dilemma" into a problem we have to go deep in the idea of science and the modes of working in science not only in different scientific fields but also in their interdisciplinarity. Additionally, once again, we need to define our personal position. Paradoxically, the idea of science is very subjective and so we have to take our own conception and be able to argue in favour of it. Boavida & Amado [9] can help us understand the concept of science, its epistemological evolution and paradigmatic crises as well as the themes concerning the "scientification" of humans.

The essence of science is the ability to identify problems and look for solutions, a process that implies a questioning attitude even if the questions seem meaningless. "This is the essence of science. Ask an impertinent question and you will find the pertinent answer" in Bronowski's words, an English mathematician and biologist who lived in twentieth century and became famous for presenting the TV program *The Ascent of Man* and wrote *Science and Human Values* after studying the effects of the atomic bomb in Hiroshima.

Which are the implications of being a scientist in the complex field in which we work focused on the human being? Have we been able to find pertinent answers to our impertinent questions? Have we been able to raise impertinent questions?

Another recurrent concern relates to the nature of data.

4.3 Exclude OR Include Quantitative Data in Qualitative-Oriented Studies?

It is quite common to think that quantitative data should not be used if the study is qualitative-oriented. I want to stress again that we should not think in dichotomous terms but rather in complementary ones. Besides, an approach is a holistic perspective. Data are components of the research process; they are related to the methodology to reach the objectives. The inclusion of quantitative data, due to their objectivity, is more evident and synthetic. I found a good reason for the complementarity of data in the words of a former PhD student who, when questioned by me, said: "the introduction of quantitative

data brought strength to what I have already discovered through the qualitative analysis". I can also cite the words of two well-known researchers:

"The distinction between quantitative and qualitative methods is often mistakenly taken to be the chief mark of distinction between the paradigms; in fact, the two dimensions are orthogonal. Either methodology is appropriate to either paradigm even though in practice there is a high correlation between quantitative and rationalist, on the one hand, and qualitative and naturalistic on the other" [10].

The quali-quanti issue becomes easier to understand if we distinguish between two paradigmatic levels: the philosophical and the methodological one. The first one has to do with questions about the vision on reality, its essence and nature; the second is oriented towards the mode of practising research. As Niglas [7] so well stresses, the relations between these two paradigmatic levels are not self-contained but can take multiple combinations.

The issue of generalising results is another of the commonly raised questions.

4.4 Generalise OR Keep Within the Context of the Study?

This question is indeed very controversial, yet very important and up-to-date because of the present awareness of the social value of knowledge or what I once called the teleological dimension of knowledge development [11]. This theme is frequently discussed in books on methodology. Not surprisingly, researchers aspire to the application of the results they obtain. In the educational contexts, they wish them to be useful to as many situations as possible. Then they would like that their conclusions could be generalised and, if possible, even universal, as science tends to be. However, this is very difficult to occur. Educational situations are unique, each one has a specific feature - as quite well experienced by those who have tried to organize experimental and control groups to test variables. Besides, due to the present trend to use case studies, which are, by nature, contextualised in specific situations, it becomes impossible to presume generalisation. This situation, however, does not imply that case studies should be disregarded. If they lose in extension, they gain in depth and level of comprehension. Besides, they may become exemplary stimuli to the analysis and reconstruction of similar situations according to the principle of critical transferability and mobilization of knowledge. In addition, as stressed by Yin [12], a renowned author of books on case studies, if these research modes cannot be subject to processes of statistical generalization, they can however bring interesting and useful contributions to knowledge construction through analytic generalization. This type of knowledge construction ("theory building") implies establishing relationships between the results of the studies and the theoretical propositions underlying them [12]; it can also involve more than one study, if they are based on the same propositions. In this situation, and because of their nature (case studies) it is important to take into consideration each case study specifications and their respective contexts, an issue I will come back to later.

The role of the researcher is a source of other "dilemmas"

4.5 Detached Researcher OR a Participant One? in Addition, How Do We Deal with the Relation Objectivity-Subjectivity in the Process of Data Collection?

It is very difficult to conciliate the principle of non-contamination of data with the wish to participate in order to gain a better understanding. It involves a very clear definition of the most appropriate type of role of the researcher in the research design. However, in order to be at ease with the question it is also very important for the researcher to know him/herself well and be able to identify the risks of contamination and bias. The question to be asked is:" will I have the ability to be objective in the collection of data and the interpretation of the results?"

Indeed, supervisors are quite often confronted with data - mainly with interpretations - influenced by an imaginary and desired reality rather than with the true reality and they have to raise queries to their students and remind them that there is a principle that cannot be disregarded when doing research: the principle of rigour.

It is easier for the researcher to be a detached observer. However, it is more interesting to be an implicated participant. In this case, the researcher should never forget that he/she is not a mere participant doing observations but someone that, as researcher, decides to participate. He/she is a researcher that participates, observes, and gets distance to make meaning of the reality without distorting it through his/her own vision, although we have to recognize that we are never neutral when observing. The researcher has to be very disciplined to be as neutral as possible. Sometimes researchers prefer to present their personal visions; if this is the case, then they should make it clear and explicit to their readers/listeners. I remember one of the difficulties experienced by my PhD student mentioned above. When interviewing the participants in his study on some topics he became aware that some did not mention some aspects that he himself, as participant researcher, had evidenced. "What shall I do?" he asked me in his perplexity. After deep reflection on this "dilemmatic" situation, he decided to make that information explicit (only when very relevant) but put the words in his own voice and not in the voice of the participants.

Research must be an ethical activity. Ethical questions are usually "dilemmatic". Let us consider some of them.

4.6 To Be OR Not to Be Critical of the "Gurus"? Identify OR Not to Identify the Participants?

Reviewing the literature is one of the steps in the research development. This process, which is very often of poor quality, is a demanding process of personal, creative authorship. The primary discourses (the authors' originals) are read, interpreted, aggregated and systematized in a second discourse (the discourse of the researcher doing the review); this second discourse must be coherent, meaningful, stimulating to the readers, respectful of the original thought, but not necessarily in agreement with it. This is the point of difficulty, namely for early career researchers. Sometimes they do not agree with the ideas of the recognized "gurus", but they doubt if they are allowed to disagree.

Again, a very deep consideration is necessary in order to identify the reasons of disagreement. If they are clear, then they should be presented and justified as this is the logic of autonomous critical thinking in search of truth.

Another question, raised by my student whose voice I have added to my text, has to do with the treatment given to participants. Should they remain anonymous OR should they be identified? It is quite common to accept that participants remain as anonymous. However, we can question whether they would not prefer to have the right to let their voices be heard, a question that comes up mainly when interviews are used. How can we solve this "dilemma", then? In most cases, a single direct question can help to solve it, but we can envisage situations that are more complex.

The "dilemmas" about the writing process cannot be forgotten in the present reflection.

4.7 A Very Descriptive and Explanatory Text OR a Synthetic One?

The preference, nowadays, goes to hermeneutic-interpretative studies, usually in the mode of case studies. This preference has influenced the writing of research reports, dissertations and theses. Very often they end up turning to extremely long, repetitive texts that become boring to the readers and stimulate them to stop reading instead of creating acceptability and interest. This may result from the highly contextualized nature of the studies, the great amount of data resulting from the use of several sources, the respect for participants' contributions and researchers' observations, the difficulty to systematize qualitative data, the lack of a discursive paradigm to report this type of studies, the researchers' uncertainties and their wish for rigour.

If we give second thoughts to what a scientific text is, some features come to light: explicit intentionality, pertinent but not excessive informativity, intertextuality to articulate relevant knowledge and, obviously, linguistic cohesion and intellectual coherence. To achieve rigour and precision in the analyses and interpretations, we have to add the liveliness of a piece of writing that attracts. In addition, it keeps the reader's attention. You should think about the prospective readers when you write. However, use the writing process to your own advantage and organize your mind. An organized mind is a pen that communicates well.

Still in relation to writing, another "dilemma" comes to my mind: "should I reveal OR omit the "dilemmas" I have experienced? This decision has to be put into context, considering the transparency on one side and the pertinence on the other.

We have now come to the concerns about the pertinence of the study, which is an issue very often expressed as follows:

4.8 Will My Study Be a Contribution to Knowledge OR Not?

"Is this study worth doing?" Researchers quite often question the relevance of their studies. This feeling occurs mainly when the research is coming to its end. What is the reason for the feeling that you are just adding a small, isolated, descriptive study with a low level of transferability? Sometimes we feel that the results are so obvious that it would not have been necessary to proceed with such a research to reach that.

5 A Leeway

I confess that there is a growing belief among many educational researchers that we are keeping too much to the descriptive level and that this will not take us as far as it should. Methodologies have to change as well as the ways to give visibility to the studies. I am firmly convinced that we have to be able to articulate and systematize the pieces of knowledge that are being produced. Therefore, in the last few years, I have developed an interest on literature reviews, knowledge systematisation and meta-analysis [13]. I have also confirmed this concern about the articulation of knowledge in a recent Conference on Education. I have even commented with some colleagues that I had not found new ideas in the Conference themes but that I was hopeful because I could testify a strong concern to proceed to good systematisations of knowledge – an essential step to go further in knowing and applying knowledge.

The systematisation of qualitative studies also raises some questions. I have in mind the adequacy of meta-analytical methods in relation to the systematization of results of qualitative studies and to the emerging concept and practice of meta-ethnography.

In 1976, Glass, one of the founders of meta-analysis, defined it as "the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings" (quoted in Davies [14]). This process consists of the accumulation of convergent results emerging from different studies and, on this basis, performs a deduction of generalised principles and results. The process follows a quantitative logic and is very often used, for example, to test the efficacy of medicines. The term started to be applied in the field of humanities and social sciences but soon it was perceived that the statistical treatments were rarely appropriate. The idea of "meta" is also obviously pertinent in this field; however, the quantitative methodology was questioned. Other processes and other names started to be used such as integration of results, qualitative meta-analysis, meta-synthesis, meta-study and more recently meta-ethnography. The systematization of research results in humanities and social sciences usually face problems that derive not only from the highly contextualised nature of the studies that are, in its great majority of qualitative nature, but also from their hermeneutic feature and the diversity of their methodologies. I remember very well the difficulty my research group and I myself experienced in a meta-analytic study [15] in the beginning of the present century; we wanted to compare studies but we very rarely found studies in same or very similar contexts. We faced the same difficulty when we compared methodologies because the authors used different methods and different names for the same type of methodology.

After having defined the concept of meta-analysis and mentioned the quantitative nature of its processes of analysis, it is now the moment to consider the meaning of meta-ethnography. It is a meta, super analysis process; based on an interpretative perspective, it involves re-interpretation of data rather than merely addition. The meta-ethnographic researcher is an interpreter, someone who gives a new configuration, reconstructs. He/she is a kind of translator who searches for and interprets the same phenomenon although the original studies had been performed in different contexts. In order to be rigorous and transparent, this process has many requirements. There is a need to rebuild the social and theoretical contexts of the original studies, organize problems and results

in themes, keep the structure of the relations between the concepts in different studies (sometimes with different names), re-interpret the perspectives of the original author without ignoring them. The meta-ethnographic researcher is a synthesiser who develops the "multivocal interpretation of a phenomenon" [16].

I cannot help transcribing here a comment made by our group about the study just mentioned. We expressed this idea in a paper we presented about our study: "a process that took us from analysts of other researchers' original texts to authors who reconstructed information in the original texts. On doing it, we reconstructed the previously produced knowledge, managed it and presented it at a more extended level and so, in a less casual and more interactively articulated way" [17].

This comment, made more than a decade ago, makes clear the awareness of the interpretation of the original studies and its use as a step to get to a higher level of knowledge: the level of systematisation.

As a synthesis, we could establish a comparison between the concepts and processes of meta-analysis and meta-ethnography. Meta-analysis follows a replication logic. Based on a great amount of studies, it determines the sum of parts and estimates means or results within the same interval. Meta-ethnography, on the other hand, has an integrative logic; it works in depth, focuses in fewer studies, does not use complex statistical analyses, but gives preference to the compared, contextualised analysis and the reinterpretation of original studies in their own context and in their relations with other studies. Both have in common the review of literature and the systematization of knowledge. As it happens with qualitative and quantitative approaches, they are not exclusive, but can establish multiple combinations.

6 Conclusion

Which message would I like to leave with this text? I would like to express my conviction that, through study, it is possible to transform the "dilemmas" of early career researchers into problems to be solved. In addition, I would like to remind my readers that questioning, advanced study, rigour and transparency are features of the profile of a researcher. In this context, I cannot help raising another query that quite often comes to my mind - even if I am no longer an early career researcher but belong to a community still in the pursuit of identity: are we managing to transform our persistent "dilemmas" into *in transit* problems with possible solutions and characteristics of a process of epistemological development?

My message also brings the idea that researchers must know themselves and reveal their position about the way they face reality, the modes of knowing it and what they want to do with that knowledge, i.e. their ontological, epistemological, methodological, dialogical and teleological positions.

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On the Quality of Qualitative Research in Nursing

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Abstract. This addresses three issues: 1. what is the science that we create? Recognizing the non-neutralization of the science and knowledge, we will address the theme from a dialectical and historical materialist way of seeing the world. Investigation is a social practice and science is a phenomenon involving processes. 2. What is the quality of this perspective? The primordial characteristics of quality are considered along their relationship with the phenomena of nursing. Qualitative research is suited to phenomena that are complex and intense or profound, and is the only way of expressing the parts of a whole, in a dialectic movement, reconstructing reality. 3. What is required to ensure quality in qualitative research? Qualitative research depends on the application of theoretical-philosophical fundaments of the object of investigation. The rigor across the entire process and knowledge in the state of the art of the subject being studied are fundamental.

Keywords: Qualitative research · Dialectical and historical materialism · Research ethics · Nursing · Collective health · Philosophy

1 Introduction

A complex theme like this can be approached in several ways. We chose to think about three questions that researchers should know before applying into qualitative research journey. The first one: What is the science we produce? The second question: Why develop qualitative research? And third, to ask: What we need to do to print quality to qualitative research? Finally concluding, we will highlight some reflections about research ethics or its humanize potential in the development research process and the contributions of Nursing in the development of qualitative research.

English version of Egry EY, Fonseca RMGS da. Acerca da qualidade nas pesquisas qualitativas em Enfermagem. In: Costa AP, Coutinho CP, Souza DN, Egry EY, Souza FN, Zarco J, Gómez MCS, Fonseca RMGS da. (Org.). Investigação Qualitativa: Inovação, Dilemas e Desafios. 1ed. Aveiro: Ludomedia, 2015, v. 2, pp. 75–102.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_4

Present on a round table[1] with several experts, each one from a different knowledge area, we imagine that our contribution to the debate could be about three features that help us to explore more deeply the quality in qualitative research. We are also aware that we will not exhaust the subject, nor will we cover all the possibilities that might be involved in a qualitative study, particularly because there is not one, but many different qualitative methods, depending on the references or world vision that the researchers adopt. The first point to clarify is which worldview belongs the research in order to avoid confusions or unnecessary comparisons between the philosophical references.

Aranha and Martins [1] affirm that science aims at cognitive values, but scientific work goes beyond that, necessarily imparting ethical and political values. The authors say that cognitive values must have characteristics that guarantee the status as a science: "impartiality, autonomy and neutrality" [1, p. 346]. The *impartiality* "is the conception that theories are rightly accepted only by virtue of manifesting cognitive values to a high degree according to the most rigorous standards of assessment, and with respect to an appropriate series of empirical data" [1, p. 346].

The *neutrality* of scientific knowledge occurs because it

> "Does not cater to any particular value, and their practices may be performed within any value scheme: they would serve no particular interest. That is, in the research process itself, moral and social values should not directly influence scientists when the goal is cognitive" [1, p. 346].

By *autonomy*, Aranha and Martins [1] understand that "it refers to the independent conditions of the investigations, because the scientific institutions should be (expected to be) exempt from external pressures for the production of unbiased and neutral theories" [1, pp. 346–347].

If the cognitive values give the impression that science is "outside" concrete time and space, ethical and political values place the scientist's activity as non-neutral. It's not about incoherence, say Aranha and Martins [1], "But from the recognition that the power of science and technology is ambiguous because it can be at the service of the flowering of humanity or only part of it. Hence the need for the work of the scientist and technician must be accompanied by reflections of a moral and political character, in order to question the ends that guide the means being used" [1, pp. 346–347].

By having moral and social values influencing research choices, the non-neutrality of science is admissible, and hence the construction of knowledge itself. This is the reason the scientists should not give up their social responsibility.

1.1 What Is the Science We Produce?

The Department of Collective Health Nursing from Nursing School of Sao Paulo University, where we belong, was created in 1987. Since the beginning, it adopted a dialectical and historical materialist (DHM) perspective as a philosophical reference, in opposition to the idealist-functionalism hegemonic both in the public health and nursing.

[1] Paper presented during round table in the 4o. Congresso Ibero-americano de pesquisa qualitativa. Badajoz, Spain, 2014.

In 1988, we published with Doctor Vilma Machado de Queiroz what would turn out to be the first article to apply DHM to nursing: 'Methodological foundations for nursing care, based on dialectical and historical materialism' [2]. In this article we sought to clarify the application of DHM to the process of nursing care in the primary health care, family nursing and nursing consultation.

A few years later, a more extended version of the MHD perspective applied to nursing resulted in a book titled "Collective Health: a New Method in Nursing" [3]. This work showed a theory known as Theory of Praxis Intervention of Nursing in Collective Health, known by its acronym TIPESC. We will briefly revisit TIPESC to better explain our ideas.

TIPESC is a nursing theory based on historical and dialectical materialist worldview which seeks the intervention of Nursing through a dynamic and participative methodology. It is the dynamic systematization of capturing and interpreting a phenomenon - nursing assistance or care - articulated to the process of social production and reproduction, referring to the health-disease of a given community, in the mark (or framework) of its conjuncture and structure, within social context which is historically determined it Is also a systematized dynamics of intervening in this reality providing nursing assistance and care, and in this intervention, continuing reinterpreting - evaluating the process and the product of assistance or care - to interpose again an intervention tool in the reality of the health-disease process of the individual, the family and the community (or social groups in the territory) [3].

TIPESC is also adopted as a theory and method in Collective Health Nursing, as a field of theories and practices that aims to intervene in socially determined health-disease processes of the community. In other words, the way in which each society organizes itself for the production of its existence is to divide people in large groups called social classes. Furthermore, the way in which each social class are inserted in the production process determine the processes of social reproduction, resulting in different qualities of life and therefore, in the different profiles of health-disease [3].

Additionally, TIPESC has roots in two philosophical bases: historicity and dynamicity. Historicity is anchored in historical materialism and characterizes the constant mobility of history, the continuous coming-to-be of social transformations. It is provisional, unstable, labile, imperfect and precarious. Rooted in, it is the vision of the unfolding of history that seeks the final cause and the great driving force of all important events in the economic development of society, in the transformations of modes of production and exchange, in the consequent division of society into distinct classes, and in the fight between them [3].

Dynamicity is embedded in the dialectical mode of thinking whose key concept is contradiction. The contradiction is the opposition between two incompatible poles, one denying and the other stating the same time and on the same thing. The dialectic to which dynamism relates is the materialist dialectic of Marx and Engels, in which contradiction is the very internal motor of development [3].

In summary, the philosophical foundations of TIPESC are in accordance with the understanding of historical materialism and dialectical materialism.

Subordinated to this historical and dialectical worldview, the theory base of TIPESC contains *conceptual categories* and *dimensional categories*. *Conceptual*

categories refer to the totalizing sets of historically constructed notions and ideas that must be understood as mediators in the understanding of the phenomenon upon which the intervention will accomplish [3].

For example, to understand the given health-disease profile of the population, it is necessary, first of all, to understand the theory that interprets health and disease, whether it is ontological or dynamic, idealistic or realistic. On the other hand, to intervene in the qualification of nurses in collective health, it is necessary to conceptualize the work process and to understand the current way of social production of a given society, assuming that societies are different from organization to production of people existence.

According to the dynamics of social transformations, each conceptual category undergoes a process of continuous and historical redefinition. The concepts most used in our health work nowadays are society, human being, health-disease process, collective health, nursing, nursing care, work, health needs, vulnerability and education. Currently, with the view of implementing the Brazilian Unified Health System (SUS), other concepts must be explicit, such as integrality, equity, accessibility, territory, social participation, and others [3].

Dimensional categories are conformed by the set of notions used in the operationalization's process of development of TIPESC. Because they are dimensional, they are not watertight and there is a continuous permeability between them. Three dimensional categories are fundamental to TIPESC: the totality, the praxis and interdependence of the structure and the particular and the singular [3].

Totality is the relation of everything within the part that allows the understanding of reality in its intimate laws. It also is the revelation of its necessary internal connections. Moreover, it allows revealing a process of totalization from the relations of production and its contradictions [4].

Praxis refers to the theory-practice dialectical unity [5]. In the Marxian sense, it is: "A concrete activity in which the subjects affirm themselves in the world modifying the objective-reality, and it transforms themselves in order to change it. It is an action that in order to delve deeper, it needs reflection and self-questioning of the theory also, it is the theory that refers to action which faces the challenge of verifying its accuracy and its mistakes, taking into account the practice" [5, p. 103].

The dimensional category *interrelation between the structural, the particular and the singular* allows illuminating simultaneously the different parts of the phenomenon and to expose the dialectic between the parts referred to the totality. The structural refers to the greater totality of the phenomenon, the particular is the mediation between the structural and the singular, and the singular is the smaller totality. In nursing care to the family of any given territory, for example, the nurse can verify the articulation of this dimensional category the family, object of caring process, is in the singular dimension. Particularly is the set of families of the territory pairs in terms of production and social reproduction, and in the structural are the populations of the collectivity, city or region, with different health-disease profiles. Even the production and reproduction profiles are different between large social group, they are united in a same structuring and social conjuncture of a given society and a given era. When intervening in a sphere of totality, the other spheres also may change [3].

With these theoretical foundations, the TIPESC must be developed in phases: capture of objective-reality (knowledge of the phenomenon in its historicity and its

situationality), Interpretation of objective-reality (explanation of dialectical contradictions), Project of intervention (with conceptual definition, objectives, methods, strategies, carried out collectively and with shared responsibility), Intervention in the objective-reality (execution of care and nursing care), and reinterpretation of objective-reality (process and product evaluation, seeking the contradictions in the execution of assistance or nursing care) [3].

Thus, the dialectical and historical worldview can properly illumine the field of nursing in collective health, where we have produced the knowledge capable of transforming objective-reality. The investigation is understood as a social practice and science as an in-process phenomenon where the understanding the meaning of the process becomes fundamental.

This chapter revisits several previously published texts, but we will only highlight the most significant articles:

(a) the first article, published more than 25 years ago in the Journal of the School of Nursing of the University of São Paulo, entitled "Search to evolve? Search to overcome!" [6]. In this article, we postulated the difference between the idealist worldview (and functionalism as its most fertile aspect applied for health and nursing) and the historical and dialectical materialism view that the Brazilian society movement of reforming health sector has adopted in opposition to the dominant functional-positivism ideology in health sciences, in our case, dominant in Nursing science;
(b) the second article, published in the same journal in 2001, entitled "A look at the nursing sciences: the analytical aspects of care practices" in which we thought about the categories of analysis of scientific research in the field of health and nursing. In this article, we suggested rethinking about the paradigms adopted in the research [7].

Never before the Japiassú's words [8, p. 70] and Demo's [9] seemed assertive about science. Japiassú criticized the science taught in universities, which had become an instrument in the hands of economic and political power, and in the "ideological coverage of the capitalist system where the dominant mode of production of scientific knowledge is the knowledge-merchandise". Demo [9], on the other hand, argued that research should fundamentally be understood as social practice and science as an in-process phenomenon, as in historical reality.

According to Demo [9], reality is in-process and being, so it contains historicity because of its historic, reality is not recurrent, nor is it static or harmonious; rather, it has numerous conflicts and it is in a permanent state of mutation, presenting relatively persistent in time in the dialectic of the enduring and the ephemeral. Based on Demo [9, p. 24], when the scientist wants to capture reality with outmoded theories, the thought process is destroyed since the in-process dialectic reality requires categories that are in process. Therefore, validity is not absolute and is precarious and in constant mutation.

According to Minayo [10], both historical materialism (HM) and dialectic materialism (DM) explain the major foundations of the process of social development. The in-process dialectic of reality will require an in-process body of categories, differently of the functionalism. In functionalism, the societies are systems with subsystems seeking

equilibrium and stability. For this reason, each society has its control mechanisms and everything that threatens this control is considered "deviation" or dysfunction.

The dialectic methodology is the most fertile for analyzing historical phenomena because it gives precedence to contradiction and conflict above harmony and consensus. It privileges change above stability, prioritizes movement, and the totality and the unity of the opposites [9].

The scientific investigation in collective health nursing is non-contemplative and non-universalizing; rather, it is a historical human activity and is able to transform the objective-reality. The health-illness process is socially determined and cannot be taken in social isolation since it is inherent to itself and to its own constitution.

Primordial quality characteristics will be mentioned below and their relation with the phenomena of Nursing. For some researchers, qualitative investigation is more concerned with qualitative aspects of reality, visualizing them as a priority, but it should be noted that within quality there is quantity in our way of thinking the world. The qualitative approach of investigation object is also appropriate for complex and intense or profound phenomena, and unique to get the articulation of the parts of the totality in a dialectical movement of reconstruction of the real.

1.2 The Second Question: What Is Quality?

Demo [9] presented the answer to this question in article called "On qualitative research: search for a balance between form and content". The author said, in the etymological aspect, quality comes from the Latin term *qualitas* meaning essence "Hence, quality refers to the essential element of things which is most important and determinant (…) the quality points to the central component of things and of beings, that is not consumed over time, remains forever, and determines what something is definitively" [11, p. 90].

"Quality refers to a horizon of *intensity* that goes beyond extension". Intensity is dialectically in opposition to extension, the first one pointing to the dimension of "better", and the second is pointing to "bigger". Intensity also relates to dimensions such as:

(a) "Phenomena that are not just about the superficial, but are marked by their profoundness, like love;
(b) Phenomena that react to extensive routines and therefore, always seek to be renewed, such as happiness;
(c) Phenomena that place a primacy in the dynamic of compromise, such as political engagement or militancy;
(d) Phenomena that bear witness to the fullness of human realization, such as sanctity;
(e) Phenomena that value human participation, more than mere physical or quantitative presence, such as community involvement, democracy or citizenship;
(f) Phenomena that express the valued dimensions of human beings, such as ethics, altruism, involvement, dedication, solidarity, etc." [11].

According to Demo [12, p. 7] qualitative research "was invented, in part, to recover the theoretical/practical link, to the shivers of positivist traditions, which still pray for the creed of neutrality and objectivity as well as universal validities".

Nonetheless, there is an inseparable unity between *quantity* and *quality*. According to the Law of the Dialectics "all phenomena have characteristics that are determined quantitatively and properties that arise from the collection of characteristics revealing their qualitative character (quality being the essential property of the material system). Every material system also contains quantitative elements (height, volume, weight, intensity and structural organization). Therefore, quality always exists with quantity, inseparably. Transformations exist first in quantity (evolution) and are prepared for qualitative transformation (a qualitative leap) [5].

1.3 The Third Question: What Is Required to Ensure Quality in Qualitative Research?

More than other methodologies, qualitative research depends on the exposure of the theoretical-philosophical foundations to the object of the investigation that will be captured by the method.

In other words, the process of knowledge is implied in the worldview that contains it.

The reflection on the knowledge process goes through the way the object of study is recognized, delimited and approached. From the production of knowledge in antiquity through empirical observation, to the use of methodological procedures derived from current scientific knowledge, This clipping is dependent on the way the researcher interprets the world around him, that is, articulating it to a certain theory of reality [13]. Thus, "all scientific knowledge presupposes a philosophical speculation about the problem of its determinants because there is a gap between the object of the investigation and its possible representations (…) so that reality becomes intelligible and it is structured and ordered by the human being according to his worldview" [13].

The worldview refers to "the set of principles, points of view and convictions that determine the attitude of the human being in relation to reality and to himself, the orientation of the activity of each concrete person, social group, class or society in general" [14].

The explanatory task of the world, that is, the elaboration of the worldview itself is the task of philosophy, which not being timeless, apprehends in thought its era. This means that the process of knowledge production is also determined by the way men organize themselves in society [14].

To ensure quality research we must pay attention to the methodological citation of defining properly the analysis' categories, clarifying the theoretical framework of reference closest to the object of research, finding and choosing correct analysis techniques, and detailing contextualization of the phenomenon in the historicity and dynamicity of the transformations. As in all kind of research, the rigorosity throughout the entire process and the knowledge of the state of the art of the subject or research problem are fundamental to ensure quality to the qualitative study. Finally, to further assure the relevance of qualitative studies is the ethics in its production process and dissemination.

A study conducted to define quality criteria for qualitative research in the field of health (COREQ) presented the most relevant aspects that must be followed in a publication. The article "COREQ - Consolidated criteria for disseminating qualitative

research: a 32 item checklist for interviews and focus groups" was originally published by Tong, Sainsbury and Craig [15].

The COREQ study sought to define the criteria for quality in qualitative research. It pointed to the most important components that should be considered in a publication. Since the publication is the result of an investigation, this means that many of the criteria require highlighting starting with the initial conception of the research project. In our experience as scientific editors in a nursing journal, we are able to confirm that articles especially from qualitative sources leave a lot to be desired in terms of rigor.

The study highlighted the formal interview checklist for in-depth interviews and focus groups since, according to the authors, they were the most common methods of data collection in qualitative research. Although the article was written so that the manuscripts can be better evaluated by high-impact scientific journals, it seems very interesting to highlight the attributes that should give transparency to the data collection process, in order to promote rigor, comprehensiveness and credibility of interview studies and focus group [15, p. 350].

Let us consider the main elements of these criteria in the chart below, copied from Consolidated criteria for the dissemination of qualitative studies (COREQ) Tong et al. [15] (Chart 1).

Chart 1. Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Domain	Guiding questions
Domain 1: Research team and reflexivity	
Personal characteristics	
1. Interviewer/facilitator	Which author (or authors) conducted the focus group interview?
2. Credentials	What are the researchers' credentials? e.g. PhD, Master's etc.
3. Occupation	What is the occupation of the researchers at the time of the study?
4. Gender	Was the researcher male or female?
5. Experience and training	What experience or training did the researcher receive?
Relationship with participants	
6. Relationship established	Was a relationship established prior to study commencement?
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic
Domain 2: study design	
Theoretical framework	
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis

(*continued*)

Chart 1. (*continued*)

Domain	Guiding questions
Participant selection	
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email
12. Sample size	How many participants were in the study?
13. Non-participation	How many people refused to participate or dropped out? Reasons?
Setting	
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace
15. Presence of non-participants	Was anyone else present besides the participants and researchers?
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date
Data collection	
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?
20. Field notes	Were field notes made during and/or after the interview or focus group?
21. Duration	What was the duration of the interviews or focus group?
22. Data saturation	Was data saturation discussed?
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?
Domain 3: analysis and findings	
Data analysis	
24. Number of data coders	How many data coders coded the data?
25. Description of the coding tree	Did authors provide a description of the coding tree?
26. Derivation of themes	Were themes identified in advance or derived from the data?
27. Software	What software, if applicable, was used to manage the data?
28. Participant checking	Did participants provide feedback on the findings?
Reporting	
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number
30. Data and findings consistent	Was there consistency between the data presented and the findings?
31. Clarity of major themes	Were major themes clearly presented in the findings?
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?

Several important aspects are shown in this study, especially those that should be explicitly described in the reports or in the manuscripts. We emphasize those that we consider indispensable to give quality to the qualitative researches:

(a) The environment in which the data is collected must be described in a way that clarifies why some questions are answered and some are not. The presence of nonparticipants at the time of the interview, when this is agreed between them, should be explicit because they may affect the opinions given by the interviewees or focus group participants;
(b) The characteristics of the researches should be explained in order for the readers to be able to understand and evaluate if the perspectives of different groups have been explored;
(c) The questions, the rapports and the ways in which the researchers were encouraged to speak should also be explicit; In addition the method of recording must also be informed. Accuracy of transcription is improved if participants confer their own transcription interview;
(d) Field notes should maintain contextual details and non-verbal expressions;
(e) In the analysis of the data the researchers must specify the multiple coders or methods of triangulation used. The credibility of the results can be evaluated if the processes of codification and the derivation and identification of the themes are explained. Researchers often use software that helps with storage, searching, and coding that must be made explicit;
(f) Obtaining an opinion from the participants about the results increases the validity of the interpretations of the researchers, because it ensures that the meanings and the perceptions of the participants are represented without being reduced by the expectations and the knowledge of the researcher.

Ethics in the production and dissemination of research also guarantees the quality of qualitative studies. In Brazil, the Resolution of the National Health Council, an instance of the Ministry of Health[2], (CNS 466/2012) updates the ethical research procedures involving human beings. All research must, therefore, be submitted to the Research Ethics Council (CEP) and cannot be developed without its authorization. Our experience has shown that authorization for research in our area has been submitted to the instances of responsibility for its development (teaching and research institutions) and also the fields of application of these (municipal health secretariats and health equipment).

There is also an important debate in the scope of the publication in the ethical aspect (or the lack of) that has been increasingly problematic: the problem of plagiarism, self-plagiarism and falsification of data. In addition, several mechanisms for searching for similar texts have been created. One cannot speak of the quality of plagiarized research, where there is dishonesty or appropriation without due recognition of other people's ideas.

[2] National Information System about ethics in researches involving humans and the National Commission for Ethics in Research (Brazilian Council in Research Ethics – CONEP), which are part of the National Health Council (Brazilian Council of Health – CNS).

All of this shows that changes in the way of doing science and in the very conception of science are more than welcome and necessary because as a human product, "Science can not progress without the freedom of criticism, debate, and the permanent confrontation of different points of view between researchers, both within the same social worldview, and between scientists linked to contradictory axiological and socio-political positions. The absence of such debate, the weakening or interdiction of criticism, can only lead, inexorably, to the sterilization of scientific thought, dogmatism, obscurantism and/or dimensionality" [16].

Besides this perspective of interaction between scientists amongst themselves, between producers and consumers of knowledge, it is necessary to recognize a greater ethical-moral duty that is the social responsibility linked to the development of knowledge.

In the words of Clara Cruz Santos, social scientist at the University of Coimbra, we gradually witness to the emergence of what we call a process of "practical scientific production". It calls for practice because it involves awareness of the need to intervene.

"Knowing to describe, characterize or categorize is no longer enough for the social scientist [here, as applied science, we consider nursing, especially collective health, in the field of sciences that approach social sciences]. He cannot be indifferent to the most urgent results of his action. It is not possible for him to reduce himself to the role of observer, especially when he is in possession of a formation and a deontological code that demands a social action, a form of approach to the exclusion. The constellation of social responsibility of scientific knowledge allows it to mobilize not only for the knowledge of the world, but also for the 'broadening of the capacity for intervention and participation of citizens' (…) and, consequently, to interpret the social responsibility of knowledge as generating new Theories, new forms of intervention that promote greater social justice" [17].

This is because to foster the deepening of the vision of reality it should seek the essence of phenomena in which the qualitative research may be the key to the production of a critical, emancipatory knowledge deeply committed to social transformation.

1.4 How Can Nursing Contribute to the Development and Improvement of Qualitative Research?

Nursing, by the nature of the object of its attention, has been advancing in terms of references on qualitative research that can contribute to other areas of knowledge since its advances are epistemological, methodological and philosophical.

Joana Latimer [18] published an interesting book titled "Advanced Qualitative Research for Nursing". This book contains perceptions of different authors and its aim was "to demonstrate how qualitative methodologies could produce rigorous and relevant understandings about nursing practice and relationships with patients" [18, p. 15].

The author claimed to justify the importance of the book by stating that qualitative methodologies "are often considered within the competitive world of health research as epistemologically inferior to more positive approaches". In addition, it characterizes nursing as being "a dynamic practice and offers methodological approaches that are themselves dynamic and creative".

We agree with the author, quoting Silverman [18] that: "There is an unwritten insistence that nursing research should be faithful to the humanist tradition that shapes most nursing theory. Consequently, the dominant qualitative tradition in nursing research is caught up in the demand for positive knowledge with extremely romantic notions of individual experimentation. The result may be an investigation that is sociologically naive" [17, 18].

A key characteristic pointed out in the book is that the qualitative methodology "Offers ways to investigate nursing while localized in sociocultural relationships while nurses and researchers are portrayed as people integrated in relationships with others. (…) The commitment of nurses and researchers to the other can not be taken for granted; On the contrary, nurses 'and researchers' relations are mediated by many social influences and cultures, in ways that nursing theory does not always admit" [18, p. 17].

So, otherness is a central concern for clinical practice and the development of appropriate methodologies for nursing research and health care. Latimer advocates that "By recognizing that nursing and research are both dynamic practices, changes everything: it means that time, space, and context have to be taken seriously; Means that nursing and research are interactive; Means that we are grounded in a research paradigm, which underlines the need for knowledge that helps us to predict, control and standardize dominant in health research" [18, pp. 17–18].

We agree with Latimer that some issues and dilemmas of qualitative nursing research should be emphasized:

(a) In a realistic approach made by Gerrish [19], the author Explores the tensions between the objectivity of observation as a researcher and the subjectivity of participation as a nurse in the production of nursing understandings and knowledge about the patients and their needs (…) One of the methodological challenges in the investigation of ethnicity is that the participants will respond in ways they deem appropriate in the context of how they perceive the ethnicity of the researcher in relation to his own identity [19, p. 22].

(b) Parker and Wiltshire [20] addressed another issue: when referring to the method of working with history and narrative, they argue that research that merely reproduces stories is seriously under-theorized. "Using a family care study, the authors present a particularly literary approach to narrative analysis that deals with voice, content, and structure. This approach […] helps explain why caregivers in similar external circumstances describe very different meanings and affective responses to caregiving" [18, p. 23].
This approach helps to "locate responses to care provision not merely as effects of an instrumental rationality, of personality, or of an unmediated choice. More than that, the responses to the care delivery are explained by considering the care provider as a social being that is constituted by a very particular socio-cultural context that he helps to achieve" [18, p. 24].

(c) There are inherent dangers in the analytic approach to discourse if it is "taken as a way to either consider the intention or present a stable or enlightened world image that is capable of perceiving reality beyond ideology" [18, p. 24].

(d) Margarete Sandelowski defends the importance of study of the nursing material culture [18, p. 26]. It is an opposing the almost exclusive use of verbal texts in qualitative nursing research, neglecting the richness of nursing cultural material. She gives an example regarding the telephone used in tele-nursing, that rematerializes the relations between nurse-patients and "May clarify how contemporary health care policy and practice are redoing these relationships. […]"; She explains "how ethnographic and fieldwork approaches contextualize the use and construction of materials by ways that enhance the interpretation of their meaning and effects" [18, p. 26].
(e) Another challenge is to investigate the performance of nurses in relation to multiple schedules, considering that nurses are involved in relationships, not one but in many others. It is suggested a methodology that approximates ethnographic and analytical methods that can enter into relations for "Demonstrate how they constitute much more than a patient-nurse dyad […]; demonstrating why patients need to be understood both as persons and as the virtual object through the practices of nurses and other representations of them" [18, p. 28].

In Brazil, we greatly appreciate the philosophical thoughts of Vilma de Carvalho[3], Recently she has published a book "Toward a Nursing Epistemology: Topics of Critique and Contribution" [21] which may help researchers understand what hovers around the quality of qualitative research, depending greatly on the in-depth understanding of episteme, method and theoretical and philosophical milestones.

According to Carvalho [21], the starting point for the researcher is a matter of personal position and intellectual posture for the construction of knowledge. From a philosophical and epistemological point of view, she says that "The greatest difficulty of researchers - in the case of Nursing - is in inferring amongst many methods and not the other; without knowing in fact which one is the most appropriate. Neither they know for sure which is the best theory of support nor support that should deserve the greatest weight in their studies" [22, p. 290].

The twelve propositions made by Carvalho [23, p. 144] continue to be updated when performing a tangency, explained by the author as - a scratch the surface - on the text "Theory - Why?" by Pedro Demo [23]. That is, when synthesizing and at the same time re-reading the author's work from the perspective of nursing science, states that:

(a) A good theory is essential to the practice, a good practice is essential to the theory; Theory and practice are dimensions of science.
(b) A good theory is an explanation of reality, it is the one that discredited an earlier, creating another way; It transmits typical moments of academic quality.
(c) A good practice is the lithic context of scientific activity, it is the field of the hypothetical game of science, it is the field of application of the results of theoretical construction.

[3] Philosopher. Nurse. and Emeritus Professor at the Anna Nery School of Nursing at the Federal University of Rio de Janeiro.

(d) Science, one of the ways of seeing reality, results from the theoretical necessity and the explanatory pretension of reality, in addition to the accumulation of facts and data.
(e) Reality is the unity of opposites - phenomena and essences - something that is not, all, nowhere; It escapes between appearances and hides behind the immeasurable horizon and appears with a thousand faces, which are disguises.
(f) Last word does not exists in science - there is no explanation that needs neither explanation nor explanation without criticism; Therefore, there are no finished theories.
(g) Explanation is only an instrument of correctness, since there is no expedient capable of closing the theoretical conception of reality with reality itself.
(h) Criticism is par excellence the instrument of explanation of theory. To criticize is to seek an explanation for every explanation. It is to reject a theory given as certain, with another that is proposed as the right one.
(i) The critical stance is the one that underlies the in-process vision of science and reality - an inexhaustible reality corresponds to a science in process of constant reformulation.
(j) Science is a version of facts - it does not directly work with reality, but with a theoretical and practical construction of it; The construct speaks through the mouth of theory, but derives from the conception of reality, and is influenced by it; Methodological rigor is necessary because there is no first or final evidence.
(k) The act of knowing can subsist on its own; In practice, it has a historical purpose and serves dominant interests; Because it is relative to the process of knowing, which is historical-cultural and comprises tradition, dominant interests and ideology.
(l) To do science is to fight appearances (naive immediacy, common sense) and try to approximate reality itself (to demystify manipulations and ideology of power)" [21, pp. 144–145].

However, even with all the scientific rigor of the method, we know that science is far from certain and definitive, because it derives from continuous movements of dialectical overcoming of previous knowledge.

2 Conclusion

The quality of qualitative research depends upon the adoption of a theoretical-philosophical framework that can include complex phenomena that are not reductive to simply numerical descriptions; the object being studied, and the degree to which it can be considered from a qualitative angle. The methodology and the methodological pathway should be chosen so that they can shed light on the phenomenon in totality-parts and ultimately reconstruct it synthesizing the contradictions that must be overcome. The rigor and the transparency in the theoretical framework and methodological pathway are indispensable. The rigor of qualitative methodology requires appropriate analytical categories and data analysis techniques. It cannot give up the in-depth analysis of the findings by means of inter-texts with the results of other broad

and current research. To ensure the quality of qualitative research is fundamental to expose the synthesis of the dimensions of the singular, the particular and the general; Ethics in conducting research and in returning results and dissemination. Finally, the quality of qualitative research depends on the production of knowledge that has a social manning for society and population of the territory.

Acknowledgements. The Authors would like to thank Mrs Vivien Rosenberger RN, BSN (Family Nursing Practitioner Student), USA, who kindly and efficiently reviewed the English version of this Chapter. Also would like to thank Dr Dulce Aparecida Barbosa RN, MNSc, PhD, and Associate Professor of Nursing Department of Federal University of São Paulo, Brazil.

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Foundations, Mishaps and Dissemination of Qualitative Approaches

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Abstract. This chapter addresses the foundations of qualitative approaches in humanities and social sciences, their historical development and their status of scientificity. It discusses the birthplace of hermeneutical, phenomenological and dialectical thought in Germany; its dissemination into France; the construction of the first empirical works in the Chicago School; the period of ostracism of qualitative research overshadowed by the hegemony of quantitative studies in the United States, especially in the aftermath of WW2; and the revival of the comprehensive theoretical and empirical perspectives from the 1960s. The author argues that qualitative approaches are currently a promising type of knowledge within humanities and social sciences, because of consolidated theories and a permanent review process; researchers organized in Congresses and University Departments; training books for new researchers; increased spaces in scientific journals; and critical approaches on the validity, reliability and possible universalization of research.

Keywords: Qualitative research · Qualitative approach · Comprehensive theories · Scientificity · Epistemology

1 Introduction

In this paper, I discuss the historicity, diversity, the construction processes and foundations that ensure scientificity and recognition of qualitative approaches in the universe of scientific literature in general and social sciences in particular, ending with a description of some hardships and internal contradictions of this type of knowledge.

It is worth remembering that qualitative research is a kind of research-oriented analysis of specific cases in their temporality and location, through expressions and meanings that people give to their thoughts, attitudes, behaviors and practices. The recognition of subjectivity, the symbolic, and relationships' intersubjectivity as parts of social reality are common aspects of all qualitative approaches. Moreover, all bring within the analysis an inseparable interlock between subjective and objective, social stakeholders and researchers, facts and meanings and structures and representations. Although it generally focuses on the microsocial universe and further study of human phenomena, it has a universal contribution to science.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_5

Without intending to carry out a historiography on the subject, I dedicate myself to think the qualitative issue in the construction of modern and post-industrial science, as well as the various denominations created from seminal research groups. For the purposes of this study, I shall refer to some authors who I believe are seminal in Germany, the United States and France and, more briefly, the Iberian-American and national production. I stress the importance of classics [1].

2 The Construction of Qualitative Approach in Philosophy and Social Sciences

2.1 The German Humanistic Thought as the Cradle of Qualitative Approaches

There is no doubt that Germany is the cradle of the foundations of qualitative approach to human experience in modern times. And the list of the most important thinkers are Hegel, Kant, Husserl, Heidegger, Dilthey, Gadamer, Max Weber, and more recently those who made up the so-called "Frankfurt School", namely, Adorno, Horkheimer and Habermas, among others.

In the "Phenomenology of Spirit" written in 1807 (1971), Hegel (1770–1831) [2] says that consciousness is born of experience. Authors such as Merleau-Ponty [3] consider that all the philosophical ideas of the last century referenced Hegel, even if that reference was used to relativize or challenge his ideas.

The theory of Kant (1724–1804) [4] dueled Hegel, noting that the crucial concepts of the human mind structure experience and are the source of morality in "Critique of Pure Reason". In this book, in the chapter on "Transcendental mathematics", the author points out that all phenomena have quantitative (magnitude) and qualitative (depth) and their understanding occurs when these two dimensions are synthesized.

Philosopher and historian Wilhelm Dilthey (1833–1911) [5] focused his work on the different ontological statute of historical and social sciences in relation to natural sciences. Dilthey insisted that social and human sciences are important not only as a logical construction, but also as a history-based reflective process. His works are based on hermeneutics and address human affairs by favoring the understanding and interpretation of individuals on social reality, including through art and poetry.

The end of the nineteenth century witnessed the works of two seminal German philosophers who would influence other thinkers and social scientists from around the world with their studies on the phenomenology, whose focus is the meaning of human being in the world. The first one is Edmund Husserl (1859–1938) [6], who wrote a treatise on pure phenomenology, in which he criticized historicism and psychologism, proposing a systematic foundation of what was conceived as "phenomenological reduction" (observation and description of the object within itself), a topic that generated much controversy in the philosophical universe, since it included a reflection on the world and human beings in the study of their essence. His theory was resumed, further studied and criticized by disciple Martin Heidegger (1889–1976) [7], with whom he shared the phenomenological thought, but introduced more dynamic understanding of human beings, showing that they are marked by history, culture and veiling and unveiling processes of the interpretations of existence. His best-known work "Being and

Time" is based on the hermeneutic tradition, thus, in the understanding of the individual and social life from the interpretation of the original experience of the subject.

Despite controversies about his person – we must remember that Heidegger flirted with Nazism, and was dean of the University of Freiburg in Germany during Hitler's dictatorship – the influence of his work became unquestioned in Western philosophy and science. Heidegger was the teacher of Hannah Arendt and Hans George Gadamer and influenced other important thinkers like Sartre, Paul Ricoeur, Merleau-Ponty and Bourdieu, among others.

The great contribution of Gadamer (1900–2002) [8] appears in "Truth and Method", a work in which the author summarizes his proposed philosophical hermeneutics: the meaning of history as the horizon of all comprehension where the interpreter's understanding is part of the becoming that stems from the very text he interprets. Gadamer says that all science is based on the historicity where the past is read from the present; pre-concepts are not a problem for knowledge, as proposed by positivism, but its condition; and language is a universal and preliminary element that also encompasses non-comprehension as one of understanding's issues.

It is important to note, in a more recent period, the strength and vigor of the thought of the "Frankfurt School", which had great influence on philosophy and sociology of the twentieth century, particularly in its second half. Among them, I point out, for the purposes of this reflection, Adorno (1903–1969) and Horkheimer (1895–1973) [9], Gadamer (1900–2002) [8], Habermas (1929 still alive) [10, 11]. More recently, Oevermann (1940-still alive) [12] put in an important step-by-step the proposed "objective hermeneutics" formulated by Adorno and Horkheimer.

Philosopher and sociologist Theodor Adorno and Max Horkheimer [9] were outspoken critics of American positivist and functionalist sociology. According to them, it excelled at method fetish (1981). Instead, these authors developed a comprehensive methodological approach of society and human beings, which they called "objective hermeneutics" in order to uncover the logic that exists between social reproduction and processing structures. Adorno and Horkheimer argue that science has to be comprehensive and critical and further analyze the themes studied, breaking the duplication circle from what the researcher sees with a naked eye. They considered the "subjective" as the object of analysis, but insisted on the need to escape from subjectivism. Their thesis is that its deepest sense is found in the text (and not out of it), and through it we can find understanding and contradictions of history and reality: "He who does not compare human things with what they want to mean, sees them not only superficially, but definitely falsely" [9, p. 21].

"Objective hermeneutics" is a term coined by Adorno and Horkheimer and was technically developed by Ulrich Oevermann, whom I quote through Vilela and Napoles [13] since I do not master the German language. In their work, not only do Vilela and Napoles [13] write a step-by-step, but also the logic Oevermann introduced in his proposal, following particularly the thought of Adorno and Horkheimer [9], an understanding that, in sociology, theory development and advance in knowledge can only be achieved through concrete analysis. Comprehension should be sought in the particularity of the object studied.

Thus, the theoretical models obtained in this process can be generalized. Oevermann [12] also repudiates the pretended objectivity called content analysis, which he says has become for many an operation to measure elements retrieved from data collection, transformed into categories of analysis and then subjected to regularity confirmation tests as a criterion to produce generalizations, as proposed by Berelson [14], Lazarfeld [15] and Lasswell et al. [16] and in some modalities described by Bardin [17]. In the hermeneutic vision, the content analysis that only favors the technique lacks the understanding of the meaning of texts.

Habermas [9, 10] is one of the thinkers of the Frankfurt School who is still alive. Among his theoretical contributions is the association between hermeneutics and dialectics, which he tries to perform in a debate with Gadamer [8]. Inspired by Marx [18], Habermas [10] introduces the issues of interest, contradictions and conflicts within the same comprehensive process, by saying that everything that is understood must also be criticized. Thus, he goes beyond Heidegger. The latter philosopher argued that there is a veiling effect in the very origin of human experience that is the mark of incomplete understanding and interpretation of the facts. Habermas extends the originating veiling idea to what happens in society, manifesting itself in the internal contradictions of any account. For in them lie the influence of interests, social position and domination. In his masterwork "Theory of Communicative Action I and II", Habermas [11] develops the thesis that contemporary society moves in systemic interrelations and socialization processes. The first, marked by technicality and a material reproduction system governed by instrumental logic (adaptation of means to ends), incorporated in the hierarchical relations (political power) and exchanges (economy). On the other hand, the world of life is the sphere of socialization, symbolic reproduction, language and networks of meanings that make up the world's view of the facts, the social norms and the subjective content, which, in turn, are marked by and mark the system's urgings.

From the perspective of sociological theory, the seminal author is also German, namely, Max Weber (1864–1920) [19], who is a classic of comprehensive sociology. His thesis is that human action in history is the core category of a sociologist's work: "*Action carries all human conduct, to the extent that the stakeholder gives it a subjective meaning*" [19, p. 110]. Weber's work dialogues with the hermeneuticist philosophers, it is strongly influenced by Kant [4] and Dilthey [5] and can be considered as anti-Durkheimian. Its importance is essential to qualitative research, because Weber has created a theory, developed concepts and applied them in his studies, countering the then ruling positivism and Marxism in the ways of interpreting social reality. The Weberian sociology of reality is essentially hermeneutic, since it proposes to understand, interpret and explain respectively, meaning, organization and sense of thoughts, feelings and actions, and even to achieve conduct regularity – as Durkheim [20] desired – but discussing institutionalization of practices as historically constructed human work.

2.2 Influence of German Philosophy in Some French Thinkers of Reference

Several French scholars suffered the influence of German comprehensive philosophy and sociology, among which I quote Paul Ricoeur, Merleau-Ponty, Sartre and Bourdieu.

These are authors of monumental works and I only briefly mention their connection with German philosophy and the comprehensive current of sociology.

Merleau-Ponty (1908–1961) [3] considered himself a pupil of Husserl [6] and Heidegger [7]. In his work "Phenomenology of Perception", he speaks of an embodied consciousness, whose reflectivity stems from body and sensations. He says that a human being discovers another and discovers itself in the other in its whole body and spirit, reaffirming the primacy of existence over the idea of essence. Merleau-Ponty states that Husserl and Heidegger joined the tips of extreme subjectivism and extreme objectivism in their reflections on reality and being in the world. Their concept of the world resumed by the author is about sensations and meanings that are reflected at the intersection of personal and group experiences, overlapping each other, making subjectivity and intersubjectivity inseparable.

Paul Ricoeur (1912–2005) [21–23] was also deeply influenced by Hegel, Dilthey, Husserl and Heidegger. The author established an important reflection on phenomenology and contemporary analysis of language through the theory of metaphor, myth and scientific model [22]. He studied and wrote about how someone's reality is shaped by his/her perception of world events. His concept of "action that is and remains a human legacy" is one of his great contributions to philosophy. In the aftermath of the Berlin Wall fall in 1989, he focused his reflection on individuals, otherness, solicitude and just institutions [23]. His moral philosophy also found powerful reverberation in the current thought and is reflected in the beautiful title of one of his last works, "Oneself as Another" [21]. His work has been recognized as a theory of the human person, on respect for others and reciprocity of human relationships. In his own words (1996): "Consciousness? How might someone still believe in the illusion of transparency associated with this term, after Freud and psychoanalysis? Subject? How could someone still feed the illusion of a last foundation in some transcendental subject, after the critique of ideologies made by the Frankfurt School?"

Jean-Paul Sartre (1905–1980) based his work on Husserl's phenomenology and Heidegger's "Being and Time". Much in the same way as Raymond Aron (1905–1993), one of the great French thinkers of the twentieth century, Sartre conducted part of his studies in Germany, where he further reviewed phenomenology. However, the central thesis of his work inverts the rationale of Husserl's thought: existence precedes essence, making him one of the existentialist philosophy exponents that also marked his political activism. Most of Sartre philosophical legacy is systemized in two books: "Being and Nothingness" [24], written in 1943, and "Critique of Dialectical Reason" [25], written in 1960.

Another author of reference is Bourdieu (1930–2002), who started his academic career with a work of great sociological and anthropological importance, namely, "Travail et travailleur en Algérie" [26]. Towards the end of his life, he wrote with several fellowmen "La misère du monde" [27], whose content is marked by strong empirical component and social commitment. He assimilated quite eclectic influences, among which those of Husserl, Heidegger, Merleau-Ponty and Max Weber, although works by Canguilhem [28], Bachelard [29], Claude Lévi-Strauss [30], Marcel Mauss [31] and Marx [18], among others, played a crucial role in his education.

Due to the lack of space, I shall refrain here from developing a deeper reflection on the French contribution to qualitative research, but not without recalling all the reflective tradition of social sciences in this country, which is expressed in Alain Touraine's studies [32] focused on the collective stakeholder; in the theories on the study of Daniel Bertaux [33] biographies; in Michel Maffesoli's [34] daily sociology; in Pêcheux [35] speech analysis method; in Luc Boltanski's [36] ethnographic studies; and in the works on social representations by Herzlich [37] and his group, among others. All tapped in at the source of sociology's classics, but especially in the principles of comprehensive philosophy, followed in sociology by Weber.

2.3 Chicago School - Cradle of Empirical Qualitative Research

When speaking of empirical qualitative research practice, the cradle is the called "Chicago School" in the United States, which, as German philosophy, had a strong influence in the country's academic world and abroad, especially in the first half of the twentieth century. Regarding the institution and the role of intellectuals at the time, I recommend readers a colloquial story told by Howard Becker [38], influential author of the second generation of sociologists from that University. Becker so relates:

> *There are at least two stories of sociology that need to be told […]. I shall speak first about practice, research methods and research conducted, because we should not take for granted that ideas are the driving forces or the main achievement of any sociological school. […] The history of sociology is not one of great theory, but rather great research works and large studies about society. The second is that of institutions and organizations, where the sociological work was carried out, because no idea exists by itself in a vacuum; they only exist because they are advanced by people who work in organizations that perpetuate them and keep them alive* [38, p. 177].

Becker's words refer to the reason why the Chicago School and its researchers have become so renowned. From the institutional standpoint, the unequivocal commitment to the city's population has been clear since its inception, and researchers have developed several research strategies to contribute to a better understanding of their living conditions and their worldview. The main motto of these pioneers was the understanding of social reality in an interactive process with the population.

> *We were much more eclectic in relation to methods than people we knew. We thought we had to interview, collect statistical data and seek historical information. We understood that, because most studies are conducted in Chicago, it was essential to understand the studied facts' context* [8, p. 178].

Biographical or life stories narrative strategies were built under this perspective, such as the classic study by William Thomas and Florian Znaniecki (1918) [39] on Polish immigrants in the United States; the ethnomethodological approaches developed by Garfinkel in 1937 [40], who prioritized observational knowledge and field presence; the symbolic interactionism coined by George Herbert Mead [41] to focus on intersubjectivity; and, among others, human ecology studies conducted by Robert Park [42]. It was also at this School, that the world's first sociology journal, namely, the "American Journal of Sociology" was launched in 1895. This journal remains one of the most influential in the field and, if it used to publish its teachers' sociological research results,

it has now become a sounding box of Western sociology as a whole, including critics to the practice of its own qualitative research. It also had a leading role in the establishment of the "American Social Science Association" in 1865, whose goal was described by Wright Mills [43] as follows:

> *In the second half of the nineteenth century, social science in the United States was linked directly to the reform movements and the improvement activities. The establishment of the "American Social Science Association" in 1865 was one of the last attempts to "apply science" to social problems without resorting to explicit political tactics. In short, its members sought to turn poorer people's problems into middle-class audience issues. In the first decades of the twentieth century, this movement had already been exhausted. (…) It did not follow through as the bearer of any middle-class radical ideology, concerned about reforms; its greatest pressure toward welfare became the limited concerns of social work, charitable associations, child welfare and prison reforms* [43, p. 94].

A second generation of scholars was fundamental to the continuity of the Chicago School project and, among them, I quote Howard Becker [38] and Herbert Blumer [44], who improved the concepts and practices of symbolic interaction; Erving Goffman [45, 46], who developed and worked with symbolic interactionism and total institutions' ethnography; and Eliot Freidson [47], who played an important role in creating the sociology of professions, especially medicine.

However, as from the 1930s, the Chicago group began to lose its leading role as a school of comprehensive and qualitative thinking. The expression "The School has spread worldwide and fled from Chicago" [38] has become common. On the one hand, scholars trained there carried to other campuses approaches they had learned in their education in sociology. On the other, the School of Sociology took another turn: it became a fertile field of secondary data studies and surveys, leaving qualitative tradition in limbo. Today, when we hear of "Chicago School", we immediately refer to the education of orthodox economists and monetarists who are total strangers to that which used to be the cradle of qualitative sociology and even farther from the political economy idea as conceived and developed by Marx [18].

Some conclusions should be made about the sociological cradle that has been fundamental in the history of science: first, empirical approaches have been developed in practice and drew a lot from anthropology, which was also consolidating itself as a discipline. As such, contribution by English anthropologist Malinowski (1884–1942) [48] who became the inspiration of the "how to do" for both anthropology and qualitative sociology has been crucial. In his methodological and analytical proposal, Malinowski taught to take into account not only action, but also the general information on the studied society, collective representations, the everyday life observable aspects and cultural intangible elements that are expressed in the daily life and individuals. His model of theoretical qualitative work preparation is, up to this day, a compass for researchers in the field.

The second point is that pioneers of the Chicago School were also influenced by hermeneutics and German phenomenology. It is noteworthy that Robert Park and George H. Mead were partly educated in German universities and had access to the hermeneutic, phenomenological thought and comprehensive sociology gestated there. I consider a symbolic fact that today, on opening the online homepage of the University of Chicago, which celebrates 125 years, a book is highlighted: "Hegel and The Birth of

Theory" by Andrew Cole [49], sealing the attunement of the two cradles of reflective (qualitative) social thought.

The third point is that it was noted that School's strength lied in its comprehensive, contextual and social commitment view. This work ethos meant that researchers did not produce a creeping and bureaucratic discussion on the studied universe, but rather a complex and engaged sociology. Becker recounts this adventure yet again:

> *For a long time, every decade following completion of the census, the Department of Sociology published what was then called the Local Community Fact Book. In this book, covering all Chicago's communities, as defined by the census, each community received two pages of basic information extracted from the census statistics, including issues such as juvenile delinquency, crime, health data, everything there was to know about a certain field, such that, also, when someone was willing to study a particular field, it sufficed to grab the book and, with data from the last forty years, have a historical and statistical overview of all that had happened in that region; it also contained information on ethnicity* [38, p. 180].

As a reference author, we cannot forget the contribution of Alfred Schütz (Vienna, 1899–New York, 1959) [50], who first worked at the University of Vienna and, due to Nazi persecution, migrated to the United States, becoming a brilliant professor at the New School of Social Research, New York. He made a particular reading of philosophical phenomenology and Weberian sociology, developing a monumental work, which he called "social phenomenology". He established theoretical parameters and operational concepts guiding the researcher's foray in qualitative research. The importance and magnitude of his work are synthesized in five volumes of his "Collected Papers".

3 A Brief Reflection on the Current State of Qualitative Research

We can never forget that theories and methods have to do with the reality of the world, so their rise and fall are historically linked to the development of societies.

After a few years of vigor, which coincided with the first three decades of the twentieth century, since then, qualitative research suffered a long period of ostracism in its cradle, namely, the United States. This stage already emerged in the early 1930s and continued until the 1960s among scarcer publications, increasingly criticized method imprecisions and functionalities, reduced number of papers and shrinking of the proposed legitimacy. In particular, immediately after WW2, philosophy and positivist practice accompanied and supported the American economic, cultural and scientific hegemony and the political resurgence of the Western world [51, 52]. The social issue seen under the perspective of stakeholders' interests remained in the background. Most social scientists who began to prioritize quantitative approaches in sociology criticized that qualitative research lacked efficiency and effectiveness to analyze and evaluate social issues that United States and Europe had to face in their new historic moment.

Thus, the comprehensive perspective in which the subject is the focus of social life became counterhegemonic. The symbolic document of this decline was the doctoral thesis of Samuel Stouffer in 1931 in the very University of Chicago [53], in which the author compares quantitative and qualitative approach, clearly favoring the former, which is more accurate, objective and applicable, in contrast to the qualitative studies

mentioned by him as expressions of opinion about the reality or, sometimes, as a botched journalism.

Of course, the avalanche of merely descriptive and explanatory quantitative studies always had important critics, among which I quote Wright Mills in "Sociological Imagination" [43] and Adorno and Horkheimer [10]. The following sentence is from Wright:

> *Lately, the concept of social science, which I defend, is not predominant. My conception is opposed to social science as a body of bureaucratic techniques that inhibit research with their methodological claims, congesting this work with obscurantist ideas or vulgarize them, concerned with minor problems, unrelated to issues of public relevance. Such inhibitions, obscurities and vulgarizations stirred a crisis in current social studies without at least suggesting a way out of it* [43, p. 29].

These authors exposed the theoretical weaknesses of an American sociology that most favored (quantitative and statistical) method than questions about reality, reflection and criticism and interaction with groups and society.

In the 1960s, a new effervescence phase started in the scientific field throughout the Western world, following an environment of questioning and social changes, counterculture and student revolts. In this context, there was a revival of comprehensive approach and qualitative research as part of the convergence of various theoretical proposals and social movements. Of course, there is not and there has never been an abrupt break in relation to conservative theories strong enough to remain dauntless in their propositions. However, we can say that questions welled up in synergy, and a new time came for comprehensive sociology and qualitative research, which emerged stronger and stricter in the compass of several simultaneous social movements. Among them are: discontent of the intellectual world vis-à-vis science as it was being practiced; student outrage against traditionalism of Western universities and their distancing from the real needs of populations; the oil crisis that led to the increased environmental movement worldwide and whose theoretical and methodological ecosystemic parameter required citizen engagement; feminism's cultural wave that increased women's rights, the gender concept and the development of participative methodologies for addressing issues; broadening of the so-called fourth generation rights, which led to the consideration of the life cycle specificity, the appreciation of specific ethnic groups and social segments, such as homosexuals and the disabled [53].

This was an historical moment of intense questioning on the major theoretical accounts of social reality – of which positivism and mechanistic Marxism were symbols – on social, subjective and environmental reality; they could not cope with the social world's pluralization anymore, growth of individualization and biographic construction methods, subcultures and life styles and ways [54]. Herbert Marcuse [55] carried out this critique brilliantly in his work "One Dimensional Man" written in 1964. Disenchantment with macro-theories eventually opened a growing space for local, temporal and situationally defined approaches, dialoguing with an exponentially larger and more complex literature.

The new change context was also marked by the acceleration of knowledge and techniques in microelectronics, information, computer science, communication and advancement of rights claims, global interactions and interdisciplinarity in both science development and innovation. Since then, in the so-called Cultural Revolution track,

qualitative research gained more relevance, while remaining counter-hegemonic. It is now recognized as a scientific approach to the extent that well-designed robust theoretical and methodological parameters and open to various formats and interlacing prospects were being established in its core [50, 54, 56–58].

An open and comprehensive view of social sciences started to be shared by many of the most prominent social scientists of our time, such as Giddens and Turner [51], Wallerstein [59], Geertz [60], Denzin and Lincoln [57] and others. Their works also show a blurring of disciplinary boundaries while stressing that some topics continue to challenge us today as yesterday, such as the relationship between structure and subject; the role of individuals in history; the institutionalization of practice; the role of culture and representations; social changes; and which social and other scientific changes require new approaches [59]. This set of questions expressly studied by classics, establishing theories, concepts and methods to address them is, yet again, before us and require a renewed glance, never limiting its reading to a mere and sterile scholarly exegesis, nor just reinforcing reflections on a specific period of time which do not make sense in another.

Regarding qualitative research in particular, a meaningful configuration of the *field*, *habitus* and *symbolic capital*, understood here as proposed by Bourdieu [61, 62] can be observed. This dynamic occurred in at least three directions: (1) further theoretical and methodological [54, 56, 58, 60]; (2) Internal organization and expansion study: we are now in the 12th International Congress of Qualitative Inquiry and 5th Iberian-American Congress of Qualitative Research; as far as I know, there are at least two specific journals in the field with international circulation: Qualitative Research Journal and Qualitative Health Research. Not least important, there are now more recognition and space opening for publishing papers in journals such as The Lancet, British Journal of Medicine, among others of highest impact on world science [63]. Some magazines are also published in Brazil and internationally indexed that have been instrumental in disseminating qualitative approach, such as the *Ciência & Saúde Coletiva*, *Cadernos de Saúde Pública*, *Interface*, *Saúde e Sociedade* and others [63]. There are also, allowing theories circulation and further studies, methods and techniques, a specific training center, namely, the International Institute for Qualitative Methodology, Alberta, Canada, as well as books and articles that coordinate comprehensive approaches; (3) Increased use of the approach in various fields of knowledge such as sociology, education, health sciences (medicine, nursing, physiotherapy, physical education, dentistry, psychotherapy and psychiatry), psychology, linguistics, assessment, social service, administration, education, public safety, among others.

In the Brazilian scientific production, it is worth mentioning some names that had and still have influence on the use of a qualitative approach in the country. In chronological order of their contributions, I recall first social scientist Luiz Parga Nina, who has coordinated the Brazilian Institute of Geography and Statistics (IBGE) since 1974, alongside the statistical surveys of the "*Estudo Nacional sobre Despesas Familiares*" (National Study on Household Expenditure), a qualitative research based on local researchers' field notes. The empirical work was carried out throughout 1974, and its analysis comprises three volumes called "*Informações não estruturadas sobre as despesas familiares dos brasileiros*" (Unstructured information on Brazilian Household

Expenditure) [64]. Its disclosure had very negative impact on the military government at the time, because it evidenced the face of poverty, malnutrition and hunger grayed out in the cold statistics and were not of interest to authoritarian triumphalism. The military ordered the incineration of these books. Some copies survived, hidden at the researcher's home, but censorship minimized the investigation's deserved impact. All this pioneer story is told in the work: "*História das Estatísticas Brasileiras"* (History of Brazilian Statistics) [65]. It is important to listen to someone who participated in the work at the time:

> *Researchers followed the daily life of a family for seven days, collecting information about their living conditions. The standard form was composed of 25 fields to be completed, which should describe in detail the various aspects involved in the household's budget. Eating habits received special attention, recording information on family diet during the observed period and food costs. Each meal was also weighed, as well as its leftovers and an assessment of their nutritional values. In addition to food data, expenditure with medicine, health care, domestic services, clothing, housing, public services, education, leisure and acquisition of assets (furniture, electronic equipment, real estate) was described and quantified. Economic activities and the income of family members were also recorded, as well as records on goods produced in the household and on the flow of exchange, that is, factors that produced non-cash income* [66, p. 23].

I emphasize two points in this study: first, it was conducted in the most unlikely place, the Brazilian statistical sanctuary, namely, the IBGE, triangulating quantified and qualitative information, since institutional authorities, at the time, understood the in-depth knowledge on national reality as an IBGE's mission. The second highlight is its scope, since it gathered a collection of hundreds of field reports written by IBGE local researchers. Although these investigations were abandoned, they show the wealth and possible combination of data's magnitude and depth. They also question myths that only very localized studies would be meaningful in qualitative approaches. Between 1981 and 1985, Parga Nina performed, much in the same way, another study "*Configurações de situação de pobreza*" (Poverty situation settings) in the territory of the city and metropolitan area of Rio de Janeiro (RJ), funded by the Ministry of Planning and conducted at the Pontifical Catholic University of Rio de Janeiro. I had the honor to participate in all its stages. This three-volume work remains unpublished, as there was no great interest from sponsors to publish it. In short, throughout his career as a social researcher, Parga Nina believed that qualitative constructions bring a wealth of another nature vis-à-vis the statistics: they show the human face and experience dynamics and poverty reproduction from the very rationale of the poor [19, 50, 67].

Then, I mention Menga Lüdke and Marli André [68], who published in 1986 a small book titled "*Pesquisa em educação: abordagens qualitativas*" (Research on education: qualitative approaches), introducing the topic in pedagogical practice. Their influences come from both French literature and American qualitative sociology. I mention then Teresa Haguette [69] from the Department of Sociology and Philosophy of the University of Ceará, who, in 1987, published a pioneering book *"Metodologias qualitativas na sociologia"* (Qualitative methods in sociology), inspired by the masters of the Chicago School, especially the development of symbolic interactionism. Another name is Joel Martins, who established, in 1989, the Studies and Qualitative Research Society

in São Paulo, where he developed the qualitative-phenomenological thought in education, influencing generations of teachers, inspired by Husserl, Heidegger, Merleau-Ponty, Paul Ricoeur, William Thomas and F. Znaniecki. Finally, Maria Cecilia Minayo, who published, in 1993, *"O desafio do conhecimento: pesquisa qualitativa em saúde"* (The challenge of knowledge: qualitative research in health) today in its 14th edition [58] and translated into Spanish (already in its second edition) [70], bringing various trends of qualitative approaches and possible triangulations of techniques and methods to the health sector.

The presentation of empirical qualitative approaches to the Brazilian scientific community is fairly recent (the 1980s, with the exception of those by Parga Nina, which date back to the 1970s). Since then, comprehensivist thought and practice have intensified and consolidated in the most different theoretical and methodological formats (hermeneutics, phenomenology, symbolic interactionism, ethnobiography, life history and oral history, participatory or action-integrated approaches) and in several areas. Many publications have been produced and shared among Iberian American researchers, as is the case of the two-volume work organized by Francisco J. Mercado, Denise Gastaldo and Carlos Calderón "Paradigmas y deseños de la investigación cualitativa" [71] and "Investigación cualitativa en Salud en América Latina" [72], which gathers over 60 authors from different Spanish- and Portuguese-speaking countries and several currents of thought. Another more recent Iberian American book was coordinated by Maria Lúcia Bosi and Francisco Mercado, namely, Avaliação qualitativa de serviços de saúde [73] (Qualitative evaluation of health services). All these efforts that are also reflected in scientific articles and thematic issues in indexed journals show the internalization and internationalization of the approach and the setting of a field of theoretical and methodological reflection and practical application in several different fronts of national social and human studies.

4 Conclusions

Briefly, I would like to end this reflection highlighting some points:

(1) I need to make amends for several limitations of this paper. I have not mentioned here anthropology – unless when I mentioned Malinowski and Geertz inputs – because, since its inception, it is the discipline par excellence geared to comprehensive studies in which any social scientist seeks an inspirational source. However, as Wright Mills [43] reminds us, many disciplinary boundaries are fictitious and improper. I intended to show how this approach was created and developed in social sciences as a whole, and particularly in sociology. The second limitation refers to names and authors' works. Indeed, many of considerable importance have been left out. Of those mentioned, only a few works were referenced due to the paper's objectives and editorial restrictions.

(2) I also want to reaffirm the key role of comprehensive philosophy of hermeneutic, phenomenological or historicist nature as an inspirational source and foundation for sociology, anthropology, social psychology and other fields constructed in the Western world from the second half of the nineteenth century and during the

twentieth century. I also wish to emphasize that, in the twenty-first century, despite the unequivocal social change and advances on all knowledge fronts, understanding the human being and his life in society remains as important and crucial as before.

(3) There is a consensus among many theorists [43, 51, 59] about the fact that disciplinary divisions that arbitrarily separated areas such as sociology, anthropology, psychology, political economy and history (among others) are increasingly diluted, from the understanding that human and social sciences' foundations are heuristic devices that should make it possible to find the intelligibility of the universe of human constructions, with inputs that each can offer.

(4) The history of qualitative research as we know it today dates back to the late nineteenth century and early twentieth century, and this memory can be retrieved in various parts of the world. Therefore, it is important, for those who practice it, to understand that they are part of a saga, a humanistic line that believes it is possible to understand and interpret the individual located in history, in his/her own biography and own social world, as it is also possible to understand and interpret social reality analyzing it as an objectified human action.

(5) While there are many names and proposed qualitative approaches and different techniques for achieving both empirical work and text interpretation, there is only a single foundation of this field of knowledge, which is its comprehensive, contextualized, interpretive and dialectical character [74, 75].

(6) The qualitative researcher has some ethical attitudes: (a) consideration that his/her subjectivity and who he/she studies are part of the very reality of the understanding process and also the object of investigation; (b) understanding of the reciprocal effect and reflectivity of any qualitative study; (c) understanding that all qualitative research is intersubjective and never neutral, although it should always strive for objectification through the proper use of each methodological step of the investigation process [74, 75]; (d) accepting the various perspectives of the studied group; (e) valuation and inclusion of participants' knowledge and practices; (f) understanding that respondents have different views and practices because of their social perspectives and personal history; (g) awareness that the researcher has the burden of second order of interpretation [50], but always from his/her own primary material.

(7) Comprehension – core substantive of qualitative research – predates interpretation (Heidegger 1980), although based on the narrative originally interpreted by the respondent/interlocutor's experience, which Schütz [50] calls first-order construct. The investigator should ethically respect and try to understand subjects' viewpoint and the contradictions and conflicts brought by their narrative.

(8) Interpretation should be made based on the reports and texts and not outside of them, through speculations and fragmented theories. The researcher must, through a cross-sectional analysis of findings and backed by relevant literature (second-order construct [50], find a reality that transcends the individual or common sense discourse, giving rise to the social reproduction structures and signs of transformation [10].

(9) The qualitative research practice's big issues today, as they always were, can be summarized in three points. The first is the researcher's poor theoretical basis, which leads to an interpretation of the reality close to common sense, or what Adorno and Horkheimer termed "double reality" [10]. The second is the reverse path trodden by researchers with wide intellectual baggage and little respect for the accounts of own respondents/interlocutors. This behavior impairs their appreciation of empirical data or texts at hand. Thus, they produce interpretations dissociated from the eloquence of primary data. The third refers to the use and superficial reference to the approach and analysis techniques, particularly in the chapter dealing with the methodology in scientific papers. Having read some introductory works on qualitative research, some mention their affiliation to a particular line of thought, but show insufficient knowledge of it in their analysis. This flaw is perhaps the most common; it is evident in the superficiality of procedures adopted, in the imprecise use of techniques and, in particular, in the quick-and-dirty analysis of outcomes. While these problems are observed in the Brazilian scientific community, they are also common in international works, as outlined by Giddens and Turner [51].

(10) Finally, it is important to highlight that no qualitative research classical author with strong background in social sciences and humanities is affiliated to only one classical author's thought or embodies a single discipline. In particular, there is a flow of disciplinary borders that are rather upheld on ideological grounds or corporate interests than on epistemological reasons [59, 75]. The unrestricted foray in social sciences' foundations leads experienced researchers to innovation, new perspectives, combinations of techniques and methods, so that many of them could be treated as "contemporary classics".

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Potentialities of the Qualitative Analysis Assisted by Computer: An Exploratory Study About Content Value Perception in TripAdvisor

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Abstract. This study explores the potentialities of the qualitative analysis assisted by computer. The study is exploratory and focus the perception of the functional value of the content created and shared by TripAdvisor users. Data were collected through online interviews. The study sample consists of 85 respondents. Through content analysis performed using MaxQDA, eleven categories were related to functional value. The most frequent category is "advice on restaurants, places to visit, etc.", followed by "real testimonials" and content on "value for money". Through Multiple Correspondence Analysis (MCA) using SPSS, three strong associations among the categories are identified: "actual testimonies", "information about the destination" and "useful in choosing the destination"; between the categories "Advice on restaurants and places to visit" and "experiences in restaurants"; and an association between "Quality/Price" and "Hotel Information". The articulation between the two techniques proved adequate and allowed a rewarding analysis and interpretation of the data.

Keywords: Content analysis · Multiple correspondence analysis · Functional value · User-Generated content

1 Introduction

Web 2.0 has led to the creation of user networks, whether these are companies or consumers [10, 11]. Within this context, platforms such as TripAdvisor have emerged. They add a new dynamism and interaction to the flow of knowledge and information between users and travel service providers [25].

TripAdvisor.com is a site and a mobile travel application too that provides information and reviews of travel-related content. It is considered the largest online travel consumer platform that contains reviews and opinions on hotels, restaurants, attractions and other travel-related businesses.

TripAdvisor is simultaneously a social network, a virtual community and a blog. As all Web 2.0 sites it is difficult to categorize. Its main function is to gather and disseminate user-generated content (UGC), that is, content created and shared by users such as reviews, ratings, photography and videos (in this case related to travel).

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_6

Users can go to the site and gather qualitative and quantitative information about a hotel, restaurant or other tourist attractions shared by other visitors.

Because shared comments on social networks are formed by consumers with similar interests (peer's opinion), they are considered more relevant and reliable than traditional advertising [29].

The emergence of the UGC gave rise to a new dynamic in the information-seeking phase during the consumer buying decision-making process [7, 24]. Consumers consult UGC platforms such as TripAdvisor before making their choices [17].

The research questions of this study are: Which categories are taken into account by consumers regarding their functional value perception toward TripAdvisor?; What are the potentialities of the qualitative computer-assisted analysis to analyze the perception of the functional value of the UGC?; What are the potentialities of the use of computer-assisted content analysis (MaxQDA) combined with multiple correspondence analysis (MCA; SPSS)?

This study is an exploratory study that aims to show the potentialities of computer-assisted content analysis (MaxQDA) with MCA (SPSS) applied to the functional value perception of UGC in TripAdvisor.

2 Literature Review

2.1 The Emergence of Web 2.0 and Emergence of UCG

Web 2.0 presents new challenges and opportunities for both business and consumers. The emergence of Web 2.0 resulted in changes in consumer needs, perceptions of value and consumer buying behavior [11].

Nowadays, in order to form preferences and decisions, consumers are increasingly relying on information from sources unmanageable by marketers such as TripAdvisor. The content of these platforms is spontaneously created by the users themselves [10, 11].

Among the main advantages of Web 2.0 are the new ways that companies have to communicate and interact with consumers/customers [11]. In case of tourism, Web 2.0 can contribute to the strengthening of relations with consumers [26], with companies in the travel area (hotels, restaurants, etc.), being encouraged to respond immediately to consumers seeking information on real time [25]. According to Goldsmith & Horowitz [18], the main reasons that lead users to seek information on these platforms are: the risk reduction associated with a purchase, the influence of other people, price comparisons, and the ease of use of information available online.

2.2 Functional Value of UGC

The purchasing decision process changed as a consequence of the emergence of Web 2.0 [24]. The way consumers get evolved with brands and make buying decisions has changed [14]. According to a Google study, 83% of respondents' daily use the Internet for personal reasons [19] through computers, smartphones and tablets, and 49% of individuals use online sources to learn more about products [19].

It is within this scope that the UGC has been gaining increasing expression. Associated with the concept of UGC is the concept of value perception. In this study, we will specifically analyze the functional value perception of the UGC. The functional value perception is related to the existence of relevant functional, utilitarian and physical attributes [28]. In the specific case of the UGC, it relates to the fact that consumers are satisfied with their information desires regarding the objectives and practical needs of the products, namely, convenience, availability and ease of use [21].

According to Kim et al. [21], the concept of functional value perception means the usefulness of content shared on platforms such as TripAdvisor and it is related to the theory of gratification. This approach seeks to understand and characterize the usefulness of the media (online or traditional) as well as the reasons why users choose to select a particular medium over alternative ones at their disposal. In addition, it also aims to understand how consumers use new interactive technologies such as the platform such as TripAdvisor, where UGC predominates.

Functional value perception is related to credibility and quality of the information of the UGC. Filieri et al. [16] explores the factors that influence trust toward UGC in TripAdvisor and conclude that information quality, website quality and customer satisfaction influence trust toward UGC. Ganzaroli et al. [17] also highlight the need for aggregated and up-to-date information provided by TripAdvisor so that consumers can make informed decisions.

2.3 Computer-Assisted Content Analysis

This study aims to explore the potentialities of computer-assisted content analysis. There are many definitions in the literature regarding content analysis. This method can be applied on qualitative or quantitative data, in a deductive or inductive way, selected according to the purpose of the study.

The content analysis is characterized as a systemic method of research and aims to describe and quantify phenomena [13, 22, 27], and can be used in any qualitative as well as quantitative data analysis.

Berelson [3] defined content analysis as a "technique that allows the objective, systematic, and quantitative description of the manifest content of communication." For its part, Bardin [1] defines it as a set of communication analysis techniques. Cole [9] defines it as a method of analyzing verbal and written messages. Krippendorff [22] describes it as a technique capable of making valid inferences from the text to its context of use. Thus, content analysis produces new insights that help the researcher to understand the phenomenon under study through specialized procedures.

In order to increase the reliability of the results, it is important to clarify concepts regarding the content analysis applied to qualitative research. The first step in qualitative content analysis is to define the focus of the analysis, i.e., whether the analysis will focus on manifest or latent content [20]. Manifest content means everything that is explicit in the text under analysis. However, everything involving interpretation and understanding of the meaning of the text refers to latent content [13, 20].

As regards the unit of analysis, Clemente et al. and Graneheim & Lundman [8, 20] argue that their selection represents one of the basic decisions for the application of the

content analysis method. The authors' argument should be considered the full interview. In turn, the unit of meaning is defined as a constellation of words or statements that relate to the central meaning [2]. Authors Costa et al. and Graneheim & Lundman [12, 20] consider words, phrases or paragraphs related to one another through their content or context as units of meaning.

Content analysis presupposes the coding of these units of meaning. Code is the description of the unit of meaning, expression of the manifest content of the text, and can be constructed or divided into subtopics. According to Carson & Coviello [6], pre-coding may exist in cases where the researcher is aware of the data before exploring the text.

2.4 Articulation Between Qualitative Analysis and MCA

This study is exploratory and aims to show the potentialities of computer-assisted content analysis (with MaxQDA) with MCA (with SPSS). MCA is also known as Homogeneity Analysis and is particularly appropriate to the simultaneous approach of multiple indicators and to the treatment of qualitative variables (extendable to quantitatively categorized variables). The practical and analytical importance of MCA stems from this dual attribute—multiple indicators and qualitative variables—that exist in a large part of the empirical material of scientific research and applied studies, in very different domains in the social sciences [5]. The MCA is an important analytical instrument in the field of social analysis and marketing because it allows analyzing the interdependence between multiple indicators and simultaneously projecting the categories of multiple indicators into a plan revealing its multidimensional structure.

3 Methodology

3.1 Data Collection

This study is exploratory and aims to show the potentialities of computer-assisted content analysis (with MaxQDA) with MCA (with SPSS). MCA is also known as Data for this study were collected through interviews conducted through an online questionnaire with open questions, implemented through Google.docs. The hyperlink was shared through social networks, and therefore it is considered a convenience sample. The population consists of individuals, more than 18 years of age, resident in Portugal and users of the TripAdvisor platform, this being a filter issue.

In one of the open-ended questions in the questionnaire, respondents were asked to share examples of UGC from other travelers on TripAdvisor that have affected their decision-making process. Data collection through the questionnaire was carried out between 1 and 15 February, 2017.

3.2 Treatment of Data and Procedures

After collecting the data through the questionnaire, MAXqda was used and later SPSS to analyze the data.

According to Bardin [1], the content analysis process consists of the pre-analysis phase, followed by the material exploration phase and finally, the data processing phase, inference and interpretation. In the pre-analysis phase, the data were organized with the purpose of operationalizing and systematizing the initial ideas.

This was followed by the data organization phase. Alligned with Elo et al. and Kyngas & Vanhasen [15, 23], we opted for an inductive approach that included open coding and data grouping through the spontaneous creation of the categories that are grouped taking into account their relation. The objective of this phase was to proceed to categorization in order to describe the phenomenon under study.

Responses were coded at two levels—dimension and indicators—in MAXqda. The indicators were later recoded into two categories: 1 = presence and 2 = absence. These categories are the input variables in MCA, operationalized using SPSS. This technique makes it possible to perceive the associations configured between the multiple categories (in total 11) and to access to its multidimensional structures, in which it is intended to preserve its multifaceted and relational structures.

4 Results

The study sample consists of 85 respondents, TripAdvisor users, of which 46% are men and 54% are women. About 39% of the respondents are aged between 31 and 40 years, followed by the age group of more than 40 years representing 31%. In terms of education, 37% have a bachelor's degree and 46% have master. At the occupation level, 74% are self-employed. As for income, 51% said that "it allows to live comfortably" and 45% said that it is "enough for living".

In Fig. 1, we can see an example of the coding in MaxQDA for the functional value perception dimension. In total, eleven categories were created based on the answers given by the respondents to the questions asked in the interview.

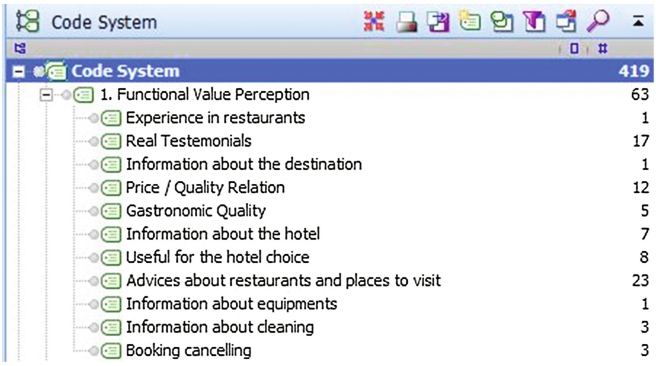

Fig. 1. Example of coding in MaxQDA for the functional value dimension.

In Table 1, we can observe one of the examples related to the respondents' verbatim for the "functional value" dimension.

Table 1. Example of *verbartim* for functional value.

Sociodemographic characterization	*Verbatim*
Woman, 26 years, Master's	In the summer of 2010, holidays were booked for the south of France (Nice, Marseille, etc.). These holidays were cancelled due to TripAdvisor reviews. The reason was the lack of cleaning of hotel rooms as well as poor functioning of air conditioners. Reservations had been made for 4 star hotels
Woman, 37 years, Degree	I value suggestions such as added value, service, positive and negative experiences that help in the decision making for the place
Man, 46 years, Degree	I have advised several times on TripAdvisor, and on weighing the different opinions, it is possible to make a grounded judgment. Even if anyone's opinion is always a personal point of view, the insights will give a better idea of the places to visit

Through content analysis regarding the open question about the functional value perception UGC on TripAdvisor, illustrated in Fig. 2, we identified eleven categories. The most frequent category (23) relates to the content shared by users about "advice on restaurants, places to visit, etc.", followed by "actual testimonies" (17) and content on "quality/price" (12).

Fig. 2. Frequencies of the categories of functional value dimension

Through MCA, operationalized through SPSS and illustrated in Fig. 3, we were able to perceive the associations configured among the 11 categories.

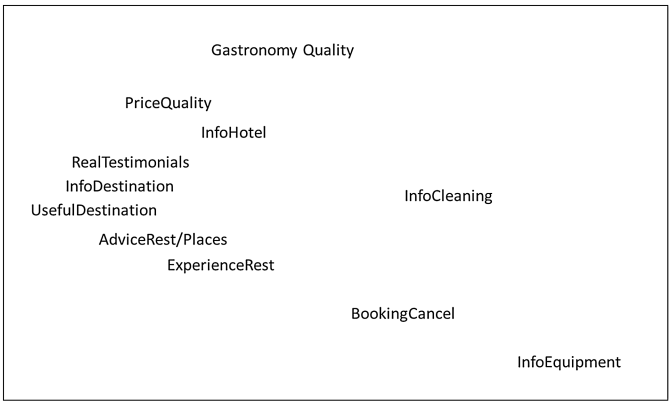

Fig. 3. MCA for Functional Value Categories

We find that there are 3 strong associations among the categories: (1) categories "real testimonials", "destination information" and "useful in choosing the destination", (2) an association between the categories "Restaurant advice and places to visit" and "Experiences in restaurants" and (3) an association between "Quality/Price" and "Hotel Information". The remaining categories are scattered.

5 Conclusions

At the academic level, this study contributes to a better understanding of the functional value perception of UGC on TripAdvisor as an online source of information. The combined use of the two analytical techniques enables greater potentialities in understanding the meaning of UGC and its associations. MCA enables the analysis of the interdependence between multiple indicators and simultaneously projecting the categories of multiple indicators into a plan revealing its multidimensional structure. The dimension describes [4], the indicators quantify (relevance) and the MCA shows the associations between the indicators. The articulation between the two techniques proved to be adequate and enriched the analysis and interpretation of the data.

Understanding how UGC in TripAdvisor can be used by travelling service providers (hotels, restaurants, tour operators, etc.) is critical [16, 17]. The findings of this study enable travel industry manager to acknowledge that the categories "advice on restaurants, places to visit, etc." followed by "real testimonials" and "quality/price" content are the most frequent and, thus, it is important to take into account these categories when promoting their services online. Consumers mainly look for useful content about places to visit at a destination, value the realistic testimonies of travelers and are interested in the information on the quality/price of places to visit. For marketers in the travel industry, it is important to monitor these comments and take advantage of these insights to improve the level of information and transparency of this, for example on their websites, social networks and other communication materials. The fact that there are three strong associations among the categories: (1) categories

"actual testimonies", "destination information" and "useful in choosing the destination"; (2) an association between "Restaurant advice and places to visit" and "Restaurant experiences," and (3) as association between "Quality/Price" and "Hotel Information" also reveals evidence that might help in the development of segmented offers based on the type of information travelers value the most.

Acknowledgments. We gratefully acknowledge the financial support from FCT - Fundação para a Ciência e Tecnologia (Portugal), national funding through research grant (UID/SOC/04521/2013).

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Qualitative Analysis of Reproduction Knowledge Through the Drawings Study with webQDA

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Abstract. Research on Health Education and Biology teaching contributes significantly to scientific literacy and health promotion. Thus, the reproduction function is one of the great topics to be considered. Because of that, a cross-sectional study has been designed to analyze the knowledge of Secondary students on this subject. The population under study has been made up of students from a school in Badajoz (Spain). The method used includes research techniques using a questionnaire and drawings of the reproductive system made by the students, which were analyzed using the webQDA program. In a first phase of the study, focused on qualitative methodology, the suitability of the software used is verified. Among the conclusions obtained, the difficulties of the students to locate anatomical structures are highlighted. It is proposed to design activities that will help students better understand anatomical-physiological relationships.

Keywords: Health education · Qualitative methodology · Adolescents · Anatomy of the reproductive system

1 Introduction

The main justification for initiating this research is the progressive importance that Health Education is acquiring preferably in schools from Primary Education to Secondary Education. However, the same consideration can be made in university. It is necessary to carry out investigations related to the affective-sexual knowledge in the adolescents, since this population is highly sensitive to the problems that entails the ignorance about Sexuality. Among those which stand out, we could highlight those related to the transmission of venereal diseases or unwanted pregnancies. Adolescents should not only have knowledge about issues related to Health Education, but must have a good scientific basis in the field of biomedicine as marked by the current Education Act. Likewise, the learning of scientific knowledge must address both the conceptual, procedural and attitudinal knowledge of its biological aspects as well as its

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_7

social and bioethical implications. In other words, the adolescent population must be competent and be able to apply scientific knowledge to society. On the other hand, the relations between Science, Technology, Society and the Environment help to comprehend globally the world in which we live and facilitate the resolution of problems that arise in local contexts during ordinary life.

For all this, the present research work, focused on the function of reproduction and on sexuality, has as main objective to find out the knowledge that the students of Forth of Compulsory Secondary Education (ESO) and Second of Bachillerato at a center in Badajoz on the anatomy of the Reproductive System. Research in students of these courses may have very relevant applications in order to avoid problems related to Health in the future and to improve the consolidation of scientific knowledge and its practical application in life.

After an analysis of the existing bibliography on research in Health Education and Biology Teaching in the main national and international databases, the study design was carried out; it includes quantitative research techniques and qualitative methodology. Subsequently, issues related to the development of questionnaires and qualitative research will be addressed. Nevertheless, we present a synthesis of the design made including the theoretical framework, the objectives and the questions that guided the investigation, as well as the general methodology used. It should be noted that data are currently being dumped to perform the quantitative analysis. Because of this, preliminary results of this phase of the research cannot be presented.

2 Theoretical Framework: Biology Teaching, Health Education and Qualitative Research

On the one hand, the theoretical framework of this research is determined by the objectives and has as basic pillar the promotion of health, integrated in the teaching-learning process of Biology. On the other hand, qualitative research is a very interesting tool to achieve these objectives. It is necessary to clarify that the teaching and promotion of Health Education is not only a cross curricular topic in Secondary Education and Bachillerato, but is currently addressed longitudinally within the contents of Biology teaching [1]. Health Education aims to prevent diseases and promote health through education of the population. In this way, Health Education will advocate a healthy lifestyle, among others [2]. Within this healthy lifestyle is the Affective-Sexual education, although, unfortunately, it is one of the less treated subjects within Health Education [3]. The low number of references in international databases evidences this [4, 5]. According to some authors [6], sex education must be explained from primary to university, because a large number of adolescents start their sexual activity early and the lack of information they possess, makes them more vulnerable to risk practices. In reference to this, Sanmartí (2002) establishes that “in a teaching context, tackling these topics is not an easy task, since we are in a social context in which there can be prejudices, myths and taboos” (quoted in [7]). However, sexual educators must possess the knowledge and resources that facilitate this task [8]. Further, it is essential to have knowledge about anatomy and physiology to understand sexuality, although it is true that not only are these necessary; social, economic and cultural environment

surrounding the individual is also involved [9]. For this reason, it is necessary for students to be informed and educated in the field of Reproduction and Sexuality from the age of 12, although independently of the way of doing the educational intervention [10].

When carrying out a research it is necessary that the methodology that will accompany the study allows the researcher to achieve the objectives that have been proposed. For this reason, each researcher must decide which strategy is the most appropriate to his or her work. The analysis of the theoretical framework that we have used, has led epistemologically to separate research using both methodological strategies, quantitative and qualitative instruments to cover our objective. It should be noted that both methodologies have completely different perspectives and characteristics [11]; however, if each of them adheres to the corresponding epistemological spaces, they may be complementary [12]. It is also important to note that qualitative studies have experienced a boom in recent decades and their use in the field of scientific research and social sciences is increasingly developed. Thus, asserts that thanks to qualitative research, positivism tends to fade and a process opens where the researcher designs the research, collects the information, analyzes it and gives it meaning, ending in a discussion with the research community [13]. At the same time, the qualitative research model emerges to solve those questions that cannot be analyzed from the point of view of quantitative research [14].

3 Objectives

As already mentioned above, overall our research has as main objective to find out the knowledge that Secondary students have about the reproduction function. However, the question that has guided the design of the research has been the following: Is it possible that scientific contents that can help solve situations of ordinary life are better learned and preserved than others more theoretical or conceptual? In principle, the most practical and useful content, i.e. those that students can apply to life would be those that would be learned and assimilated with greater ease. All this would connect with the work through competences proposed by the last educational laws (LOE, LOMCE) since the work on contents related to the promotion of health are directly related to this philosophy. Thus, the present work has the following objectives:

1. Check if the use of drawings made by students and qualitative software webQDA are useful tools to find out the knowledge that students have about Anatomy of the Reproductive System.
2. Identify if the sex influences the erosion or loss of knowledge of the contents taught about the reproduction function in Third of Secondary Education and what type of contents have not been correctly assimilated.

4 Materials and Methods

The research approach was based on a cross-sectional study, because our intention is to evaluate the reiteration of a fact with some interest in a certain period of time. As is well known, cross-sectional studies are observational and descriptive [15]. The study population consisted of students aged between 15 and 18 (N = 111), belonging to a Charter School in the city of Badajoz (Spain), where 62 of them is enrolling Forth of Secondary Education and the remaining 49, Second of Bachillerato. A random sample of 30 students was selected at each educational level (n = 60). The way to include the students in the sample was to order their date of birth and choose one out of two following a sequence. In Bachillerato to avoid a selection bias, students of Sciences were grouped together and those of the modality of Humanities and Social Sciences were in another group, later 15 students from each group were chosen following the same procedure of selection (sequence of two in two).

The analysis was carried out in three phases: First the data processing quantitative addressed, then the qualitative data obtained were analyzed and finally a descriptive analysis of responses and comments made. The instrument of analysis used in the study has been a questionnaire to be completed by students with open and closed questions about reproduction. When starting the construction of a questionnaire, it is very important to clarify the purpose of the study, taking into account the objectives, in this way there will be questions about those items considered to be fundamental and issues of little validity will be avoided. For that reason, a list was drawn up with the subjects on which the information was wanted [16] and it was decided to include a space for drawings on the male and female reproductive system.

In the elaboration of this questionnaire, the process of transition of the Spanish educational system between two different educational laws was taken into account. Although this process is currently completed, students have studied under different educational laws. The first, DECREE 83/2007, of April 24th, establishing the Curriculum of Compulsory Secondary Education in the Autonomous Community of Extremadura, and the second, DECREE 127/2015, of May 26th, that establishes the curriculum for Compulsory Secondary Education and for Bachillerato in the Autonomous Community of Extremadura. After comparing the contents of both laws related to Reproduction and Sexuality in Third of Secondary Education, a questionnaire was developed which the students of both courses should be able to answer, since these contents have already been taught previously in their classrooms. They differed only in one point, which was not included in the questionnaire, in order not to favour one group against the other.

The questionnaire was organized into three clearly defined sections according to the type of questions: the block of questions A comprises twelve closed questions of multiple choice of fan type responses [15], where students could choose the correct answer among four possible options. Sections B and C of the questionnaire are composed of two open tasks, where students have to draw the male and female reproductive system respectively. Lastly, the question of section D, focused on emotions, is an issue that the students must answer based on the feelings they had when they were taught the lessons related to this subject. In addition, three socio-demographic characteristics,

date of birth, sex and course were included in the questionnaire, since the questionnaire was totally anonymous.

Undoubtedly, one of the fundamental aspects in an investigation that includes a questionnaire is its validation [17, 18], in our case it has been validated in three different ways. Firstly it was applied to two researchers of the University of Extremadura, both of them specialists in didactics of the Biology, and to a doctor from the Health Service in Extremadura. The suggestions of these experts allowed to configure the final questionnaire, which was analyzed by the INFLESZ v1.0 program to measure its readability. This computer application uses the formula of Perspicuity of Szigriszt, which is expressed as follows: INFZ = 206.835−62.3 x (Syllables/Words - Words/Phrases) [19]. This program allows to identify the clarity of texts in Spanish by using a scale called INFLESZ, which provides a score in five sections from "very difficult" to "very easy". According to the INFLESZ scale, the questionnaire elaborated was located in the section of "quite easy". Finally, the clarity of the text when read was subjected to a last validation in a school center belonging to the same sociocultural level. In this pilot test 15 students of Forth of Secondary Education and 25 of Third of Secondary Education participated whose answers and comments contributed to slightly modify two questions of the questionnaire.

The questionnaire was made by the students in their classes on January 30th, 2017 and February 20th, 2017. Note that the students were informed about the study objectives just before completing the questionnaire. Any negative response wasn't obtained from any student, nor the denial of any of them to participate, on the contrary, all of them showed enthusiasm and positive emotions when feeling protagonists of an investigation.

For the analysis of the data it was decided to use the statistical program SPSS and the application of qualitative analysis webQDA, according to the nature of the questions posed. Specifically, section A of the questionnaire consists of 12 closed questions, and therefore, the SPSS program will be used. The question of section D will receive the same treatment; However, it should be remembered that this is a question about the emotions that students experience when receiving classes on the function of reproduction and not on the content itself. As already indicated, these results will be analyzed quantitatively in a later phase of our study, focusing at this moment on the qualitative analysis. The tasks in sections B and C of the questionnaire are that students draw the female and male reproductive system indicating their parts. The program chosen to analyze these two tasks was the webQDA program. The categories established are mixed because some are established prior to the analysis of the images and others are incorporated according to the analysis. Therefore, the data were grouped into the following categories: (a) correct design (A1/B1), (b) incorrect design (A4/B4), (c) names all structures (A2/B2), (d) names less than three structures (A5/B5), (e) correctly locates all structures (A3/B3), (f) incorrectly locates some structure (A6/B6). "A" being the categories of the female reproductive system and "B" those of the masculine.

In the following example, it can be seen that the student names the important structures of the reproductive system (A2), the design is incorrect, does not refer to the external female reproductive apparatus (A4) and the ovaries are not located in the corresponding place (A6) (Fig. 1).

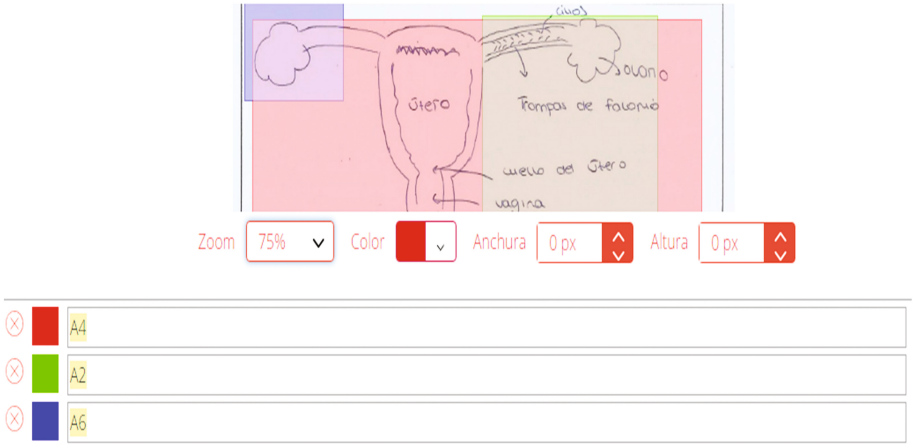

Fig. 1. Example of qualitative analysis through webQDA in drawing on the female reproductive system

5 Results and Discussion

There were 15 boys and 15 girls among the 30 students of Fourth of Secondary Education. As can be seen in Fig. 2, students of Fourth Secondary Education design and locate structures of the male reproductive system better than those of the female reproductive system. However, when naming the structures of the corresponding reproductive apparatus, we obtain the same results.

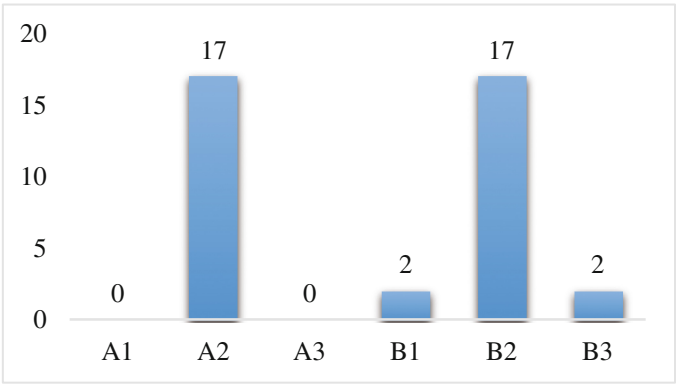

Fig. 2. Graph on the results obtained when analyzing the drawings of the male and female reproductive apparatus in the fourth Secondary Education

Once it is known that the students of Fourth of Secondary Education can design better the male reproductive system, we analyze which group of students has obtained better results in this section. As can be seen in Fig. 3, the male students are the ones who obtain the best results.

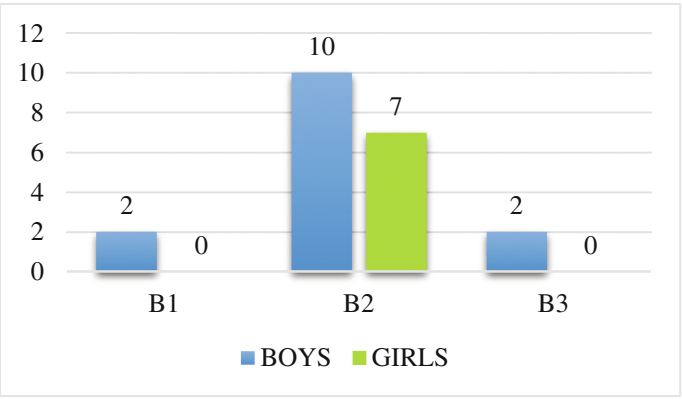

Fig. 3. Graph on the results obtained when analyzing which group of students of fourth Secondary Education obtains better results when analyzing the male reproductive system

In reference to which group of students in the group of fourth Secondary Education names the greatest number of structures in the female reproductive tract, as can be analyzed in Fig. 4, the group of female students obtains better results, although with a difference of only 1.

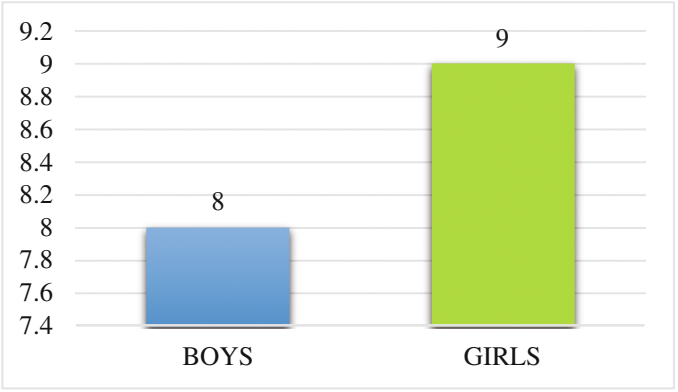

Fig. 4. Graph on the results obtained when analyzing which group of students of fourth Secondary Education obtains better results when naming the structures of the feminine reproductive apparatus

Focusing on the group Second of Bachillerato, the male students were 6; 5 of them belonged to the Scientific branch and 1 to the branch of Humanities and Social Sciences. The women's group consisted of 24 girls; 10 were students of the Scientific branch and 14 of the branch of Humanities and Social Sciences. As in the previous case, the first thing to be studied is in which drawings better results are obtained. As can be seen in Fig. 5, the students name more structures of the female reproductive system than the male ones. However, better results are obtained in the design of the male reproductive system and the location of its structures.

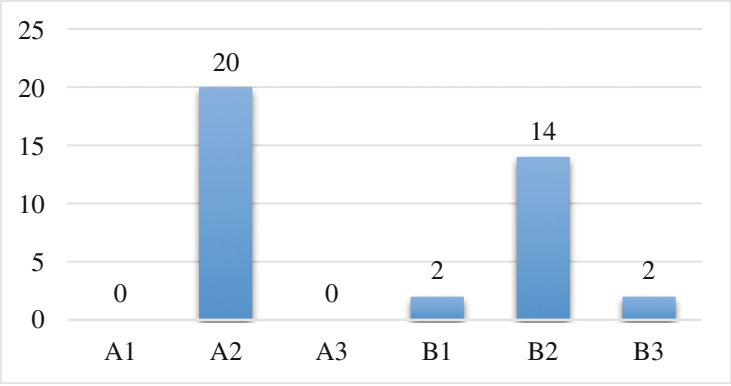

Fig. 5. Graph on the results obtained when analyzing the drawings of the male and female reproductive apparatus in second of Bachillerato

In this case, the results of Fig. 6 are expressed in percentages (%) because the number of female students exceeds that of males. As can be seen, female students obtain worse results than males, in fact, as it was the case in the Fourth of Secondary Education, it is the latter who best design, name and locate structures of their own reproductive system.

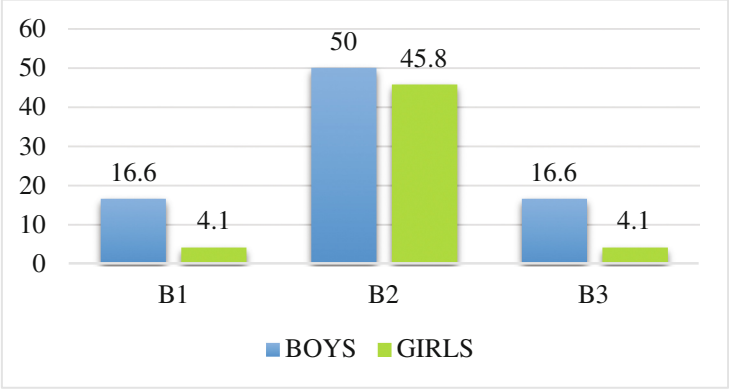

Fig. 6. Graph on the results obtained when analyzing which group of 2nd grade students obtains better results when analyzing the male reproductive system

In reference to which group of students names a greater number of structures in the female reproductive system, as can be analyzed in Fig. 7, the group of female students obtains better results.

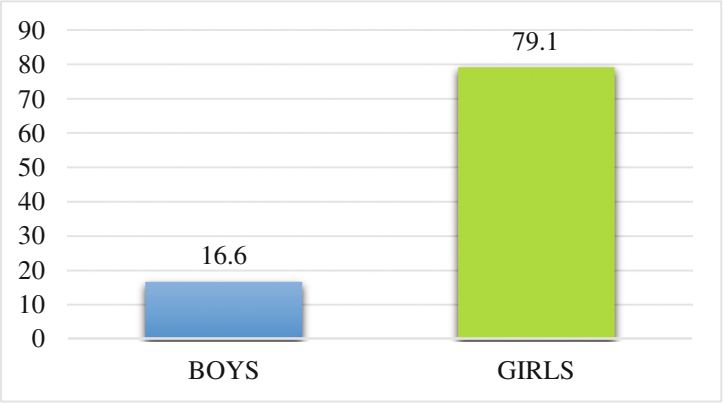

Fig. 7. Graph on the results obtained when analyzing which group of second of Bachillerato students obtains better results by naming the structures of the female reproductive system

The questionnaires that students complete about sexuality and reproduction can be considered effective in determining that adolescents have serious difficulties in understanding subjects related to this topic and in demonstrating their knowledge about it [6].

Likewise, it should be noted that the chosen software (webQDA) allows to efficiently translate the observations of the drawings and drawings of the students into categories in a computer support. Besides, it is necessary to make qualitative observations to effectively measure anatomical knowledge, being for this the drawing a very useful tool because it allows to measure a more real, functional and practical knowledge. In all the drawings analyzed, it has been observed that none of the students correctly designs the drawing of the female reproductive system because the ovaries are not placed in their corresponding position, on the contrary, the students places them attached to the Fallopian Tubes. This may be due to errors in students' textbooks or even over the Internet. In fact, if some basic concepts in the area of Physiology and Anatomy are not treated correctly, it can lead to consequences such as the appearance of alternative ideas [20]. There are also difficulties in terms of male topographic anatomy, for example in terms of anatomo-physiological relationships between the vas deferens, prostate and seminal vesicles.

From the results analyzed, it can be affirmed as other authors [6] that male students know better the anatomy of their reproductive system in comparison to the group of female students who have more knowledge about theirs.

A good part of the younger population acquires erroneous or mythological concepts coming from the oral tradition. For this reason some groups of adolescents would obtain worse academic qualifications [9], an assertion that cannot be corroborated from the present study.

Finally, we wish to emphasize that the students showed great enthusiasm and positive emotions when feeling involved in the research. In addition, they became aware of the need to acquire functional knowledge about reproduction and the relevance of having a solid sexual education training, both for the individual and for society.

6 Conclusions

In this research, it is verified how the computer applications contributes effectively to facilitate the computer analysis of the qualitative investigations, referred to the categorization of observations. Besides, the involvement of the Secondary students generates a benefit in the methodology used, because it establishes a complicity between "the observer" and "the observed one", obtaining an educational effect in the students. Focusing on curricular aspects and once analyzed the data obtained from the drawings made by the students of Fourth of Secondary Education and Second of Bachillerato the following conclusions can be enunciated:

- The drawings made by the students and the qualitative software used have been useful to ascertain the degree of knowledge that the students have about the Reproductive System.
- There is insufficient knowledge about the anatomy of the Reproductive System as they do not know the correct location of the organs. This has been especially noted in the case of the Female Reproductive System, and especially in the location of the ovaries. Consequently, students will have difficulties in understanding the relationship between organs and their functions.
- The sex of the students will influence when identifying and designing the different reproductive systems.
- The age of the students does not seem to influence the permanence of the knowledge about the Reproduction.

Finally, and as a consequence of the conclusions obtained, it is proposed as a corrective measure to reinforce the teaching-learning process with activities that emphasize topographical anatomy. We also find it interesting that these tasks are performed using a competence-based design.

Acknowledgements. The authors of this research thank the school Hermanos Maristas "Nuestra Señora del Carmen" (Badajoz, Spain) for their invaluable collaboration in this research, by allowing the participation of their students. They also wish to express their gratitude for the financial support obtained through Project EDU2016-77007-R (AEI/FEDER, EU) and support to groups GR15009 (Junta de Extremadura and FEDER).

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Ethical Challenges in Researching with Children: An Application Adopting a Mixed Method Approach

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Abstract. Applying ethical principles to research is essential to ensure both participants' universal rights and data quality. From the ethical point of view, researching with children poses additional challenges in designing the research, collecting and analysing data. The ethical principles generally accepted in scientific research are complementary, yet presenting conflicts that must be anticipated and mitigated by the researcher. This article explores the application of ethical principles in research with children, considering the different stages of research and both quantitative and qualitative research, proposing a set of six ethical principles to be applied before, during, and after the collection of data. The text includes examples from research adopting a mixed-method approach which involved 779 participants aged 7 to 15 years old. The study demonstrates that there is a strong interdependence among ethical principles applicable to research with children, not devoid of contradictions. Even widely accepted principles such as informed consent are complex and multifaceted. Moreover, the adoption of mixed methodology, in this particular case, has proven to be able to create ethic synergies, making the research globally more balanced.

Keywords: Research with children · Ethical principles · Mixed-Method research

1 Introduction

In recent years, the volume of research with children has increased substantially [1–4], which is expected to continue, particularly due to the interest in the views of children as consumers [4]. Overall, it is fundamental to respect the ethical principles in order to produce quality research [5, 6], contributing to the effectiveness of the methodology itself [7]. Although most of the methodological and ethical issues of research with adults also apply to research with children, there are relevant differences, which stem from a different way of understanding and communicating the reality, and from the power differences between the child and the adult researcher [7]. This article aims to contribute to the discussion around scientific research with children. It starts by

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_8

reviewing the ethical principles applicable, gathering information scattered in literature. Implications for the different phases of research are analysed, taking into account the preparation, collection and analysis of data, as well as the different challenges faced by qualitative and quantitative research. These implications are reflected in a mixed-method research conducted by the authors, whose methodological options and practical application are discussed in this article.

2 Ethical Principles of Research with Children

According to Bryman [6], the four general ethical principles applicable to research in social sciences were proposed over 30 years ago by Diener and Crandall [8]: (i) do not harm the participants, (ii) to have informed consent, (iii) to respect the respondents' privacy and (iv) do not deceive. From the Universal Declaration of Human Rights and international codes of ethics, Nairm and Clarke [4] identified three common principles that rule the participation of children in research projects: the child's well-being, the voluntary nature of the participation, and the confidentiality. However, the same authors alert that these three basic principles are not enough to ensure an ethical behaviour in research. Consequently, the present study considers a set of six ethical principles to be applied before, during and after the collection of data (Table 1). Those principles will be analysed in the following pages.

Table 1. Proposal of application of ethical principles to the different stages of research

	Research Plan	Data Collection	Result Analysis and Publication
1. Interests and Well-being of the Child	Research design Choice of method	Method application Risk avoidance	Risk avoidance
2. Active Participation	Research instrument design Pretest	Child voice and points of view Involvement in the research process	Result validity
3.Voluntary Participation	Absence of rewards Opt-in	Confirm willingness Possible opt-out any time	Possible opt-out any time
4. Informed Consent	Guardian writen consent	Participant verbal consent	Use data according consent
5. Information Provided	Detail of the authorization form	Synthesis before starting the session	Firsthand access of results
6. Privacy and confidentiality		No idetification request	Pseudonyms Agregated analysis Non-identification

2.1 Interests and Well-Being of the Child

When designing the study, the researcher must ensure that it will generate benefits for children [1]. The extension to which the participation of children in research is going to meet their own interests must be assessed, and the child's perspective must be considered in all aspects that affect them [9, 10]. During the collection and processing of data, a balance between listening and protecting the children must be ensured [4]. Children should not be exposed to social or psychological risks from which they derive no benefit [10], even when the results of the research might bring further benefits to an increased number of people [4].

Nairm and Clarke [4] emphasize that children's emotional well-being may be affected by the research subject, by aspects of the research process, and also by the child's feelings after the collection of data is concluded. Measures should therefore be applied, such as the researcher's availability clear doubts that may arise during and after participation, and comply with the sharing and dissemination according to the preferences of the participants. Although the data collection periods should be kept short and adequate to the participants' age, they should allow the clear transmission of relevant information about the research, and answering the questions that the participants may wish to ask.

2.2 Active Participation

Children have the right to be heard on matters that affect them as elements of society, and to have their views taken into consideration by the decision-makers [10]. So, the integration of children in the research should enable the expression and ensure the consideration of their points of view [3, 10–13]. However, the full observance of the rights recognised to children by the United Nations implies allowing them to actively participate in the research process, acting as co-researchers [11]. The participation of children may include contributions to the research design, data collection and analysis. According to Thomas and O'Kane [7], the active participation of children is the way to solve ethical problems arising from research, despite creating further responsibilities and ethical dilemmas for researchers [11]. Woodhead and Faulkner [14] state that there are verifiable gains in scientific knowledge as a result of the active participation of children in the research process, and the acceptance of their feelings as genuine and valid empirical evidence. The active participation of children contributes therefore to the attainment of richer data, which reflect children's experiences and perspectives.

It should be noted that children are not used to sharing opinions and experiences with unfamiliar adults [13, 15], they usually try to please adults, and fear their reactions [13, 16]. The active participation of children can therefore be limited by the power differences between the child and the adult researcher, as is noted by Thomas and O'Kane [7]. The role of the researcher is crucial to ensure that the child's participation is comfortable, adequate and fun [1], creating empathy and conditions for an effective participation in the research.

One additional aspect to take into consideration is the selection of participants, which must observe the principles of equity and non-discrimination. The selection of participating children must correct, patterns of exclusion, not reinforce them [10].

Ideally, all children of a given population under study should have equal opportunity to participate in the collection of data, if they so desire.

2.3 Voluntary Participation

The child's participation must be of their own volition, free from any kind of coercion [4]. The absence of coercion is a requirement for the attainment of reliable data, since data collection depends on children's willingness to cooperate and sharing their reality. Only with sincere responses from the participants will the goals of research be met, thus creating knowledge. The voluntary nature of the participation doesn't apply only to the selection stage of the participants in the study, but also during the data collection. Thus, the child's right to abandon the study at any time, if she so desires, must be guaranteed [4].

The existence of participation rewards must be carefully evaluated, as it can be seen as a form of coercion that constitutes a breach of human rights [4]. As pointed out by Nairn and Clarke [4], a token gift (e.g., ballpoint pen, voucher) at the end of the research may be an appropriate way to appreciate the participation, but the same does not apply to prizes that aim to encourage participation, and are previously announced.

It has also been demonstrated that children are very sensitive to the context of the research [1, 15]. As for this, the choice of place for the data collection should be duly considered. For example, school is a space organized and controlled by teachers/adults [13] where all activities have a mandatory nature [15], so children might have a lower perception of the voluntary nature of the participation [15], and feel compelled to give the "correct" answers [13].

2.4 Informed Consent

The law does not acknowledge children the power to decide their participation in a research, and so it is necessary to obtain prior consent from their parents. However, the additional consent of the children themselves is also essential [2, 4, 10, 13, 17, 18]. When obtaining the consent of the participant child, the researcher should assess the degree of voluntariness, since children are susceptible to be influenced by adults associated with authority figures [19], like parents or teachers. The children's expressions of will must be taken into account, whether they are verbal or non-verbal, since children use different means to express their choices [17]. The children's consent implies having time to clarify doubts and think. It is an ongoing process [2] in which the child may alter her decision at any time.

2.5 Information Provided

The information provided must be sufficient to allow an informed decision of participation [10, 15, 17]. The information to be made available includes the objectives and procedures of research [4, 10, 17], the components and duration of data collection [4], and also the consequences and impact from sharing of participants' views [1, 10].

The form in which the ethical principles are applied should also be emphasized. The information should be made available before, during and after data collection. This last guideline includes the disclosure of the findings of the research [10, 15], although this may prove to be a complex and discouraging process for the researchers [15].

The way the information is shared should be adjusted to the participants' context and characteristics [10, 17]. Language clarity, particularly when communicating with children, is essential at all stages of the process. Children have a more limited vocabulary and may use a different language from that of adults, who may not understand it [13]. The researcher must therefore prepare detailed information, adjust to the study population's characteristics, ensure that the children fully understand the information that they are given, and that the researcher himself fully understands children's decisions and views.

2.6 Privacy and Confidentiality

The researcher must ensure the confidentiality, and explain to the children the limits of that confidentiality [10]. Participants' privacy and confidentiality should be totally respected, and the data obtained should be used only for the purpose for which the participant has consented, without providing their identity, except in case of specific authorization [4]. Quantitative analyses are usually less problematic, as the data is aggregated for analysis. However, the researcher should consider the need for disclosure of any element that may identify the participants, such as schools or institutions which have cooperated in the research process. Qualitative analyses, on the other hand, require additional care in the omission of relevant particularities of the participants.

3 Qualitative vs. Quantitative Methodology

In general, children prefer to participate in research using methods that provide immediate pleasure [1], with a fun theme or set of activities, which is usually best provided by qualitative rather than quantitative methods. Qualitative methods also facilitate participation and interaction. However, quantitative methods tend to provide a higher level of confidentiality, thus enabling the sharing of some more specific information, since they reduce the risk of exposure of the respondent children.

Let us consider, among the qualitative methods, the choice between individual and group interviews. Group interviews tend to be more comfortable for children, making them feel less vulnerable towards the researcher [4, 18]. As for participation and sharing, there is evidence that some children are more open in a group environment, while others reveal more of themselves in personal interviews. The group interviews question the confidentiality of responses, which are shared with the other participants, a circumstance that may restrain the participation of some children [1]. In the case of group interviews, the way the participants are selected and organised is also relevant. It is common practice to research with participants belonging to the same group or network of friends [20], which can be justified in situations where proximity between participants facilitates collective self-disclosure and the sharing of common experiences. This option may also

create a more comfortable environment for the participants, provided that the topic of discussion is appropriate for the participation of friends or acquaintances. In addition, organising the participants into groups can be made with different segmentation criteria (e.g., age, sex). Stewart et al. [21] warn that the quick development of children and adolescents makes it more difficult to mix them, so narrowing the age differences in a group will contribute to its cohesion and facilitate the discussion. Fern [22] mentions that self-disclosure is higher in groups with only girls and both boys and girls, as compared to groups with only boys. However, according to the same author, this trend is influenced by the degree of acquaintance among the participants, the gender of the moderator, and the topic under discussion.

Among the quantitative methods, one that is often adopted is the questionnaire survey. Ideally, the questionnaire should allow a quick and pleasant fill, which can be achieved by means of graphic options and the very structure and design of the instrument. A problem with questionnaire surveys is that many children consider them boring; some even admit to giving wrong answers, as for example copying the answers of another child, in order to make the process more fun [1]. To solve this dilemma, the children may be inquired in advance about the method they prefer [1]. This approach was adopted by Bagnoli and Clark [23], and their adoption of a multi-method strategy allowed the children to choose in which of the stages of research they wanted to participate. Even when this prior query is not feasible, the researcher should maximise children's choice on ways of communication and levels of involvement. Given the advantages and disadvantages of the different methodologies, some authors [e.g., [13, 15]] suggest the combination of methodologies as the most adequate approach when researching with children. The next pages illustrate a research done with children using mixed methodology, highlighting some advantages and procedures for complementing a quantitative method with qualitative research, namely to facilitate active participation and improve children's participation experience.

4 Managing Ethical Dilemmas with Mixed Methodology

One recent research of ours focused on the development and validation of a measurement scale with children and adolescents. This work included two qualitative phases (focus groups) and two quantitative phases (survey), involving, in total, 779 children and adolescents, aged between 7 and 15. All stages of data collection were carried out with the cooperation of a set of schools from the same city. For equity and non-discrimination, in each participating school all students were invited to participate in the research. Both the written consent of the child's guardian and the verbal consent of the child themselves were necessary for participation.

4.1 Information Provided, Expectations and Voluntary Participation

The information provided to both the guardians and the children themselves included details about the purpose and scope of the research, its components, how the collection of data would be performed, how that data would be processed and the results

disclosed, and the expected duration of the activity. In the case of children, the participants were clearly told that it was their decision to participate, and that this decision could be changed at any time, if they so wished. Detailed information about the whole process was made available, so that expectations were not defrauded, resulting in withdrawal and dissatisfaction of the participants. As described in David, Edwards and Alldred [24], it was our goal to give maximum priority to the children's self-selection and decision to participate, making their acceptance to participate a continuing process.

During the whole process we were able to ascertain that it is essential to reaffirm that they could cancel the session at any time if they wish to. Despite our effort to provide all the information and manage expectations properly, only in the course of the research process are the children able to assess properly the characteristics of their participation. The drop-outs that occurred were either motivated by the child's realisation that participation was not interesting to her or did not correspond to her expectations, or by the comparison with the alternative activities that the child could pursue during the same period. For example, one of the children in a discussion group argued that she did not want to skip a class, and she was immediately dismissed. During the survey stage the process became tedious or tiring for some children, who therefore did not complete the filling. From the point of view of the researcher, it will be less harmful to have a smaller number of responses, than to have untruthful answers. Besides the example quoted by Hill [1] of children who copy the answers from colleagues to make their participation more amusing, we may add cases where the answer grid was completed without the child having read the questions, by giving the same answer to all questions or repeated sequences of responses. In such a case, it was important to talk with the participants, reinforcing that responding was not mandatory, and that they could leave the task if they so wished. There was a specific case of a 15 year-old boy who asked for some time to think about it, and then requested a new questionnaire that he began again to fill, and then abandoned halfway, saying: "*I've tried, but I really don't want to answer, I'm sorry*".

4.2 Conflicts Between Voluntary Participation and Informed Consent

We also found that in some cases the voluntariness of the participation may be limited by the application of other ethical principles. We have identified cases in which children felt some obligation to participate as a result of their interpretation of prior consent from parents and teachers. Both parents and teachers usually encourage children to participate in the activities carried out in the school environment [16, 24]. Statements like "*my father told me to come*", or "*the teacher sent us here*" heard throughout our study, should be clarified by understanding the will of the child themselves, further explaining the voluntary nature of the participation. Coyne [16] emphasises the potential conflict between child's voluntary participation and parents' informed consent. Children can abide by the decisions of adults, and participate in the research because they are used to act according to adults' decisions and opinions, and to please them [16].

However, we were faced with situations where children asked us to participate in the study, in spite of not having parental consent, as was the case of a 13-year-old girl that approached us before the session, saying "*I want to participate, I would like it very*

much, but my mother refused to sign the paper, I asked her, but she won't let me…". Although we recognised the conflict implied in the ethical principles adopted, in which the non-consent of the mother infringes the universal right of the child to give their opinion on subjects of their interest, this child was unable to participate in the research.

4.3 Appreciation of the Contact with Science

Throughout our work, we found that the participation in the study was also motivated by the opportunity to get in touch with scientific research. As it happened to David et al. [24], we were surprised by many questions about the researcher's role in the social sciences. It was evident that children derive pleasure and gratification from developing their own experimentation of participation in scientific research, and understanding the extent of their contribution. It is up to the researcher to provide the participant children an experience of scientific research, also meant to be educational and enriching. The involvement in scientific work is, in itself, a way to create additional benefits for the participating children, by showing them the work underlying the research, and the benefits generated for the participants and the for community in general, so that the child's participation can also be seen by them as a contribution to science and an enriching experience. Alderson [25] explains that the participation in scientific research provides children with additional skills, confidence and determination to overcome difficulties. In our opinion, even in situations or stages of the research when the co-creation with the participant children is not possible, all opportunities for maximising the experience for the children must be explored.

4.4 Synergies Between Qualitative and Quantitative Methods

While some of the ethical principles have similar application in qualitative and quantitative methods, some differences stand out when it comes to active participation, privacy and confidentiality of participation, as already explored in Sect. 3 of this text. In our view, it is quite challenging to ensure active participation of children when the method is quantitative, such as a survey. Even when children have cooperated in the design of the survey instrument, those who are going to participate in the data collection stage will have reduced opportunities for active participation. We found that one aspect valued by the participant children was to understand the structure of the study itself, including the result of the contributions of their peers in previous stages of the research, or how the results of their own work would influence the participation of other children in future stages. In our case, the survey questions had been developed with the cooperation of children, either through focus groups aimed at identifying items and vocabulary to be included in the measurement scale, or by pre-testing the questionnaire, which had both a quantitative and a qualitative stage. Knowing that the questions had been developed with the participation of other children resulted in positive reactions from the children who took part in the survey, contributing both to their comfort and the reduction of perceived risk. Thus, the adoption of mixed methodology, in this particular case, has proven to be able to create ethic synergies,

making the research globally more balanced, e.g., by combining the less active participation in the quantitative stages with the co-creation that took place during the qualitative phases. On the other hand, a mixed methodology may allow participants to choose one of the stages or methods according to their personal preferences.

5 Discussion

As the text demonstrates, there is a strong interdependence among the ethical principles applicable to research with children, not devoid of contradictions. Even widely accepted concepts like informed consent are complex and multifaceted, and the consent of the children themselves should be carefully evaluated, as our study shows, and is also proven by the experience of other authors such as David et al. [24]. The prior consent of the guardian can inadvertently coercing them to participate, as it can challenge the absolute right of the child to express their views on issues interest her in the case of non-permission.

The application of the ethical principles of research with children turns out to be an ongoing apprenticeship for the researcher, whose role is essential to define the most appropriate approach, be it in a planned or responsive way. In our opinion, the researcher not only defines how the ethical principles will be applied throughout the various stages of the research, but also prioritises them, in order to be able to respond to any conflict that may arise between them. In our case, we gave priority to active participation, although co-creation didn't always suit the objectives of the study in all its stages. This way we have tried to take advantage of synergies between quantitative and qualitative methods. On the other hand, the participation was subject to the consent of both parents and children themselves, thus disallowing the participation of children who did not have their parents' permission. In our opinion, these dilemmas do not have a simple or unique solution, and the researcher must therefore choose the one he/she finds more suitable. These options have to be clearly stated, both during the research process and when reporting results. We therefore subscribe Christensen and Prout [11] who recommend researchers to report in detail the ethical choices adopted, to share their experiences, and to collectively discuss and develop the application of ethical principles of research with children. In this article we mean to contribute to this debate, as well as to share some aspects of our own experience. The need to develop protocols and to report practices remains. Further research on this topic will contribute to the development of methodologies and for a greater reliability and validity of results.

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Work Process in Mental Health and Social Inclusion: Qualitative Analysis by ALCESTE Software

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Abstract. Qualitative research which analyzed the mental health work process in the Family Health Strategy, by "Analyse Lexicale para Contexte d'um Ensemble de Segments de Texte" (ALCESTE), considering as purpose the social inclusion of the person with mental disorder. To collect the data used Semi-structured interviews. The analyses were through the intermediary of ALCESTE, with subsequent content analysis. There were three empirical categories: Identification of the work object in mental health; Mental health actions and interventions; Social Inclusion as the purpose of the work process in mental health. We discussed the tension between the biomedical and psychosocial models, the incorporation of mental health in the Family Health Strategy, the need to integrate the health team in the planning of care and interventions for the social inclusion of the "crazy". The use of ALCESTE to aid in the analysis of the data gives coherence and trustworthiness to the research.

Keywords: Primary health care · Mental health · Social inclusion · ALCESTE software

1 Introduction

The Brazilian National Mental Health Policy (PNSM, Política Nacional de Saúde Mental) succeeded in reducing the number of long-term inpatient psychiatric beds and expanding mental health community services. Thus, the Ministry of Health established the Psychosocial Care Network (RAPS, Rede de Atenção Psicossocial) through Ordinance 3088 of 2011 [1]. RAPS aims at providing a comprehensive care, tailored to the reality of its users and their social context [2]. The RAPS, including the Family Health Strategy (ESF), coordinate several services.

ESF has great potential to deliver mental health care to people with common mental disorders [3]. Its objective is to reorganize primary care, supporting the work process by positively improving the health of the population in a cost-effective manner [4]. The discourses of mental health and ESF are coherent since these practices perceive the reality in a broader and integral way, and focus on the deinstitutionalization movement and social inclusion [5].

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_9

Historically, psychiatric care based on the exclusive hegemonic model produced significant losses in the lives of people with mental disorders, leading to their social exclusion. Socially excluded are individuals systematically "blocked out from lively social exchanges" [6, p. 20], not restricted only to the exit from the job market, but also to social and family bond ruptures.

The work process of health care teams that treat individuals with mental disorders must consider this scenario. In this context, the object of this work process is the population ascribed in the territory, and any corresponding instrument must be coherent with RAPS and ESF proposals in the attempt to include people with mental disorders socially. However, inserting mental health within the scope of ESF requires changes to the work process, and their professionals still face difficulties in this development.

In view of this scenario, the research asks the following question: Does the mental health work process carried out by ESF teams promote social inclusion among individuals with mental disorders? Therefore, the aim was to analyze, using ALCESTE, the mental health work process in Family Health Strategy, taking into account its final purpose to promote social inclusion of individuals with mental disorders.

2 Method

This article is a qualitative research, which explores the history, relationships, beliefs, perceptions and standpoints, all products of individual interpretations of the respondents about the reality they experience and share with their peers [7].

It divided in two phases. The first one consisted of collecting data for a more comprehensive research with the following purpose: contribute to the evaluation and qualification processes of mental primary health care actions, and to the processes of training nurses and other health professionals, especially in mental health care. In this manner, the research setting were 04 Primary Healthcare Units (UBS) located in the municipality of São Paulo. Four ESF teams integrated each UBS, composed of 01 nurse, 01 physician, 01 or 02 nursing assistants, and 05 community health agents. All 105 health care professionals from the four UBS with ESF teams and they were invited to participate of the study. Nevertheless, 02 professionals declined due to personal reasons and 11 professionals excluded because they were on vacation or absent during the data collection. So 92 professionals of both genders, plus average age of 43 years, and average working period of 4 years in the UBS responded to the survey. The contact with the respondents was in person, during their working hours.

The inclusion criteria of the subjects were as follows: working for more than 6 months at the UBS' ESF, and have between 18 and 65 years old, while exclusion criteria were being on vacation or away during the data collection periods.

Data collected through in-depth semi-structured interviews, combining closed and open questions, where the respondent answers the question without being limited to the formulated question [7]. The interviews were individually. They were also recorded and fully transcribed. The guiding question of these interviews was "To what extent does the mental health work process carried out by the ESF team promote social inclusion of individuals with mental disorders?"

Study submitted to the Research Ethics Committee of the School of Nursing of University of São Paulo. It approved through expert opinion 1084/2011, authorized by the Municipal Health Department and consented by all health workers, i.e., subjects of the survey. We followed all ethical and legal measures related to the research, and the subjects were duly oriented and instructed through the Informed Consent Form (ICF), according to National Research Ethics Commissions (CONEP) resolution 196/1996.

The second phase involved 05 researchers who submitted the data obtained from these interviews through 02 data analysis methods: first, using ALCESTE (Analyse Lexicale par Contexte d'um Ensemble de Segments de Texte) software, and later by Content Analysis [6]. A software performs content analysis [8, 9]. Therefore, a method based on the textual data analysis of transcribed words. By identifying the occurrence of words in the responses, it organizes and compiles any relevant information. This way of handling, the results indicate that different vocabularies may point to multiple perspectives about a certain object [10]. Using the software does not exempt the researcher from having detailed notions of the context that goes beyond the corpus, that is, the researcher must know who are the typical subjects of each thematic class, what are the variables related to the phenomenon analyzed, and what literature is pertinent to analyze the theme.

ALCESTE is both a technique and a method for textual analysis. As a technique, it searches the distribution of vocabularies in the corpus, while, as a method is uses statistics for data exploration and description [8, 9]. The researchers used the software as a data analysis technique with the lexical sets produced by the software. Thus, the data leveraged by ALCESTE was interpreted according to Minayo's [7] content analysis.

The thematic content analysis consists of disclosing the core meanings that integrate a communication in which their presence or frequency represent the targeted analytical object, denoting reference values and behavior models contained in parts of the answers given by the subjects [7]. The content analysis may feature as the procedure that fragments the texts to identify regularities. Thus, it addresses the entire textual material [7]. It differs from ALCESTE as initially the software only analyzes reduced forms with a frequency greater or equal to 04, which may be a problem since it discards less used synonyms, identifying them as less frequent words.

ALCESTE generated seven classes, derived from lexical sets generated by the program. We did a free-floating reading of all generated data [7] to recognize and understand this material. This stage of the content analysis process characterized by the recognition of the documents, obtaining impressions and orientations [7]. The classes considered more relevant to the objective of the research are Classes 4, 5, 6 and 7. Later, we did new and successive readings of the selected material so the themes contained in each phrase of the corpus assimilated, and the content revealed, enabling the construction of empirical categories for this study.

The Content Analysis identified the thematic plurality contained in a set of texts and, in parallel, considered the frequency of such themes within the same set. Consequently, it provided through a comparison between corpus elements (words or sentences), a constitution of sets of elements with similar meanings, allowing the formation of more general content categories.

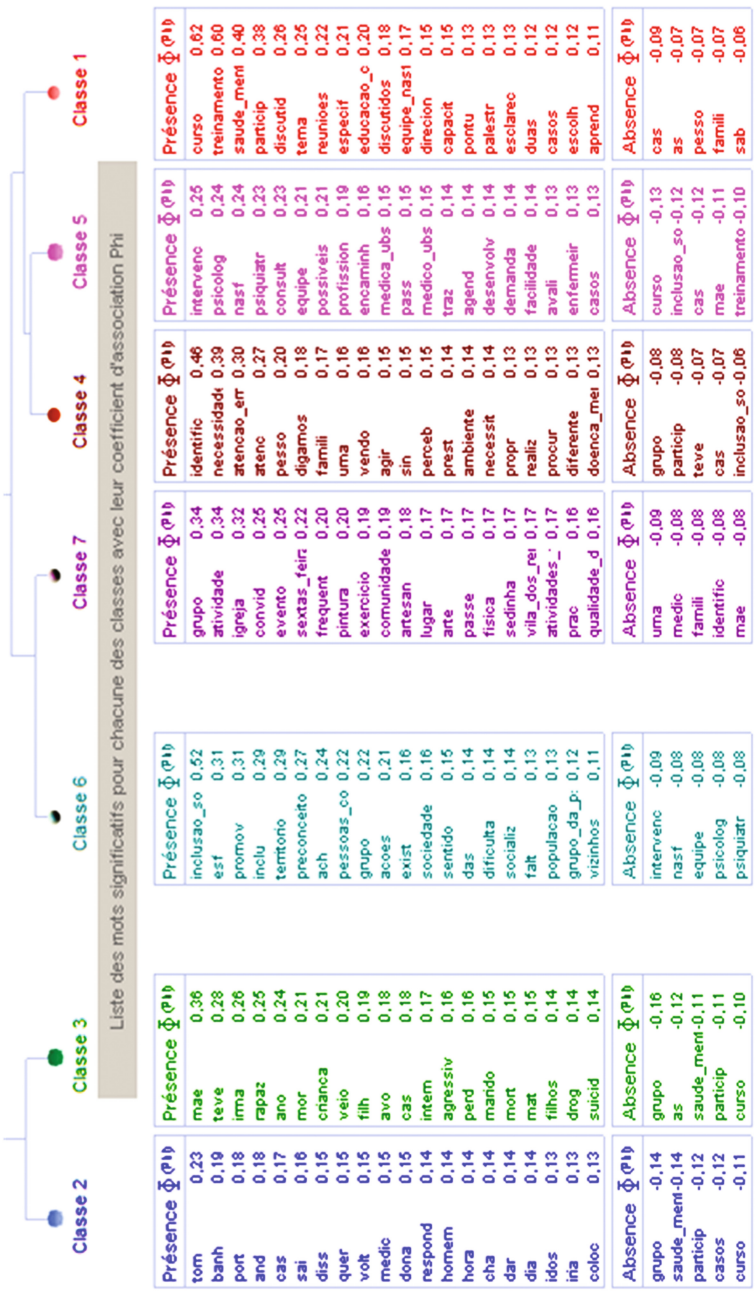

Fig. 1. Empirical categories according to ALCESTE's analysis. São Paulo. 2016

The categories created from the data inserted in ALCESTE and their subsequent lexical sets help attaining the objective of this paper once they submitted to statistical calculations and later interpreted by the researcher. Therefore, if data interpretation followed by data systematization occurs in content analysis, in lexical analysis what happens is the opposite: textual data systemized after their words and textual segments identified and organized so they interpreted to establish assumptions or lines of interpretation useful for the researcher's work.

The theoretical basis that established the viewpoint, the organization and the data analysis was the theoretical reference for Mendes-Gonçalves' [11] work process. For the author, the key aspects of the work process include the object of the work, the instruments, the purpose and the agents, being all this elements examined jointly. Therefore, a specific work process can only exist through a reciprocal relation.

The work object represents what we modified, the raw material (either in its natural state or as a product from a previous work). In the health care sector, this represents the human health care needs. The object is what affects the action of the worker. Work instruments are not natural as well, but historically constituted by subjects that consequently expands the possibilities of intervention over the object. The means, or the work instrument, is a thing or a complex of things that the worker inserts between himself and the work object, and is useful to guide his activity in relation to this object [12].

The work process depends on the agent that prints out a purpose and at the same time configures the object and the instrument of the work. Therefore, in the case of the health work process, we understand the agent as an instrument of work and subject of action, especially when this agent brings personal and collective projects within the field of possibilities (Fig. 1).

3 Results

The lexical set generated by ALCESTE and the content analysis enabled us to compile the results of this study in 03 categories. They are:

3.1 Identifying the Work Object in Mental Health (Class 4)

The respondents see a person that needs mental health care, as a social subject, inserted in a family and belonging to a territory that needs interventions beyond medications. Additionally, there is still a major influence of the biomedical model when identifying the needs when addressing mental health care.

The factors recognized to assist in the identification of mental health care needs include medical diagnosis; signs, symptoms, and behavior; use of psychiatric drugs; professional advice to service user; closer contact with family context, and social media. These factors stress out the tension between 02 opposite concepts of work object, the biomedical model against the psychosocial model. For example:

> *E11: I can identify the need of mental health care services for a person or family by visiting and talking to them. The daily life of a person, their relationship with the family and how they live together in their homes are signs that can indicate if a person has a mental illness.*

It is understood that the concept of the object reflects a moment of paradigmatic transition, supported by ESF' characteristics. However, professionals still notice indications of the stigma that affect a person with mental illness. This person rarely has an opportunity to tell the professional what he/she really needs in terms of care, considering a prior psychiatric diagnosis, information provided by the family, and the evaluation of a professional during a home visit are prioritized.

The next category indicates the actions and interventions in Mental Health revealed by the respondents of the research.

3.2 Actions and Interventions in Mental Health (Class 5)

A very common statement about this class is that when a UBS nurse or physician detects the need of mental health care services for a user, these professionals refer them to a psychiatrist or psychologist at NASF. Another intervention reported was the shared medical appointment among UBS and NASF professionals. Still in this category, the information given was that NASF professionals conduct all mental health appointments. Another point emphasized by the workers interviewed is the need for more support from NASF and that the lack of specialized professionals results in less mental health actions. According to the respondents, the restrictions in mental health actions carried out by UBS reduced due to NASF's prompt action. For example:

E42: We expected more support from NASF. We understand that the number of professionals at NASF is small in relation to their demand.

On the other hand, some professionals declared that the whole team gets involved in user-oriented Mental Health actions and interventions, such as going on home visits, scheduling individual appointments, physical therapies and establishing bonds. For example:

E83: So the bonding was established. Together with the shared appointment and with the team it was possible to create a definite bonding with the team.

3.3 Social Inclusion as a Purpose for the Work Process in Mental Health (Classes 6 and 7)

According to the interviews, social inclusion of people with mental disorders is not yet a reality. However, the professionals recognize that social inclusion actions as one of the purposes of the work process in the UBS. The discourses indicated that the goals of inclusion actions include expanding the access of people with mental disorders to health care services, reducing stigma among the community, promoting the circulation of these people within the territory and the empowerment of people with mental disorder that use the service. For example:

E74: I believe that ESF promotes social inclusion actions. We have a key role, even when we identify and demystify a little this stigma on people with mental disorders.

However, the health professionals stated the existing difficulties in promoting social inclusion of people with mental disorders. Some of the difficulties mentioned were the stigma of the professional and of the population towards mental disorder; the non-adhesion of users to groups and; the service organization. For example:

E27: There is a lot of discrimination towards people with mental illness. I don't see social inclusion in terms of society. The UBS offer several physical activities, dancing and gym classes, and group and individual therapies.

These were some of the facilitators mentioned: characteristics of the territory, configuration of the UBS, which allows a closer contact with the community, and the health care network. For example:

E23: The inclusion in the territory depend a lot of the commitment level. I think that because we are located in a very bohemian and artistic are, we don't face too many difficulties with inclusion.

4 Discussion

The relation between the words is what enriches the *corpus* so that the researcher can assign a meaning to what is behind the revealed contents. By enabling the researcher to access a significant network of words contained in the discourses through elementary context units (ECU) [10], ALCESTE allows the researcher to access the essence of an extensive data volume. Subsequently, he/she has more time to assign a meaning to data through content analysis, thus increasing the precision and depth of the analysis [9]. With the help of this methodology, we defend that mental health actions are part of ESF's daily practices; however, social inclusion is still not a purpose of the mental health work process in a systematic way.

The discourses of the respondents reveal that the concepts and actions of ESF health professionals reflect the tensions between biomedical and psychosocial paradigms. In some instances, the health professionals see the health-disease process according to the biomedical model, while in others, from the psychosocial paradigm. These different concepts interfere in the way professionals and administrators understand health and care [13].

Although public policies have advanced in the last years in the sense of incorporating mental health to primary care [2, 4, 14, 15], many studies focused on this object [16, 17] proved that in practice, this does not happen. The influence of the traditional biomedical paradigm is still present. The ESF still has not addressed the core factors that would transform mental health care, such as professional availability, material and human resources, key work instruments for practices in mental health [17]. Moreover, the results of this survey show a progress, once it revealed that professionals have developed concrete ways to treat people with mental disorders within the ESF, through groups and home visits.

Incorporating mental health actions in the ESF work processes may be promising to mobilize resources in the territory and ensure integral care [18]. The Ordinance 648/GM [19] that regulates the ESF does not prioritize mental health. For some years now, however, there are in Brazil some regulations that incorporate mental healthcare

actions in ESF [2, 4, 14, 15]. The primary care efforts require the organization of a joint assistance project in relation to the division of care responsibilities among ESF and NASF team members [20]. As a skilled service, the Family Health Support Center (NASF) has the intent of expanding ESF's capacity of resolution, thus, enabling a more efficient and effective use of its resources [21]. It is also important to highlight that ESF's team is responsible for mental health care services [15]. The division of responsibilities among planners and executors, and bad communication jeopardize the creation and enforcement of the assistance project [22].

Another issue demonstrated as having a negative effect on the mental health work process is the team's lack of integration, especially between nursing technicians and graduate health professionals. Nevertheless, something that draws attention is the fact that nursing technicians and community health agents (CHW), who are the ones that generally identify this demand, are not included in team meetings or in decision-making processes. Consequently, the exchange of information and the communication established inside the units can be affected, reflecting on the service quality [22–24]. Additionally, due to ESF's set up, we noticed some progresses concerning work instruments employed, such as space usage, bonding and home visits since knowledge and material are instruments required in the production of the work process. Interventions aimed at social inclusion, although limited, are a purpose of the work process in this research, as well as an evidence of the team's concern in fighting the stigma, in increasing the circulation of people with mental disorders in the territory, and the proposal of social exchange spaces among community members.

Frequently, people with mental illness have difficulties in establishing social relationships. Prejudice and the lack of options to engage in activities of social context may affect negatively this process [25]. Therefore, the ESF is a facilitator in building social networks, once it is a meeting point for community actors, a place to organize activities, to share experiences, and a potential mean of promoting the deconstruction of the "crazy" stigma.

This stigma is a brand that classifies people as undesirable, devaluing and discriminating those [26] due to insufficient or inadequate information (stereotypes) [27]. Among the consequences of the stigma is the marginalization of the "crazy" by the "non-crazy", generating prejudice and hindering social inclusion. The social consequences are critical, as the options of living a normal life for people with mental illness are restricted [28].

One of the results validate the facts exposed, indicating that the fear people have towards the "crazy" is probably the main difficulty imposed to their social inclusion. The violence attributed to individuals with mental illness is not supported by scientific literature [28–30]. Therefore, it is crucial to reinforce and value ESF actions that promote the circulation of people with mental illness in the territory, and bring other social actors closer to this population [31]. This promotes a change in the perception of the community towards people with mental illness, as well as their own awareness on their social skills and sense of belonging. According to Saraceno [32], the Psychosocial Rehabilitation process seeks the expansion of negotiation spaces for enabling social exchanges for people excluded by the system, which is what ESF needs to do.

It is already a progress that UBS teams acknowledge social inclusion as a purpose of the work process and promote, although still very limited, actions in this manner.

At the same time, the discordance between the practices and production of the academic world, and the policies of primary care and mental health is also evident. Therefore, to increase the social inclusion of people with mental disorders, more investments in actions that promote changes in concepts, attitudes, social relationships and culture, seeking for the destigmatization of the "crazy", are required.

5 Conclusion

Although the ESF advanced in the incorporation of mental health in primary care, social inclusion is still not the purpose of the mental health work process in primary care, at least in a systematic way. This difficulty in seeing social inclusion as a purpose of the work process goes beyond the stigma, still present in the social imaginary and in the assistance rendered by health professionals. This hampers the implementation of social inclusion actions and the establishment of relationships of people with mental disorders, which goes against the principles of the Unified Health System (SUS): integrality, universality and equity.

Using ALCESTE enabled us to analyze a larger number of discourses, without loosing the profoundness of the interviews. The software is valid as it analyzes the data and, subsequently, assembles assumptions and lines of interpretation, giving coherence and trustworthiness to the research [9]. However, the researcher should not consider the thematic classes and graphs provided as the result. They are only a representation of the material on the question that guided the analysis. For a deeper interpretation, the researcher must have a detailed knowledge about the context that goes beyond the *corpus* [8].

Finally, we emphasize that using ALCESTE in Mental Health researches for the analysis of mental health policies is extremely fruitful, but should be done with caution. It may even foster new themes for future researchers and be articulated to other complementary methods that seek contextualizing data better or probing a qualitative analysis. This was exactly the case of the study that used content analysis of Minayo [7] to expand the analysis of the results, adding more elements to the material interpreted by ALCESTE.

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Use of a Computational Tool to Support Content Analysis in Qualitative Research

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Abstract. The present article aims to discuss how the computational tool known as Poronto can help in the stage of material exploration, in qualitative investigations in the health area. Two studies in the Nursing area used Poronto for the identification of terms in analysis documents – one study is on a database of Terms of Nursing Jargon from a University Hospital in Southern Brazil, and the other is on the identification of terms in scientific articles and patient records from a University Hospital in Northeastern Brazil for nursing care for individuals with intestinal elimination stoma. When the identification of terms and the quantification of the frequency of occurrence are performed manually, in addition to becoming exhaustive, they are subject to failure. Poronto software facilitates the exploration of material in the content analysis, especially regarding the identification and quantification of categories, and in the identification of context units.

Keywords: Qualitative research · Qualitative analysis · Informatics

1 Introduction

Qualitative research focuses on a level of reality that cannot simply be quantified, as it deals with meanings, reasons, beliefs and values, thus corresponding to a deeper space of relationships, processes and phenomena [1]. There are several techniques that can be used in this type of research, among which is content analysis.

Content analysis is characterized as a method to treat information included in empirical texts. It is aimed at obtaining indicators that enable the inference of knowledge found in such sources, using systematic procedures and objectives of content description [2].

There are different methods used for content analysis, among which is the one proposed by Bardin [2], developed in three stages: pre-analysis; material exploration; and treatment of results, inference and interpretation.

Given the fact that content analysis is a broad method of treatment of verbal or textual data, there is the need to use computational tools, considered to be facilitators of

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_10

this process. The use of quantitative and qualitative software, in addition to facilitating material exploration, also qualifies the analysis process [3]. Moreover, the use of this software in qualitative research has been widely discussed by researchers in this area, aiming to improve the inference and analysis process [4–7].

ATLAS.ti and the IRAMUTEQ (Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires) are two examples of software used in qualitative research. ATLAS.ti helps researchers to perform data interpretation. Among its functionalities, ATLAS.ti enables the use of a large amount of text and the management of notes, concepts and complex structures between conceptual relationships that emerge during interpretation [4, 8]. IRAMUTEQ helps with the analysis of classic textual statistics, group specificity research, hierarchical classification, similitude analyses and cloud of words [9].

In Brazil, a software program known as Poronto was developed in the Health Technology Postgraduate Program of the Paraná State Pontifical Catholic University. It automatically identifies and quantifies the occurrences of terms in texts, aiming to enable the construction of ontologies in Portuguese [10].

In principle, however, Poronto was not developed to help with qualitative research, it can facilitate the content analysis process, automating the stages of identification and quantification of categories is sources for analysis. During the stage of material exploration, semantic categories and analyses of the frequency of occurrence of such categories are established [11]. The initial functionality of Poronto performs an extraction of terms in semantic categories and their subsequent quantification.

This tool has been used in studies in the health area to identify and quantify terms from several data sources, such as records of health professionals and scientific articles [12, 13]. In view of these reflections, the guiding question of the present study arises: how can Poronto software help with the stage of material exploration and Bardin's content analysis [2], based on the extraction of terms found in the literature and patients' nursing records. Aiming to answer this question, the present article includes the experience from two studies in the Nursing area that used Poronto for the extraction of terms.

Based on these two cases, the objective of the present study is to discuss how Poronto can help with the stage of material exploration in qualitative studies in the health area.

2 Methods

This section shows the key concepts of Bardin's content analysis [2], the Poronto software, and two reports of experiences about the use of such software in the health area.

2.1 The Analysis Process Proposed by Bardin

In the first stage of content analysis, known as pre-analysis, the research corpus is formed through material organization and systematization of preliminary ideas. This organization includes free-floating reading; the choice of documents to be analyzed; the formulation of hypotheses and objectives; and the referencing of indices and

preparation of indicators, including the determination of indicators through text extracts from analysis documents [2].

In the second stage, material exploration, the following are performed: a thorough analysis of the material to define categories (coding systems); the identification of record units (units of meaning to be coded, corresponding to the segment of content to be considered as base unit), aimed at the categorization and assessment of frequency; and the identification of context units (units of understanding to code the record unit that corresponds to the message segment, aiming to understand its exact meaning). This stage was an important process, considering the fact that it can enable the wealth of interpretations and inferences or not [2].

The third stage, treatment of results, inference and interpretation, is the stage when the results are treated and the coded data are condensed, seeking information for analysis, which will result in inferential interpretations. It is the moment of intuition and reflexive and critical analysis [2].

Considering the activities developed in the stage of material exploration to which this study is limited, the way Poronto software automatically performs the process of identification of terms and quantifies their frequency of occurrence will be shown, apart from the results obtained after texts are processed by this tool.

2.2 Poronto Software

Poronto is a software program for the semi-automatic construction of ontologies from texts in Portuguese in the health area. Its functioning is divided into two main stages: development of the corpus of analysis and development of the ontology [10]. This is a free software program available for download at: https://code.google.com/p/poronto/downloads/detail?name=poronto.zip&can=2&q=#makechanges.

This tool uses measures to determine the frequency of occurrence of simple and complex terms in a corpus of analysis. Terms are quantified with the application of tf-idf frequency measures (term frequency-inverse document frequency) and entropy [10].

Additionally, this software uses four grammatical rules to extract complex terms, considering the following associations: noun and adjective; noun, preposition and noun; noun, preposition, adjective and noun; and noun, preposition, noun, preposition and noun [10].

Poronto has filters: the minimum frequency of a term in a document; extraction of noun or complex terms exclusively to select these groups of words; and measures of frequency. Additionally, the number of repeated, single and selected terms can be visualized, according to the main page of the tool shown in Fig. 1.

After texts are processed by this software, the following results are shown: the list of simple and complex terms identified; the frequency of occurrence of each term identified; the frequency measures used by the software; whether the term is found in a structured vocabulary used in the health area in Brazil or not – *Descritores em Ciências da Saúde* (DeCS – Health Sciences Descriptors); and synonyms for the terms identified, according to what is shown in Fig. 2.

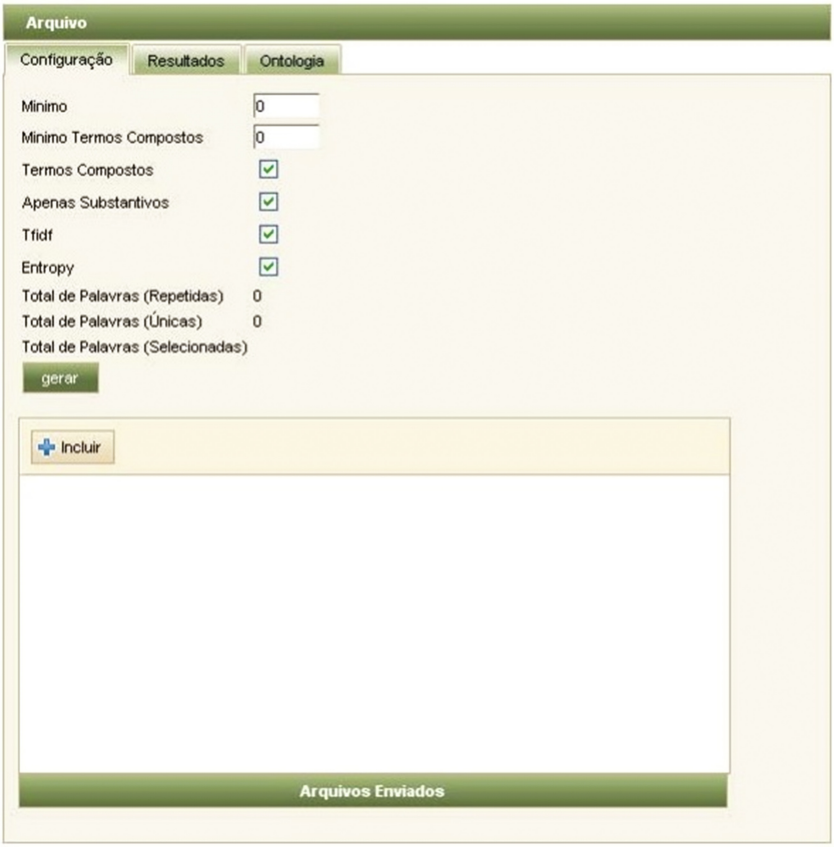

Fig. 1. Main page of Poronto software

2.3 Reports on Experiences of Use of Poronto

In this section, the process of identification of terms with the use of Poronto in two studies in the Nursing area is presented.

The first report on experiences deals with the construction of a database of terms of Nursing jargon for a university hospital in Southern Brazil, while the second report deals with the identification of relevant terms for nursing care in scientific articles and patients' nursing records.

In the first report, aiming to enable the construction of the database of terms of Nursing jargon, an initial stage of identification and quantification of terms noted down by nurses in electronic nursing records for patient progress was required [12]. Through the assessment of frequency, i.e. the number of times that a term appeared in the records, the relevance of such term and the capacity of representation of nursing practice in this space of care could be analyzed.

A total of 115,760 records of patient progress were used, from which simple and complex terms were extracted. These records were saved in Portable Document Format

Resultados

Lemma	Total	Tfidf	Entropy	Decs	Sinônimos
a	8	9.25	1.07	✗	
abaixo	18	9.25	1.07	✗	abaixo...
abalado	1	9.94	1.0	✗	abalado...
abalar	1	9.94	1.0	✗	abalar...
abalo	1	9.94	1.0	✗	abalo...
abandonar	8	9.25	1.07	✗	abandonar...
abandonarse	1	9.94	1.0	✗	
abandono	4	9.25	1.06	✗	abandono...
abandono das atividades	1	9.94	1.0	✗	
abandono de atividades	1	9.94	1.0	✗	
abandono em finalmente	1	9.94	1.0	✗	
abandono humano	1	9.94	1.0	✗	
abarcar	3	9.25	1.07	✗	abarcar...
abater	2	9.25	1.07	✗	abater...
abatido	1	9.94	1.0	✗	abatido...
abauladinho	1	9.94	1.0	✗	
abdicar	1	9.94	1.0	✗	abdicar...
abdicação	1	9.94	1.0	✗	abdicação...
abdicação pessoal	1	9.94	1.0	✗	
abdome	14	9.25	1.07	✓	abdome...

« « 1 2 3 4 5 6 7 8 9 10 » »

Fig. 2. Results of the text processing performed by Poronto.

(PDF) and subsequently input in the Poronto software to be processed [12]. Given the large number of records of progress used in this study, it would be impossible to perform the process of identification and quantification of terms manually in due time.

Processing resulted in a list of terms extracted from nursing records, with the quantifications of repetitions of each term. First, the terms went through a process of normalization – standardization, when suitable, of nouns and adjectives to the masculine singular form and of verbs to the infinitive. After normalization, these terms were divided into two categories: primary terms – the main terms extracted from the software; and secondary terms – those connected to the main term, capable of attributing contextual reference [12].

The second experience involved the identification of terms, in scientific articles and patients' nursing records of a university hospital in Northeastern Brazil, relevant for nursing care for individuals with an intestinal elimination stoma. Such identification was the initial stage for the construction of a terminological sub-group of International Classification for Nursing Practice (ICNP®) aimed at this clientele.

In the present study, there was a search for scientific articles indexed in the database of the Scientific Electronic Library Online (SciELO), *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (LILACS – Latin American and Caribbean Literature in Health Sciences) and *Base de Dados de Enfermagem* (BDENF – Nursing Database). The key words for the search in the databases were as follows: ostomy and nursing, stoma and nursing, ostomy and nursing, colostomy and nursing, and ileostomy and nursing. A total of 49 scientific articles were selected, fully available in Portuguese,

published between 2004 and 2015, with a title or abstract suggesting nursing care for individuals with an intestinal elimination stoma.

Scientific articles were converted into Word® documents, grouped and saved in a single file, which was input in the Poronto software. After processing, an Excel® spreadsheet was created, including simple and complex terms originated from the literature.

Next, this extraction process was applied to a file containing the transcription of 39 patients' nursing records in a health care service for ostomized individuals of a university hospital located in Northeastern Brazil.

Nouns, adjectives, adverbs and verbs were selected among the terms extracted, according to their frequency of occurrence and relevance with the research theme. These comprised the two lists of terms identified as relevant for care for individuals with intestinal elimination stoma – a list of terms originated from the literature and a list of terms originated from nursing records.

3 Results and Discussion

In the present study, which extracted terms from nursing records from electronic nursing records of a university hospital in Southern Brazil, Poronto software extracted 257,893 terms originated from the corpus of patient progress in nursing [12].

Although the frequency of occurrence of each term is automatically quantified by the software, orthographic corrections had to be made. Thus, the frequency of occurrences of terms was updated by researchers. This process resulted in a corpus of analysis of 110,700 simple and complex terms [12].

Table 1 shows examples of terms extracted from Poronto, categorized as primary and secondary, with their respective numbers of occurrence.

In the second study, the extraction of relevant terms for health care for individuals with an intestinal elimination stoma resulted in 20,907 terms, of which 20,668 terms originated from scientific articles and 239 terms originated from paper-based nursing records.

The terms extracted from scientific articles and nursing records, categorized into nouns, adjectives and verbs, and their respective frequencies of occurrence are shown in Tables 2 and 3.

Observing the frequency of occurrence of terms in Table 1 and the number of terms identified for health care for individuals with intestinal elimination stoma in the second study, the impossibility of this process being performed manually in due time was confirmed. Moreover, when performed manually, the extraction of terms can be influenced by the knowledge of each researcher, whether through the reliability to select terms considered to be important or strictness of selection criteria [10]. The use of Poronto causes this process to be less exhaustive and minimizes the possibility of failures in the selection and exclusion of terms to be categorized.

Terms with a higher number of occurrences should be more relevant in the representation of phenomena that one intends to investigate.

In the extraction of complex terms, the rules of morphological sequence used by Poronto can facilitate the identification of context units and the differentiation of

Table 1. Main primary terms and frequency, secondary terms and frequency from the Database of Terms of Nursing Jargon of the University Hospital. Curitiba, Southern Brazil, 2014.

Primary term	Frequency	Secondary term
Time	56162	visit; surgery; lunch; exam; medication; restlessness; ambulance; dyspnea; morning; hemodyalisis; period; fasting; day; drowsiness; lucid; procedure; diet
Abdomen	53609	open; ascites; aspect; low abdomen; clot; coloration; colostomy; concave; constipation; dressing; debit; dehiscence; distension; drain; edema; rigid; ecchymosis; excoriation; exudation; evisceration; surgical wound; globular; flacid; gastrostomy; pregnancy; ileostomy; lesion; clean; flat; protuberant; hydro sound; bleeding; dry; tense; sound; dirtiness
Access	46215	diet; team
Diet	45796	open; mild; low sodium; support; infusion; dripping; continuous; infusion pump; gastrostomy; jejunostomy; gastrointestinal tube; specific; cold; liquid; free; low fat; industrialized; partial; to offer; oral; semi solid; semi liquid
Gastrointestinal tube	32380	assessment; location; diet; infusion pump; infusion; diet therapy; difficulty; guidewire; guidance; stasis; success; technique; request; gastric; duodenum; nostril; left; functioning; right; intercurrence; obstructed; feeding; suspend; open; anterior

Table 2. Examples of relevant terms for health care for individuals with intestinal elimination stoma, identified in scientific articles indexed in the SciELO, LILACS and BDENF databases, shown as frequencies of occurrence (n) and categorized as nouns, adjectives and verbs.

Noun	(n)	Adjective	(n)	Verb	(n)
Care	879	Ostomized	591	To perform	253
Patient	769	Social	135	To care	192
Health	655	Psychological	96	To give	189
Professional	620	Emotional	96	To make	174
Ostomy	520	Corporeal	95	To speak	105
Stoma	484	Temporary	86	To show	94
Individual	482	Adequate	84	To observe	76
Nurse	448	Sexual	74	To promote	73
Familiar	414	Definitive	70	To help	71
Bag	387	Present	48	To assess	60
Colostomy	340	Permanent	47	To guide	56
Family	333	Psychosocial	33	To offer	53
Self-care	267	Spiritual	19	To exchange	52
Rehabilitation	147	Peristomal	14	To put	49
Skin	124	Provisional	8	To wash	38
Ileostomy	70	Committed	7	To explain	32
Peristomal skin	8	Absent	6	To prevent	16

Table 3. Examples of relevant terms for health care for individuals with an intestinal elimination stoma, identified in the nursing records of the Service for Ostomized Patients of the University Hospital in Northeastern Brazil, shown as frequencies of occurrence (n) and categorized into nouns, adjectives and verbs

Noun	(n)	Adjective	(n)	Verb	(n)
Bag	69	Permanent	29	To perform	14
Colostomy	47	Drainable	22	To refer	13
Permanent colostomy	24	Temporary	17	To guide	11
User	22	Collector	14	To admit	9
Material	16	Ostomized	11	To register	4
Piece	16	Peristomal	8	To do	4
Skin	15	Monthly	3	To care for	3
Temporary colostomy	13	Intact	1	To clean	3
Belt	12	Hyperemic	1	To serve	2
Service	11	———	–	To wipe	2
Disc	11	———	–	To inform	2
Cleaning	10	———	–	To communicate	1
Ostomy	10	———	–	To stress	1
Drainage bag	9	———	–	To dry	1
Guidance	8	———	–	To request	1

synonyms. In Table 1, the primary term “access” is followed by the secondary terms “diet” and “team”, which enables researchers to understand that, in this context, the term “access” referred to the patients’ access to diet and health team, rather than, for example, intravenous access (place of insertion of venous catheter).

4 Conclusions

In conclusion, Poronto facilitates the stage of exploration of content analysis material as it automatically enables the identification and quantification of occurrences of terms in a large volume of empirical material. Additionally, the identification of the morphological sequence of terms can help the process of construction of context units.

The use of Poronto as an alternative for the stage of material exploration reduces the effort made by researchers during the process.

One of the limitations of Poronto is the fact that, before processing, it requires the text format to be adequate for input. Furthermore, the selection of terms generated by this software requires researchers to pay attention, especially during the normalization process, as the context in which terms are found must be understood.

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The Evidence-Based Practice: Breastfeeding as a Preventive Factor for Postpartum Depression

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Abstract. Post-partum is expected to be a time of joy. However, this is not always the case, as it can be a time marked by moments of sadness, fatigue and discouragement. This study intended to obtain the best scientific evidence to understand whether breastfeeding has a preventive effect on postpartum depression. For this, an integrative review of the literature was made on the relationship between breastfeeding and postpartum depression through the databases: EBSCO host, LILACS, PubMed, SciELO, institutional repositories and Google Scholar. Most studies identify breastfeeding as being preventive of postpartum depression, highlighting its importance for the puerperium's mental health and consequently reducing the chances of developing postpartum depression. An informed and supported woman about breastfeeding will be able to feel confident in her new role. A constant investment by the health team, initiated during the couple's planning process for pregnancy, is essential, and is maintained throughout pregnancy, delivery and postpartum.

Keywords: Breastfeeding · Postpartum depression · Prevention

1 Introduction

The woman's preparation for the birth of a child begins early on in the pregnancy, being a period of preparation, both physical and psychological. According to a study by Marques [1] with the birth of the first child, a new transition phase of the family's life cycle begins, with the necessary rearrangements, definition of parental roles and functions.

Despite this preparation, having a totally dependent child in one's arms can be very frightening. Thus, a study [2] reports that postpartum is, of all of the phases of a woman's life, the period of greatest vulnerability for psychiatric disorders to appear. That is why

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_11

the postpartum depression is recognized as an important public health issue, because of the suffering it causes to the mothers and the negative impact on their family [3].

The formation of emotional ties between the woman and her child does not occur automatically. Only through the contact with the baby does the construction of this bond begin [4].

It is known that the period immediately after the birth is crucial for the bond between the mother and the newborn. The World Health Organization recommends that breastfeeding be initiated within the first hour of the newborn's life, facilitating the bond and reinforcing the emotional ties between the two [5].

Regarding this bond, the study by Silva [6] considers the social support and the psychological well-being of the mother to be important, since research has evidenced a lower maternal bond associated with depressive and anxiety levels.

Still, concerning the development of emotional ties, the importance of breastfeeding is emphasized. Also, it is through breastfeeding that the baby experiences one of the main forms of contact with the mother, and she feels she can provide comfort, love and nourishment to her child.

According to a study [7], breastfeeding has been associated with the well-being of both the child and the mother, as this brings physical and psychological benefits to the children, such as reducing the risk of infectious diseases and obesity, decreasing cholesterol levels and increasing cognitive and motor performance. As stated by these authors, the positive results for the mother's physical health include the reduction of blood pressure and the risk of breast and ovarian cancer, the attenuated response to stress and the improvement in sleep.

The probable psychological protective effects of breastfeeding are often neglected. According to Donaldson-Myles [8], recent studies have largely supported the proposition that breastfeeding can help protect women from stress effects. Also according to this study, the research on lactating hormones established that their part, though not fully understood in the human being, is fundamental in the relation between breastfeeding and postpartum depression.

Another study [9], refers that nowadays it is thought that breastfeeding does not cause, quite the contrary, it protects from maternal depression, and that stopping breastfeeding may constitute a risk factor for the increase of maternal depression and anxiety.

Acknowledging that breastfeeding, apart from the multiple scientifically proven advantages to the health and wellbeing of the new-born, it also contributes to the health and wellbeing of the mother, we thus believe that it can prevent postpartum depression.

The objective of this study was to obtain scientific evidence to understand if breastfeeding has a preventive effect in postpartum depression through an integrative review of the literature.

2 Method

It is an integrative review of the literature, referring the most comprehensive methodological approach to reviews as it allows for the inclusion of experimental and non-experimental studies, for a complete understanding of the phenomenon to be analysed as well as combining data from theoretical and empirical literature [10].

The bibliographic research included the following databases: EBSCO host - Research Data bases, Latin American and Caribbean Literature on Health Sciences (LILACS), US National Library of Medicine National Institutes of Health (PubMed), Scientific Electronic Library Online (SciELO), Open Access Scientific Repository of Portugal (RCAAP) and Google Scholar. The research had the following descriptors as references: "breastfeeding", "postpartum depression", "depression" and "prevention" as well as their combinations: "breastfeeding and postpartum depression"; "breastfeeding and depression"; "breastfeeding and depression and prevention" and "breastfeeding and postpartum depression and prevention".

The selection of the texts was based on the following inclusion criteria: original articles on the subject, available in full, written in Portuguese, English and Spanish, but with a title, abstract and keywords in English, and with a publication date between November 2011 and November 2015.

As exclusion criteria incomplete texts and articles were eliminated, as well as those not available online and in full, and the texts where the content did not refer to the topic.

The research of the database resulted in 233 papers. Of these, repeated articles were eliminated, remaining 116 papers. After analysing the title and the abstract, 95 papers were excluded as they did not study or refer any connection between breastfeeding and postpartum depression.

Therefore, a first evaluation included a total of 21 papers, to be thoroughly read and analysed. An additional five articles were excluding after reading, as even though the abstract mentioned the words breastfeeding and postpartum depression the papers did not focused on the relation between then.

Research was carried out by two researchers independently and later validated by an expert on qualitative research.

The research question considered in this study was: "Can breastfeeding prevent postpartum depression?"

The following 15 papers were selected for this integrative review of literature as described in Table 1.

Table 1. Description of the selected studies

	Author(s)	Title and publication year	Type of study
1	S. M. Haga, P. Ulleberg, Kari Slinning, Pål Kraft, Thorbjørn B. Steen, Annetine Staff	"A longitudinal study of postpartum depressive symptoms: multilevel growth curve analyses of emotion regulation strategies, breastfeeding self-efficacy, and social support." (2012)	Longitudinal, quantitative study
2	Emily F. Gregory; Arlene M. Butz, Sharon R. Ghazarian, Susan M. Gross; Sara B. Johnson	"Are Unmet Breastfeeding Expectations Associated With Maternal Depressive Symptoms?" (2015)	Quantitative longitudinal data analysis

(*continued*)

Table 1. (*continued*)

	Author(s)	Title and publication year	Type of study
3	Alison M. Stuebe, Karen Grewen, Samantha Meltzer-Brod	"Association Between Maternal Mood and Oxytocin Response to Breastfeeding." (2013)	Longitudinal cohort study
4	Ranadip Chowdhury, Bireshwar Sinha, Mari Jeeva Sankar, Sunita Taneja1, Nita Bhandari1, Nigel Rollins, Rajiv Bahl, Jose Martines	"Breastfeeding and maternal health outcomes: a systematic review and meta-analysis." (2015)	Systematic review of literature with meta-analysis
5	Bárbara Figueiredo, Cláudia C. Dias, Sónia Brandão, Catarina Canário, Rui Nunes-Costa	"Breastfeeding and postpartum depression: state of the art review." (2013)	Systematic review of literature
6	Gurpreet Kindra, Anna Coutsoudis, Francesca Esposito, Tonya Esterhuize	"Breastfeeding in HIV Exposed Infants Significantly Improves Child Health: A Prospective Study." (2012)	Prospective, quantitative, analytical study
7	Thomas F. Northrup, Susan H. Wootton, Patricia W. Evans, Angela L. Stotts	"Breastfeeding practices in mothers of high-respiratory-risk NICU infants: impact of depressive symptoms and smoking." (2013)	Cross-sectional, exploratory, quantitative study
8	Fiona Donaldson-Myles	"Can hormones in breastfeeding protect against postnatal depression?" (2012)	Systematic review of literature
9	Ashraf Tashakori, Azadeh Zamani Behbahani, Reza Davasaz Irani	"Comparison Of Prevalence Of Postpartum Depression Symptoms Between Breastfeeding Mothers And Non-breastfeeding Mothers." (2012)	Case-control descriptive analytic study
10	Mariana C. M. Machado, Karine F. Assis, Fabiana C. C. Oliveira, Andréia Q. Ribeiro, Raquel M. A. Araújo, Alexandre F. Cury, Silvia E. Priore, Sylvia C. C. Franceschini	"Determinantes do abandono do aleitamento materno exclusivo: fatores psicossociais." (2014)	Longitudinal study based on birth cohort
11	Tonia Olson e Angela Bowen	"Dispelling Myths to Support Breastfeeding in Women With Postpartum Depression." (2014)	Descriptive study using literature review
12	Jennifer Hahn-Holbrook, Martie G. Haselton, Christine Dunkel Schetter, Laura M. Glynn	"Does breastfeeding offer protection against maternal depressive symptomatology?" (2013)	Longitudinal, Prospective, Analytical Study

(*continued*)

Table 1. (*continued*)

	Author(s)	Title and publication year	Type of study
13	Cristina Borra, Maria Iacovou e Almudena Sevilla	"New Evidence on Breastfeeding and Postpartum Depression: The Importance of Understanding Women's Intentions." (2015)	Analysis of longitudinal data
14	Cheng Man-Wai	"Does breastfeeding affect maternal postpartum mood?" (2014)	Cross-sectional, qualitative study
15	Aisha Hamdan e Hani Tamim	"Psychosocial risk and protective factors for postpartum depression in the United Arab Emirates." (2011)	Longitudinal study, prospective

3 Results

In order to reach our goal, to obtain the best scientific evidence to understand if breastfeeding has a preventive effect in postpartum depression, and according to this integrative review of the literature, the majority of the studies selected identifies breastfeeding as being preventive of postpartum depression. Of the fifteen articles, twelve emphasize the importance of breastfeeding for the mental health of the puerpera and, consequently, in the decrease of the chances of developing postpartum depression.

Five articles also identify it as a risk factor and only one study found no clear association between breastfeeding and postpartum depression.

We will now describe the 3 categories obtained through content analysis of the 15 selected papers.

3.1 Breastfeeding as a Protective Factor for Postpartum Depression

Six studies describe the various benefits of breastfeeding, especially for the new mother's mental health, and are considered a protective factor for postpartum depression.

Hence, breastfeeding is seen as a positive natural intervention to reduce the risk of PPD, attenuating stress responses and reducing the body's inflammatory response [8].

Northrup et al. [11] highlight the importance of increasing breastfeeding rates in order to prevent depressive symptoms, since women who had discontinued breastfeeding presented more depressive cases.

In one study [12] the authors believe there is a probable association between not breastfeeding and the existence of depressive symptoms in the woman after the birth of her child.

One study [13] considers breastfeeding as a protective factor when the woman has high self-efficacy in breastfeeding. That is, if she is confident during the act of breastfeeding, she will be protective of postpartum depression because these women tend to have lower scores in the Edinburgh postpartum depression scale. Thus, the

authors suggest that increasing self-efficacy in breastfeeding in the new mother may be important in attempting to prevent postpartum depressive symptoms.

A study [14] reports that there is an association between women's satisfied expectations of breastfeeding and depressive symptoms, since the women who breastfed, for the period of time they had planned for, were not associated with postpartum depression symptoms.

Three articles emphasize how prevention of postpartum depression is the reason why the woman exclusively breastfeeds the child as she had planned during pregnancy. It would not only be necessary to plan, but also to be successful in fulfilling this personal goal. Accordingly, the fulfilled expectations of exclusive breastfeeding are a strong protective factor for these women. Likewise, according to another study [15], women who desired just breastfeeding and were successful in upholding it from 6 to 8 weeks postpartum, were associated with lower depressive symptoms in the puerperal phase.

Evidences were also found that with exclusive breastfeeding up to three months, the woman tends to show higher decrease within the depressive symptomatology over time [16].

3.2 Breastfeeding as a Risk Factor for Postpartum Depression

Breastfeeding was described as a risk factor in five articles. In one study [17], exclusive breastfeeding at 2 weeks was associated with an increase in depressive symptoms at 8 weeks.

As mentioned by another study [18], women who were not able to breastfeed as planned saw the symptoms of depression increase.

A different study [15] also concluded that depressive symptoms are increased if breastfeeding is not exclusive or when the woman is unable to breastfeed exclusively as she had planned.

A study [13] consider breastfeeding as a protective factor when the woman has high self-efficacy in breastfeeding. However, it will have an inverse relationship if the woman has no confidence in the way she is breastfeeding her child.

Some authors [14] report that unmet expectations of mothers for breastfeeding may add to the lack of breastfeeding and, consequently, to postpartum depressive symptomatology.

3.3 Postpartum Depression as a Risk Factor for Breastfeeding

The relationship between breastfeeding and postpartum depression may have an inverse influence, since according to eight studies, postpartum depression has been described as a predictor of breastfeeding or even considered a barrier to its initiation.

Postpartum depression interferes with the mother's decision to breastfeed, as a depressed woman tends not to initiate, maintain or even exclusively breastfeed.

The authors also associate that women with prenatal depressive symptomatology fail to breastfeed on average 2 to 3 months earlier than women who were not depressed during pregnancy [16], and who have a higher risk of developing postpartum depression after childbirth [18].

4 Discussion

The practice of breastfeeding has become a major challenge for women in today's society. The evolution and organizational structure of society, the entry of women to the working world and the loss of the extended family (grandparents, parents, uncles, children and cousins living in the same household), made breastfeeding an exhausting process for the new mother.

Much is now required of this mother. She will have to be able to respond to the needs of her baby, do her housework, be a wife, a woman and still have a job, even if she has to give up her well-deserved rest and let go of activities that she was fond of doing until then.

Thus, the postpartum period is considered a dangerous period for the puerpera, as postpartum depression is very common as well as other psychological changes [2].

This paper aimed to find out if there was a beneficial relationship between breastfeeding and maternal mental health in a period as critical as the postpartum one.

If, according to several studies, breastfeeding has been shown to be in fact preventive against depressive symptoms and consequently against postpartum depression, others see breastfeeding as a risk factor for postpartum depression. We also found evidence that postpartum depression is a barrier to initiating and maintaining breastfeeding.

According one study [13], breastfeeding can be considered both preventive and a risk factor for the onset of postpartum depression. If the woman has confidence in how she is breastfeeding, breastfeeding will be preventive. Nevertheless, if she does not have confidence, this will be considered a risk factor for the development of Postpartum Depression.

According to some studies [14, 15, 18], breastfeeding was protective in women who breastfed their children as they had planned. However if women could not breastfeed as planned, chances of having postpartum depression increased.

Other studies [8, 15, 16] also report that breastfeeding is preventive of postpartum depression, especially if it is exclusive.

Yet other studies [7, 9, 18–20], describe the benefits of breastfeeding, many of which help prevent postpartum depression.

As a result, the premise that breastfeeding women are less likely to have postpartum depression has more support in the existing literature than the inverse relation. Of the fifteen articles selected for this review, twelve acknowledge the importance of breastfeeding as a prevention factor, while eight report that postpartum depression influences women in their decision to breastfeed. There are also five articles that describe breastfeeding as a risk factor for postpartum depression.

Therefore, we can conclude that there is a probable association between non-breastfeeding and depressive symptoms among mothers. Increasing breastfeeding rates may provide protection for some mothers against depressive symptoms, because mothers who stop breastfeeding have higher levels of depressive symptoms.

The results of this integrative review of the literature highlights the importance of providing specialized breastfeeding support to women who are breastfeeding; but also, to provide compassionate support to women who had intended to breastfeed and were

not able to do so. It is also necessary to screen women in the prenatal period, as well as in the postnatal phase.

Our research demonstrates the need for further research in both causal paths that link breastfeeding and postpartum depression, especially given that breastfeeding brings substantial benefits to the child's health, and maternal depression has negative consequences for both maternal and child health.

5 Conclusion

In spite of the numerous advantages of breastfeeding, the risks are also described. Postpartum depressive symptoms affect the woman's decision to breastfeed or even to keep breastfeeding.

A constant investment of the health team is therefore essential. This investment will be initiated during the couple's planning process for the pregnancy, and will continue throughout pregnancy, childbirth and postpartum. It will be crucial to know the woman's wishes and expectations, so that the health professional can support and encourage the woman to achieve her goals.

Despite the importance of Nurses during pregnancy and birth, a woman's will-power should prevail, and it is not beneficial that she be forced to breastfeed if she does not wish to, or is unable to do so.

As a limitation of this study, we refer to the large number of texts found that did not meet the criteria that was initially defined, since some articles were not original and were not available for full reading. We are aware that some of these papers would be very useful in reinforcing the results of our review.

Relevance to clinical practice. This study allowed us to identify the magnitude of the problem of breastfeeding as a protective factor for postpartum depression, breast-feeding as a risk factor for postpartum depression, and postpartum depression as a risk factor for breastfeeding.

This is relevant to the practice of nurses, obstetricians and any other medical provider of healthcare to pregnant women and mothers, in order to form and plan strategies appropriate for the prevention of Postpartum depression.

These results show that it would be a good professional practice to introduce a measuring instrument to facilitate the identification of depressive symptoms in women before pregnancy and in the pre-conception consult. It is also important that healthcare professionals are alerted to the situation and provided with specific training on the matter.

Nurses should invest on the breastfeeding subject early in time, starting in schools, with children and adolescents, in order to promote a pro breastfeeding culture which should be reflected and valued in the national health care policies.

Acknowledgments. This study is financed by national funds through FCT - Fundação para a Ciência e Tecnologia, I.P., under the project UID/Multi/04016/2016. Furthermore, we would like to thank the Instituto Politécnico de Viseu and CI&DETS for their support.

Contributions. Conception and study design: MCMC, ECC; data analysis: MCMC, ECC; manuscript preparation: MCMC, ECC; discussing: MCMC, ECC; revising: MCMC, ECC; approving the article: MCMC, ECC, CMFP, CMBC, PABN, OPA, VCP, JCD, LRC.

Funding. Financial support was provided by FCT and the Centro de Estudos em Educação Tecnologia e Saúde, Portugal.

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CAQDAS in Discursive Textual Analysis: Possible Applications in Qualitative Studies

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Abstract. This article presents a possibility of using Discursive Textual Analysis (DTA) with the use of CAQDAS (*Computer Assisted Qualitative Data Analysis Software*), in particular, the Sphinx Lexica. It is a qualitative study based on an empirical research whose instrument of data collection is formed by a questionnaire applied to 24 high school teachers. It concludes that the application of DTA with CAQDAS offers a greater quality in the data analysis and enables new understandings of the phenomenon studied to emerge.

Keywords: CAQDAS · Sphinx · Textual analysis · Categories · Comparison

1 Introduction

This paper seeks to demonstrate the application of discursive textual analysis (DTA) as an information tool in software products that help the data analysis of qualitative researches. This software has been called *Computer Assisted Qualitative Data Analysis Software* (CAQDAS). According to Kelle [1], "[. . .] a CAQDAS represents some computer programs oriented to help the qualitative data analysis." With this definition, we consider software products as CAQDAS in this article.

In general, a CAQDAS has its application methodology, but the challenge proposed in this reflection is showing that we should not focus primarily on following its handbook sequence, but rather incorporate another data analysis methodology, so that the process becomes more robust based on an interconnection between researcher and the analysis results. Thus, we seek to avoid what Lee and Fielding [2] consider as a possibility, i.e., a gap between researcher and his data. Therefore, he or she cannot praise the software as it would carry all the analysis on its own and deliver the finished product to the researcher. A quality analysis assumes a *dip* in the analytical process and constant interaction with data – a process that might be compared to a *light storm*, as Moraes and Galiazzi [3] put. One cannot miss the notion that software is only a tool, and as such it must be taken throughout the investigation.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_12

Using a CAQDAS involves a period of recognition of the (im)possibilities of each tool before the elaboration of the questionnaire and before applying it. To a better software optimization, this amount of time should already be provided in the methodology. In this way, the moment for defining and choosing a CAQDAS shall not take place after data collection, either through interviews, application of questionnaires or forms or through the use of focus groups and other tools to collecting data.

The differing element proposed in this paper is to show how the *suitability* to a CAQDAS towards the discursive textual analysis methodological assumptions was carried out, according to Moraes and Galiazzi [3], having present that some studies were already conducted by ourselves [4–7].

In general, qualitative researches have been using technological resources, but not of any software or products adapted to that end, accordingly to the taste of the researcher in using it. Much more than this, the reason is based on the need of textually analyzing files not only with a textual *corpus*, but with images or audios to complement the data collection that comes up from different forms depending on current ubiquitous technologies.

For Santaella [8], not only mobile devices can be considered ubiquitous, but also "[...] networks, information, communication, objects and environments, cities, bodies and minds, learning and life in the flow of time in which it is lived." And, based on this interplay of use of technologies in multiple places, environment, and persons, it would be difficult to assume a form of research that, gradually, does not become a space of such occurrences, too. So, it is necessary to consider that the data analysis has a ubiquitous aspect, which implies that multiple factors are thought during the data analysis process. The analysis cannot be seen as a rigid, pre-defined, linear process. Inevitably it would fall into the problematic situation that a researcher may face before the changes in the ways of operating analytical processes. (See Kelle [9]; Barry [10]) It may be the cause of some insecurity, as if it could create a fear of not meeting the scientific rigor, when not following the prescription provided by the software pattern used.

With the use of DTA along with the CAQDAS, the process necessarily becomes flexible, multifactorial, with constant checking to the objectives, as the researcher is open to realize necessary changes, what Moraes and Galiazzi [3] call a possibility to capture the new emerging, resulting in new understandings before the phenomenon investigated. A DTA application along with software products can help to maintain an investigative attitude, replacing an instrumental and technicist rationality by a constructivist one.

2 Discursive Textual Analysis Applied to the CAQDAS

Currently, some software products have been made available via World Wide Web also in free versions, which brings to the qualitative research scenario possibilities of accessible using to the researchers who do not have funding available to pay the CAQDAS for the conduction of their studies. It enables a greater democratization of the resources made available on the Internet. Beyond versions entirely free, there are also demo versions, available for download for short periods of time. We know that during its development a research needs a rigorous and detailed analysis, which requires an

amount of time that often surpasses the time available in such demo versions. However, these versions make possible to conduct explorations that point to the suitability or not of some qualitative analysis software. Thus, a version of the research at play should be tested, using one of these demo software products. When it comes to choosing which software to use, and when we are before a diversity of contents and materials used in researches, it is up to researchers decide, bearing in mind the problem and objectives of his/her investigation. There is not a right or wrong choice here; the choices will be in accordance with the style and epistemological background used by the researcher.

Though do not exist unmistakable formulas, while the qualitative research presents itself as a universe of possibilities, the same goes for the choice about what use regarding CAQDAS available today. For our research, the CAQDAS chosen is called Sphinx Lexica, specifically devoted to the qualitative research analysis using discourses, messages, answers to questionnaires, i.e., a kind of software that analyzes answers of open questions and assumes an argumentative production. Sphinx Lexica was selected because there is a demo version available on the Internet, and detailed handbooks on how to use it.

In its process, the DTA is a methodology that comprises the realization of some steps based on text registers. For Moraes and Galiazzi [3], this methodology is organized in four steps, presented as follows: disassembly of the text productions, where a unitarization is identified; creation of relationship through the definition of categories; production of metatexts which make possible a new understanding of data; and an auto-organized process where the researcher turns his or her knowledge into another knowledge and another learning process, understanding differently the phenomenon studied. It is worth noting that these steps are not rigid, given the fact that the interpretation process is present from the first moment on until the end, when one step merges with another, so that is always possible to review and reorganize the material. In the following pages, we seek to show the application process of DTA using Sphinx Lexica.

2.1 Preparatory Discursive Textual Analysis (DTA) for the Use of the CAQDAS

For a better understanding, it is necessary to clarify that the exploratory research sought to investigate some teachers' perceptions of the use of technologies in the classroom. Two questionnaires were applied to 24 subjects working at a public high school network of a Southern town in Brazil.

At first, we conduct the process of typing the questionnaire answers on a text editor. The answers are entered the way they were, and then we submitted them to the disassembly process in order extract units of meaning. Both the disassembly and the entering processes require attention from the researcher so that nothing is missed concerning information collected. To illustrate this first step of the DTA methodology, we selected the following question:

In the case of the above extract, the unitarizations identified were: "*as aulas da escola como um todo seriam menos atraentes*" [school lessons would be less attractive as a whole]; "*com as tecnologias aqui existentes, a aprendizagem se tornou mais fácil*" [with the existing technologies here, learning has become easier]. Then, we needed to

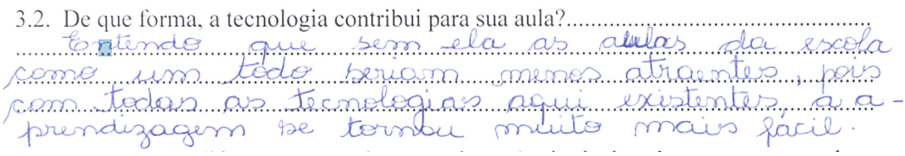

Fig. 1. Questionnaire number 20 – Extract from teachers' answers

redo part of the process aiming to identify other answers-unitarizations holding the same meaning.

So in the next step, we approximate the units of meaning, which are gradually added and constitute our primary categories. After that, there was a new reunification which formed our intermediate categories to reach the last grouping that compounds our final categories. The whole process demands successive comings and goings to the original textual production so that a meaning non-mentioned by the respondent is not attributed.

When every answer is put together through identification and grouping of a single textual meaning, the categories emerge and offer a broad interpretation concerning the answers of the interviewees. While doing so, we could define that the technology would be the final category, that the intermediate category would be Technological Adjectivations and the corresponding primary categories would be "Visualization" and "Access"; the intermediate category "Teaching Practice" would be developed into the original categories as a facilitator and motivational factor. In the case of Fig. 1, the unit of meaning "school lessons would be less attractive as a whole" was incorporated in the initial category Access, and the unit of meaning "with technologies that there are here, learning has become easier" was incorporated in the initial category "Facilitator" (Fig. 2).

Question analyzed and emerging category obtained

Technological contributions to your class regarding	Visualization	Access	Facilitator	Positive (Motivational)
	Technological Adjectivations		Teaching Practice	

Fig. 2. Extract from the emerging categories. Adapted from Paula [4]

As we can see, this process has incorporated steps 1 and 2 of the DTA, even before using the CAQDAS. It is a vital process to organize what is going to be ranked from the answers found in the questionnaires using Sphinx Lexica. It is a practice that offers a greater quality of textual analysis, given that the interpretation structure, when we move to the next step in using the software, has already been established by the researcher who uses the DTA.

2.2 Use of Sphinx Lexica Based on the DTA

The moment to use Sphinx Lexica starts with entering the answers on an editing text software, considering the previous stage for defining the categories based on the DTA. For each respondent, we must register and link an attribute (number or letter) allowing, at any time, to return to the source of the text produced by the subject interviewed. Instead of tables built using a text editor, we have files in which our questionnaires are registered. At the end of this process of entering all the answers, the CAQDAS generally offers the possibility of statistical analysis as "simple and crossed tabulations, uni and bi-varied and multi-varied data analysis" [11]. The analysis is used by the DTA as complementary, for the emphasis is on the qualitative analysis of texts from the metatexts to be produced, having as its background the categorization carried out. The difference with Sphinx Lexica is that it offers, beyond survey research, resources to analyze from "hypertext, automatic indexation and repeated passages" [11]. The technological resources vary, but the quantification provided by the CAQDAS might bring up new meanings of analysis if enriched with the qualitative data found.

The software does not change the meaning of texts produced by the respondents, for it is a task of the researcher to come and go as many times as necessary until getting the meaning that corresponds to the ranking of the categories. So it does not risk, due to using the CAQDAS, deconfiguring the questionnaires and missing the contextualization

Table 1. Technological contributions

Technological contributions	Freq.	%
Being able to show contents that other times were only able to be spoken of	1	4,3
Direct access to items	1	4,3
Lessons using images	1	4,3
Making lesson plan easier	1	4,3
Transformative, innovative, and critical	1	4,3
In a positive way, when teacher draws relations and uses appropriate methodology	1	4,3
Playing songs and children's movies	1	4,3
A better understanding of the content	1	4,3
Contributing to improve methodology	1	4,3
Lessons more creative with available resources	**3**	**13,0**
Lesson planning on the computer, use of resources with games, activities and videos	1	4,3
Interactive means	1	4,3
Interactive games	1	4,3
Did not answers	**7**	**30,4**
Intensification of the content studied	1	4,3
In several ways, for it is a resource that help us on a daily basis with videos, readings, games, images, etc.	1	4,3
Helping teacher develop his/her methodology	1	4,3
TOTAL OBSERVED	23	

Source: Adapted from Paula [4].

in which a given text was produced. At least, there is not a greater risk than the one that occurs with the mere entering of texts on a text editor. After categorizing, it is possible to analyze the meaning about the other categories presented, which would allow the formulation of metatexts. Thus, to return to our subject, that is, the contributions of technologies to classrooms via CAQDAS, Table 1 shows one of the categorizations produced.

After this visualization, it does not seem to be difficult to obtain the emergence of a feature present in the content of the answers, which in this phase are already categorized. It might be obtained for every questionnaire's questions submitted to CAQDAS. Also on this occasion, an aspect that deserves attention may be confirmed with what is displayed on Table 1, particularly the highlighted lines. When we analyze these two extracts, indicating a greater percentage, we might infer how many comings and goings to and from the text produced by the answers would need to be carried out so that the visualization above would emerge if the researcher were entering the answers on a text editor program. It is not hard to assume that, when considering frame by frame, every set of categories obtained would already allow the elaboration of metatexts to provide new insights during the analysis process, since it is supposed now to try to link different categories for alleged explanations, creating real possibilities of new understandings and data checking.

Displaying our "non-answers," so as to be clear of their presence, also takes a significant space in conducting the understandings of meaning that these subjects are showing. When the subject-respondent has nothing to say or does not want to do it, avoiding answering a question, and this is automatically compared to all the others, immediately this data draws the researcher's attention. When we can use the findings presented by the software that allows us to conduct a correlation between the answers, the textual analysis becomes fruitful to the researcher.

The greater the number of individuals involved in the study, the greater the efforts to make it possible to describe the positions adopted by them. Instead of rewriting on tables on a text editor, we just need a click on one of the software's windows so that it is shown the correlations involving the answers. It takes the researcher go on a survey of the approaches and separations occurring inside the textual analysis being made, in relation to the answers he or she might find on the research problem.

However, the software will not have the potential of deciding on what should be correlated. This decision is up to the researcher. To make such a decision, he or she will need to have experienced many moments of immersions. A CAQDAS does not carry out readings nor does it interfere in the course of the study. It is a tool that remains under the control of the one who uses it. According to Moraes and Galiazzi [3], "[. . .] a discursive textual analysis might be understood from two opposing and, at the same time, complementary movements: the first being a moment of deconstruction, analytical in itself; the second being reconstructive, a synthetical movement." In any of these steps, there is a potential for decision-making on the part of a CAQDAS. According to Moraes and Galiazzi [3], "the meanings of the units produced are the ones built by the researcher, bearing so his or her authorship." It is in this phase of interpreting what has been said that the presence of answers and non-answers offered by the subjects investigated takes place.

To analyze these non-answers, we need to consider an answer to one of the questions on the questionnaire used during the interviews. In this occasion, we asked about the different element caused by the use of information and communication technology. On the answer regarding this question, we noted that seven respondents did not answers. It might be the case that the researcher, during an analysis through a text editor, does not realize this data or does not assign it its due importance, since he or she might be focusing their attention on the results expressed, and that approximate or move away from the research question proposed.

Nonetheless, when requesting the multiple forms of showing the findings, we will see that there is something wrong, given that seven respondents do not say anything about the use of technology, which others have praised. Another point to be made about entering the answers of our respondents involves the observation of what is presented on a given question, entered via CAQDAS, so we can realize what is clearly emerging from the questionnaires applied. Thus, there is no doubt that the immersion of categories, using Sphinx Lexica, if formed more clearly through visual elements that might be extracted from this software than the ones featured in tables produced by the researcher, which would need to be updated so we could see the construction of a new phase while obtaining our categories.

Regarding the use of a text editor, the readiness at obtaining results is also an aspect to be considered, in particular, if the study involves a considerable number of subjects to be analyzed, for "categorizing is putting together what is similar. When establishing sets of categories, we need to consider that the organization takes place based on a single criterion" [8]. Choosing what this criterion is up to the researcher. He or she acts upon the means they use. There is no doubt about it.

3 Conclusions

It is possible to establish that the use of CAQDAS, particularly Sphinx Lexica, as an analytical tool is out of question in terms of contribution to the researcher. However, if he or she were accompanied by process of discursive textual analysis (DTA), they will provide restructuring possibilities on the understandings of analysis and possibility of emerging new insights in relation to the phenomenon studied. Continuing conducting researches and consuming much of the time entering data procedures on tables might be a way of reducing the number of times we need to come and go to the original text, something so needed on the DTA process. This effort does not assure the researcher is not impregnated by the text.

Using a software may qualify a study, since its possibilities of visualizing the results outweigh what we get when tables produced via text editors need to be restructured constantly. In the Sphinx Lexica, entering a text happens only once when the questionnaires' answers need to be typed out, which is an advantage if compared with traditional text editor programs, where entering occurs several times. Thus, we see that the use of a CAQDAS helps the visualization of all the answers because many times the tables produced ended up becoming lengthy and fill different pages. Too often we need to print them to be assured that in fact all data were visualized.

In the discursive textual analysis, the important idea does not involve the fact of obtaining results that remain attentive to the data saturation. For these reasons, the present article intends to sow a seed in the great harvest of qualitative research, which has been fertile in welcoming the use of CAQDAS linked to the application of discursive textual analysis in its procedures. When we have a contact with a tool made for assisting the textual analysis conducted over data of a qualitative study, we realize the doubts and discouragements may be only the fruit of an adaptation and reallocation phase of these tools inside such processes.

We believe that it is through the sharing of experiences, which show the analysis processes carried out, that the researchers may find support on the events and publications so that they are free to invest in the use of CAQDAS as an aid tool during the conduction of their qualitative researches. Another aspect expressed with a relative importance is that, though the use of software is consolidated for years on qualitative studies, we note that, for many researchers, this field still needs to be better understood. Perhaps researchers do master the different steps of their qualitative studies and researches, and even so they might remain adverse to the use of software. That is why presenting, even briefly, a research result that, in the analysis, showed the use of a CAQDAS without compromising it offers another point of view. Producing questions qualifies our studies and turn them into a carrier of other possibilities. Often walking around a given scenario, varying the chosen paths, does not change with certainty this same scenario, but enables other issues firstly imperceptible to become present. In the textual analysis of qualitative research, it is not different.

Much more than showing merely, today's publications have expressed concerns on questioning other forms of conducting the analysis procedures that involves tools, whether collecting of analytical tools. And thus we sought to consider briefly in this paper the use of Sphinx Lexica inside research step that involves analyzing data taking into consideration that all researchers may and should be attentive to the potentialities of each software since nowadays they have been varied both on the offer and the use. There still is room for qualitative research that might encourage researchers, both the newcomers in qualitative studies and the experienced ones, to go through other ways and get their conclusions over these uses. We should also say that, while this is not our object of study or evidence right now, we found during the last few years, involved in qualitative studies, that regardless of research field, there still are the ones who doubt this possibility and avoid using a CAQDAS.

Acknowledgments. The Coordination for the Improvement of Higher Education Personnel (Capes) for the support provided during our doctoral years, which included a completion stage at the University of Tras-os-Montes and Alto Douro (UTAD), Portugal, in 2017.

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How Does One "Leave" Poverty? - Socio-Identitarian Requalification Processes (PRSI) for Portuguese Women in the Basque Country, According to the Sociological Analysis of Oral Discourse

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Abstract. How does one "leave" "poverty"? It is the answer to this question that may help us fight poverty, by addressing the issue on positive terms: reorienting the - conventional - angle of observation-analysis of the causes and factors for one's fall-impoverishment (what is poverty? who are the poor/what are they like? - negative formulation), until we grasp the complexity of exit, the processes of socio-identitarian requalification (PRSI). We have been developing this analytical-understanding model of social trajectories since the late 90's, and have co-composed 31 narratives of migrant Portuguese women, Exemplary Cases, selected by social intervention specialists from San Sebastian, Basque Country. This paper does not follow a "typical" research structure because we choosed and focused on the contributions of this qualitative research for the development of social knowledge about fitting poverty, in spite of doing one approach of the methodology out of the context of their one production and results. Based on these results obtained, along this paper we explain the 7 PRSI components and also deepen the interpretative analysis and treatment of one of those narratives, Sara's, highlighting the triangle FAITH in Prayer and in Luck.

Keywords: Sociological narratives · Qualitative observation-analysis of social trajectories · Exemplar cases · Case analysis · Social desqualification · Poverty · Fighting against poverty · Social requalification · Socio-identitarian requalification processes · Sociology of identities · Sociology of hope · Oral data · Women trajectories · Women studies · Comprehensive-qualitative epistemology

1 How Does One Leave "Poverty"? - Assumptions and Tool-Problematics

"How does one leave poverty"? This question shifts the most usual formulation of poverty, which we consider to be a negative formulation of the problem, because it focuses on factors and causes of the "fall" or disqualification [1], past and present, and does not envisage the "exit" or requalification of those situations. We have thus been working since the late 90's on an analytical-understanding model which refocuses the

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_13

analysis on poverty "exit" paths - considering the personal experiences of "entry", expectations and future utopias, and the imaginary.

This paper, that does not follow a "typical" research structure, derives from our PhD research in Sociology on socio-identitarian requalification processes (processos de requalificação socio-identitária, henceforth PRSI) of Portuguese women who migrated to the Basque Country (San Sebastian area). To this end, we co-composed 31 exemplary case accounts[1], following the question: "What are the logics of action and what identitarian strategies are adopted by women who, facing the social experience of disqualification, engage in their 'socio-identitarian requalification'?"[2] The 31 women have been chosen by specialists of social intervention on poverty, who we asked to identify exemplar cases of successful trajectories. Our objective was to obtain different narratives of different social trajectories of fighting poverty, in order to identify components of those trajectories. In other words, we wanted to identify and to emerge affinities through the different experiences related. Thus, we expected to emerge categories that could help to understand how social identity are constructed by the quotidian-daily social practices and social relations – what we resume (at the end of this paper) as the 7 core components of the PRSI.

Adopting the discussion about the 'content analysis' fundaments – brief: in one hand, cutting the narratives on sequencies, thematics or other various criteria; in other hand, adopting the categorisation as an organizative activity more than a grounded methodological action – we adopted the qualitative and interpretative approach that works with each narrative as a co-construction process, and narrators are reflexive and intersubjectivity subjects.

So, the act of interpretation consisted on the analytical process of emerging categories, in relation with the previous/preparatory 'hypothetical conditions-tool-criteria' and 'guide-factors-criteria'. Do remark that this previous criteria derived from the conceptual discussion of the research, and concerned the 3 big discussions we needed to adopte, in orther to construct the theoretical problematization of our research: the poverty studies, the sociology of the social action, and the problematic of social identities.

The theoretical discussion (only mentioned at this paper) focused the research on PRSI factors and stages, their respective logics of action and identitarian reactions, considering 3 major dimensions: material, symbolic and relational; as well as the identitarian capitals, aims and strategies-tactics.

After this brief reference of the design of our research, we may summarize the 3 central postulates of this model's tool-problematics:

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[1] This **methodologic process** initiated with **31 cases** which had been determined by social action technicians among their social services users (various organizations) as experiencing PRSI. We considered 5 **hypothetical conditions-tool-criteria** for this kind of personal experience [2]: Mono-motherhood, Death, Leadership, Abuse, and Handicaps; and also 5 guide-factors-criteria — economic-material; relational; affective-emotional; symbolic-cultural and of power; and dispositional. The gradual deepening of the "PRSI model" instigated **the selection and re-categorization** of the 31 cases [2] in order to a deeper analysis of 5: Paloma, Mafalda, Esmeralda, Amélia - and Sara, presented in this paper, although some of our conclusions refer to the first 4 cases [2].

[2] Regarding the concepts of identitarian strategies, tactics and aims, see [3, 4]; [5–7].

Postulate I: PRSI are social experiences bound by time and circumstances to contexts and situations [7]; the subjective reading of exemplary paths is the scale and the type of observation which are adequate to capture that requalification of actors into social subjects, adopting Alain Touraine's definition of subject.

Postulate II: seven dichotomic vectors[3] — emerging from modernity and based on the analysis of historical studies about poverty in Portugal —, shape the vision of poor people as "social fatality and usefulness"[4]; such a vision has legitimated moralist, miserabilist and populist uses, naturalizing poverty.

Postulate III: to know sociologically is to study how social actors situate and re-contextualize themselves (there are no "social idiots"), and to integrate what we understand to be the three analytical axes of the sociology of identities[5], i.e.:

(a) to oppose prescribed/assumed identities;
(b) to oppose logics, actors' resources/social determinisms; and
(c) to re-situate identities as objective and inter-subjective negotiations in spaces-times of action.

"A Sociology of Identities, is it possible?" asked Suzie Guth [20] 20 years ago. Today, with this paper, we aim to contribute to the "sociology of hope", by analysing the socio-identitarian requalification processes - "How does one leave poverty?".

In an approach of constructive criticism about traditional studies on "poverty", let us evoque Sara's exemplary case.[6]

1.1 *Exemplary Case* - the Triangle that Legitimates Sara's Suffering

Sara (S) was born 43 years ago in a 15-child family from the North, who depended from the sea: all the men in the family are fishermen. Their absolute need is evident by the economic-material, dietary and living conditions (5 in one bedroom); and by the abuse on women and children (by the son-in-law, 2 brothers and father). Humiliations at the basis of her negative representation of father, for, although she says she inherited his strong character, her catholic model is that of the mother-hen who muffles and conceals, mother-kindness.

After several "falls", Sara progresses to a relative poverty lifestyle, after 17 years away from the labour market, although she had immigrated to the Basque Country. Our anxious narrator's wrinkled hands and face stand out, as well as her easy laughter, fertile imagination and pleasure of story-telling: « it is not a lie…».

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[3] I.e.: social attributes and designations of material/spiritual, dignified/undignified, socialized/innate, individual/collective poverty; subjective/objective factors; socio(ethno)centrism and androcentrism.

[4] Studies from the end of the Middle Ages to the 70's, published until the 90's. Cf. our analyses [8–13].

[5] Cf. contributions, significant for us, by Pierre Bourdieu [14–17] and Claude Dubar [18, 19].

[6] This is one of the exemplary cases which integrated our PhD research [2], reason for which time contextualizations and dates report to that 2008 context.

1.1.1 Sara: Faith in Prayer and in Luck - 3 Supports of Strategic Risk

An unstable life with 5 striking moments of dense spatial-relational and practical ruptures which we designate strategic risk - effects of faith in prayer and in luck -, is demonstrative of the crisis of this model of integration in late modernity.

At striking moment 1 (1962–1976), composed of two stages, work instability (6 jobs) marks the end of childhood at the age of 8: 1st stage-rupture (1962–68): early entry into the labour market (cannery worker and housemaid). 2nd stage-rupture (1968–76): return to her family home between the ages of 14–22, a time marked by begging (« I begged out of hunger! »), odd jobs (harvesting mussels, working at outdoor markets) and child labour (Finnish sewing factory, house maid, fish factory), alongside school abandonment at the end of 3rd grade, at the age of 10+.

From her youth and childhood she only enjoyed life in Oporto: "very beautiful!! tch! eating well and everything, the rest was a sad life, hunger, and ill health because of working barefoot at the unwholesome fish factories".

So, moment 1 is dominated by the logic of social destiny to which she reacts with interiorization and resistant-adaptation. These reactions are, in turn, based on the two identitarian strategies of teenager-young-S: the risk strategy and that which we designated strategic sacrifice [21].

From the moment she gets married, at the age of 22, at striking moment 2 (1976–1980), two strategic logics of action stand out: realism; and marriage usefulness and duplicity [22]. Of her husband, a Galician immigrant in the BC since the age of 21, Sara makes a very positive evaluation as a person, hard-worker, husband and father: «a true gentleman». And, one month after getting married, she carries out her duty, demonstrating a strategy of adaptive struggle: she had to follow him to "dollar-land"[7].

With emigration and family mobility around three family homes at the 3rd stage-rupture (Nov. 1976 to 1980), risk practices (ruptures, spatial discontinuities) add to the above mentioned resources. For S, the fight reaction due to the socio-spatial rupture derives from his stability at work. However, with the crisis in the BC, her husband becomes unemployed for almost 1 year, 1st factor of family disqualification which opens striking moment 3 (1980–92).

From the age of 26 to 38, Sara lives in Galicia — 4th stage of spatial rupture — associating family instability and separation with the dependence from her mother-in-law. Her husband finds work in the BC and she has to move to her mother-in-law's with her two daughters, for 18 months of infernal sacrifice. But Sara rapidly recycles her interiorized refusal of separation into a cunningly negotiated — internal and external — identitarian reaction.

Conflictualist resistance reactions, supported by a logic of irreverence in the face of social destiny, lead her to the individual risk response. And, at the 5th stage-rupture (1981–1992), having made an appointment for her elder daughter in San Sebastian, she flees with her two daughters to that city. Sara tries to legitimate the logic of risk-escape into a logic of salvation of her affective family quality of life, dignifying her option of domestic irresponsibility underneath the cape of a risky strategy of fighting for her family. All in vain: her family indeed "falls" into primary deprivation, in total

[7] The Basque Country, according to migrant talk of the time.

dependence from Portuguese social action networks, both for seeking a place to live (5th and 6th homes) and moving her belongings, as well as for furniture loan.

Shortly after, she gets cross with those same Portuguese women who helped her and her family, excusing herself with the worsening of her family's dependence.

12 years follow of apparent stability in socio-identitarian territories[8] habitational, of economic-material resources and sociabilities, until they find out the house is illegal - cause for the 2nd disqualification factor: eviction.

During the 2-year striking moment 4 (1992–93), socio-identitarian territories: spatial-habitational, sociabilities and resources, will be aggravated.

In fact, during the 6th stage (1992) of spatial-habitational rupture, the multiple debilitation of the family trajectory associates logics of risk and social destiny. However, as S considers this to be a mystical-supernatural fatality, she responds with risk and resistance-fight strategies by buying her 7th and current home, smaller and in need of remodelling, because it was necessary to put a roof above the (now) 6 family members[9]. This purchase generates different family strategies towards the dependence from her relatives: both of overcoming, seeking spatial autonomy; and of reinforcement, with remodelling loans and by storing surplus furniture.

The 7th stage of over-indebtedness, disorientation and sacrifice motivates new responses: (1) resistance-fight and work effort strategy: the elder daughter starts working as a nanny and S resumes labour activity (7th job); (2) bank indebtedness: risk which formalizes household dependence (clear family sidestepping strategy).

To make things worse, in the 8th stage (1992–93) another disqualification factor provokes the family's Downfall. Her husband is on sick leave for one year due to a work accident. Without his income and due to a late insurance payment, they fall into Rowntree's absolute subsistence level [23], without money for food, chocolate milk, or for Sara to pay the bus ticket to work.

Confronted with social disgrace and unshakable dependence, which S sees as a divine ordeal, she reports 7 kinds of reaction: (i) establishment in the situation; (ii) shame of the possible need to sell the apartment; (iii) hiding the situation from her children and outsiders; (iv) relational conflicts and a feeling of abandonment by Portuguese women; (v) social isolation; (vi) the couple's fear of going out, due to their debts; (vii) Sara's psychological and health frailty, depression.

Living in total disgrace, and conscious of it, the couple ponders several solutions, such as moving to Galicia. Prayer and faith are Sara's most valuable resources; and she prays for two things: food and shelter, to avoid the shame of selling the apartment.

Confronted with failure (negative external objective transactions[10]), shame and its correlative pride join her subsistence needs, seemingly overriding them. That is how S reacts to internal objective transactions, also negative.

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[8] Cf. our proposal for a notion of socio-identitarian territories [2].

[9] There was the couple, two daughters and one son aged 5-6, and her younger brother, aged 24.

[10] See the articulated and innovative definition of identitarian construction, and its respective change and social evaluation, by Dubar [18, 19].

This statement of identitarian pride translates into not asking for any help, a clear change in attitude: when in a desperate situation, she had accepted the solidarity of proximity networks; now, in a worse situation – of disgrace – she refuses it.

Two motives may explain the change: the narrowing of sociabilities (less support from others), and self-victimization for having followed the advice of those who, allegedly, abandon her. Hence, concealment and isolation associate and both blend in identitarian risk, defence and sidestepping strategies. S holds on to pride to legitimate her personal-family isolation from those who, in her opinion, posses natural human malice.

In such a defensive and risk sidestepping discourse, a fair solution can only be provided by a higher entity: God brings her luck. For her, requalification results from the effectiveness of her prayers and faith, overnight, exacerbating what we categorized as the components of her late realism: mystical-supernatural fatality and strategic sacrifice. Therefore, at striking moment 5 (1993–96), her family's requalification sprouts from the effectiveness of a "prayer-faith-luck-social rights" mix.

In fact, at stage 9, her husband receives compensation for his accident, 5700 pesetas, as well as 32,100 pesetas from the insurance and his unpaid wages from the ship owner: 86,000 pesetas added to the stack. Imposing the logic of pragmatic realism, S pays construction workers, the instalments due to the bank and all the loans. And concludes that her family evolved from disgrace to a situation of resource containment: "There wasn't abundance, but (…) at least there wasn't shortage either!"

Through strategies of pragmatism and strategic sacrifice, family disgrace is precariously overcome. In this scarce way of living, Sara dreams of renovating her home to make it "a bit decent!" - which she will be able to do, because she is about to be handed a new factor of social promotion.

The 10th stage (1996) confirms the effectiveness of prayer/faith in luck, for God opens up doors to her once more: Sara and a friend, who was also "going through a bad time", win a lottery prize worth 2 million pesetas.

In the end, S overcomes the phase of personal-family disgrace with stability and the remodelling of her home, while sharing the joy for her friend's promotion. Being a personal-family victory, it also represents her victory over other women who were angry at her and envied her life. To avoid this envy, S again resorts to concealment - in this case, of success - revealing suspicion and the logic of social conflict, matrixes of her experience with Portuguese immigrant women.

To conclude this brief summary of Sara's PRSI, it makes sense to refer her 5 narrative enunciations or repeated discursive elements of (i) exacerbated self-esteem and self-compliment; (ii) discursive overrating of her origin culture; (iii) ethnocentric comparison and classification; (iv) faith and mysticism; and (v) identitarian paradox: self-categorization as relationally open/continued relational ruptures.

2 What Does One Learn from the "PRSI Analytical-Understanding Model"?

From the "PRSI model" we highlight three global conclusions: PRSI configuration modes presuppose an inter-subjective, incorporated and engaged knowledge [24].

2.1 An Inter-subjective and Inter-reflexive Knowledge: Contributions to a "Sociology of Hope" by the Sociological Analysis of Identities

For us, identitarian transactions and socio-identitarian territories are organized by social interaction as a system of action. Identitarian transactions are thus the ways of construction of actors into subjects, just as social interaction is the way of constructing the system of action.

In fact, if social identities are not states, nor static, the same happens with interaction; therefore, interaction is not a mere scenery in the system of action.

Transposing the knowledge of communication systems − "it is impossible not to communicate" − to systems of action, the result is "it is impossible not to interact", the only change is the modes of interaction.

We understand interaction is at the core of systems of action, while identitarian transactions are at the core of the reconfiguration of actors into subjects. I.e., these transactions configure the identitarian update, combining

(a) on the one hand, strategies and tactics with dynamics and orientations – continued or emergent – in the (re)-evaluation and reflexivity of subjects;
(b) on the other hand, social logics - underlying or derivative - with identitarian constructions and the system of action: *"Il n'y a pas de volonté sans objet. (…) l'objet de la volonté ç'est, justement, réaliser le désir. (…) le désir ç'est le moteur de l'action (…). L'utopie [objet virtuel du désir] ç'est le font où l'action plonge son sens. Le désir part à la conquête du temps futur pour donner un sens au vécu présent."* [25].

The "PRSI model" embraces the inter-subjectively reflexive subject and the elements of significant construction of life in society: desire and volition of action. Thus, as an action mobilized by desire, PRSI handle

(1) socio-identitarian territories in the present, now;
(2) capital-resources of the personally experienced present and past, in the present[11];
(3) social logics and imaginaries, guiding them from the present to the future – a phenomenology of requalification, basis for the sociology of hope, with clear implications for the methodological plane.

2.2 An Incorporated, Experienced Knowledge: Epistemo-Methodological Contributions

Deriving from the first, this conclusion unfolds into 4 methodological vectors:

(1) Attention to obstacles: the obstacles that pervade poverty studies and our discussion of identitarian problematics justifies an alert about the persistence of

[11] Capital-resources identified in PRSI which we explain later.

(a) the influent 'tearful-fatalist perspective' [8, 12, 26] and the notions of social void, limiting the social construction of PRSI and, consequently, the affirmation of citizenship as the development of social sciences themselves;
(b) the negative formulation of the problem, under a latent moralist perspective.

(2) What does building scientific knowledge mean?: without deepening this topic here, we would just like to note that the "PRSI model" assumes a complex interdependence between subjects and researchers, the definitive abandonment of the concept "object" of study, and the defence of inter/trans-disciplinarity and correlative criticism of the (positivist) divorce of domains [2: 315–316].

(3) What is Oral Discourse?: for us, it is the requisite for the co-construction of social experience; consequently, it is itself the requisite for the research of contents or living matter from that personal experience.

In understanding approaches, getting to know the co-construction of social action presupposes access to one's expression of reflexiveness, and this emerges in oral form. However, to get to know the co-construction of social action, besides the expression of reflexiveness, its interpretative reconstruction is also important. As an interpretative reconstruction, reflexiveness derives from the co-construction by social actors of social subjectivation, which, in turn, presupposes oral discourse as its possibility process.

Therefore, in the analytical hypothesis of the "PRSI model" we argued that the subjectivation of PRSI by the actors interferes with the place and value they attribute to their oral discourse, as well as with their respective forms of expression and formulation [2: 310 ff.].

(4) Paradigmatic transition: the argument provided intends to evince that one is in full paradigmatic transition and reconfiguration [2: 317–321] — although we will not dwell here on this, to focus on PRSI construction.

2.3 An Engaged Knowledge, not External - Contributions to the Sociological Analysis of Socio-Identitarian Requalification

We derived five great lessons about the social construction of PRSI from the research process.

From the start, we concluded that there are 7 core components of PRSI. Additionally, we learned that these processes objectivate in multiple socio-identitarian territories, because (third lesson) they are not linear and are non-coincident in several configuration elements, and also (fourth lesson) that they mobilize multiple intervenients and actors. Consequently, our research ratifies the understanding and the practice of several social actors (researchers, technicians, political actors or participating citizens): PRSI demand continuous technical work following a systemic, trans-disciplinary approach — i.e.: diagnosis, planning, actions, training and evaluation — not only inter-disciplinarily, as it happens today, in the (dominant) fragmented inter-service action.

Having to make synthetic decisions, we will now deepen only the first of these five conclusions: the components of PRSI.

The 7 core components of PRSI

The construction of the "PRSI model" highlights, as components of this personal experience, the initial social and integration conditions of social actors; and, in articulation with these more structural and lasting conditions, the personally experienced situations of their identitarian trajectory.

A second component is constituted by the striking moments that make up all PRSI and which follow and differentiate each other in the sequence and as a result of factors: factors of change between moments.

We believe the third component to be that those same moments are organized, internally, into stages, which are in turn structured and made possible by disparate reaction phases. The change of stage depends on that reaction's orientation and identitarian strength.

Reaction stages and phases take root and unravel through a complex game which the actor manages, mobilizing their identitarian strategies and their identitarian tactics and aims. We were able to observe that strategies are co-constructed along the trajectory and in a non-linear way, not untouchable or definitive. They are, therefore, not available in actors' lives as initial data, being instead tryouts and answers to their life goals and the ways to achieve them.

Furthermore, strategies, like identitarian aims and tactics, are also not always consciously expressed or lived by actors — which guides our distinction between actors and subjects: in fact, with the "PRSI model", we realized that a subject's construction in PRSI includes their concrete and gradual construction into inter-subjective-consciousness-actor (cf. first conclusion).

A fifth component of PRSI is constituted by the logics of action which underlie all these identitarian negotiation processes. The five core logics of action according to Dubet [22] — integration, interaction, knowledge, communication, and also utility and negotiation — allowed interpretation and analysis of the exemplary paths.

As to the sixth component, we categorized ten changed or emergent socio-identitarian territories in the PRSI from our research. That is: socio-identitarian requalification is not circumscribed to economic-material, habitational, schooling and labour-professional territories.

All the cases we analysed show that: requalification mobilizes subjects in their entirety and complexity, encompassing, besides the above mentioned territories, socio-identitarian territories; ethnic-cultural, socio-spatial territories; the territory of sociabilities (which unfolds into affective-relational and psychological-emotional territories); symbolic-representational and also societal and lifestyle territories [2, pp. 145–312].

In fact, in the 5 exemplary cases we analysed in depth, – alongside the unquestionable and realistic mark of material and professional territories in all those paths – we highlight the strong and real power of other socio-identitarian territories: symbolic-representational territories in Sara's PRSI and in another narrator's: Mafalda; and affective-emotional territories, in other two cases: Esmeralda [2, 27] and Paloma [2].

Last, capital-resources constitute the seventh component of PRSI. From our research we drew four inferences with respect to this issue:

1. – PRSI develop and handle 4 great types of cardinal capital-resources (our designation), namely:

   type a – situational capital-resources;
   type b – contextual and societal capital-resources;
   type c – dispositional capital-resources; and
   type d – subjectivation capital-resources;

2. – In PRSI, situational, as well as contextual and societal capital-resources (types a and b), by themselves, are powerless or sterile for social requalification.
3. – For the PRSI to develop, they demand a co-mobilization of other resources and their relational and inter-subjective negotiation.
4. – The PRSI in the exemplary cases we researched emphasised the importance of dispositional capital-resources (type c), always connected to social subjectivation capital-resources (type d).

In fact, on the one hand, by the sociological analysis that emerges from exemplary cases of women in PRSI, we confirm the strong power of imposition of feminine and masculine stereotypes, due to the inheritance and social expectations of attributes and identity roles for the woman defined by or circumscribed to a domestic situation. The imagery of women sketched by all narrators displays the clear lingering of androcentric attributes, both by reproduction – see Sara's imagery; or by ennoblement (in Mafalda's and Esmeralda's cases); or yet by symmetrical inversion (in Paloma's imagery or in Amélia's path), which results in the same androcentric logic, because the founding vision of disqualifying dichotomies is not overcome. [2, 27].

However, the same "PRSI model" teaches us that the social knowledge and logics of action (common and praxic categories) of the women-subject analysed combine traditional stereotypes with paradoxal social expectations: both those of reproduction of and adequateness to stereotypical patterns; those of predominance over the latter; and also those of negotiation (between adequateness and change).

In fact, we realized that the traditional stereotype does not coincide with the diversity of ways of life of women in this social standing: neither when it is socially adequate – like Paloma or even Amélia prove; nor when it projects itself in different feminine ways of being, as illustrated by the cases analysed:

(i) by mono-motherhood — 3 of the 5 cases studied — and by different ways of, mostly, reorganizing family dynamics and the social standing of woman-mother and woman-wife — in all of the cases; [2]
(ii) by the 5 profiles-in-action witnessed, categorized and analysed; [2]
(iii) by the personal handling of stereotypes by these women: both in Sara's case: her manipulation of the supposed feminine superiority, exerted through subterranean powers (seduction and faith); and in the other cases studied: Esmeralda´s idyllic love [2, pp. 173–188]; Mafalda's deconstruction of the woman-flowerpot (her word for woman-object) and a lingering notion of a feminine 6th sense [2, pp. 189–235]; Paloma's recycling of the father figure, among so many more examples [2, pp. n236–291]; and Amélia's total regret for following an antagonistic path to her mother's expectations [2, pp. 292–309].

3 Conclusion: Sociology of Hope and "PRSI Model"

PRSI processes are unstable, unpredictable and non-linear, and that unpredictability and instability are materialized in the various socio-identitarian territories we presented above, which we were able to analyse and divide into three major types:

(i) socio-identitarian territories yielded by disqualification factors: "the fall";
(ii) socio-identitarian territories susceptible or in the process of requalification; or
(iii) requalified socio-identitarian territories: "the exit".

It is important to note that, to reconvert logics of action, strategies and identitarian tactics, subjects accomplish deep reconversions both in their socio-identitarian moments, and in the use of their social spaces – as Paloma's and Mafalda's trajectories clearly demonstrate.

From the above we also conclude that PRSI are non-coincident processes, which may even generate ruptures at various levels of their configuration.

Indeed, the external reading of disqualification does not coincide with one's experience, consciousness and, much less, with one's verbalization. This echoes in the distance between, on the one hand, the rhythms and paces of institutions and technicians involved in requalification; and, on the other hand, the rhythms and paces of subjects-in-requalification.

Commonplace as it may seem, it is a conclusion which is common to all trajectories analysed.

Having knowledge of the mismatch that exists, in the fight against poverty, between the planning of technical work and change processes, recording its evidence is a necessity. Because, in our opinion, sociological analysis has the responsibility to understand socially constructed inequalities and, consequently, to contribute to the deconstruction of such socially mutable inequalities.

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Exploring Gender Stereotypes Using Qualitative-Quantitative Methodological Integration

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Abstract. This paper presents the research possibilities of the integration of qualitative and quantitative methodologies to explore gender stereotypes underlying the professional practice of psychology. The self-report technique, used as a research tool for stereotypes, has shown deficiencies in the control of the effect of social desirability on responses. This research accessed through qualitative methodology the discursive forms used by the study population to express covert gender stereotypes in socially acceptable formulations. From the Discussion Group with Psychology students, textual statements concealing these stereotypes were taken to transform them into items of a quantitative scale to assess large samples. The results were analyzed qualitatively by and with participants in the study. The methodological integration was an adequate strategy to access socially shared meanings, both in the design of instruments and in the explanation of the phenomena investigated.

Keywords: Qualitative-quantitative methodological integration · Gender stereotypes · Parental Alienation Syndrome (PAS) · Gender bias · Psychological judges

1 Introduction

Classic studies in Psychology have already explored the effect of stereotypes on behavior perception and the attribution of personality characteristics based on gender label [1, 2]. A sufficiently large amount of research on the way in which the psychological processing of information is affected by these stereotypes [3] allows assessment of the social as well as the political implications of their effects on the structuring of society [4]. However, the evaluation of stereotypes has methodological problems of various kinds, of which the effect of social desirability is not the least. This difficulty in controlling the effect of social desirability also affects research on how gender stereotypes affect clinical judgments [5].

Qualitative research on health and social sciences has found in self-report scales an extremely useful tool to gather data from which to formulate theories and construct explanatory models of research problems. Despite this, the capacity of this type of instrument to capture the essence of the subject of study with reliability, validity and fairness [6] is still one of the most relevant problems for measurement, particularly in the case of health and social sciences which base their theories on empirical evidence.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_14

However, the possibilities offered by the integration of qualitative and quantitative methodology in the designing of research tools have not yet been studied to their full potential. The designing of instruments allows the quantification of what qualitative techniques allow to capture and may contribute towards the gathering of better quality empirical evidence and thus support the development of theoretical models with a higher explanatory capacity.

1.1 Gender Stereotypes

The different theories about the concept of attitude coincide in pointing out three components involved in its structure, i.e. cognitive, affective and behavioral aspects [7, 8]. When a person is perceived as a member of a socially categorized group, his/her cognitions, feelings and behavioral tendencies towards the group are applied to that person based on his/her membership of the group. If gender is the categorizing variable, women will be applied characteristics attributed to this group and men those attributed to their group. These three attitude components will in this case lead to stereotypes, prejudice and gender discrimination respectively [9, 10] (Table 1).

Table 1. Gender stereotype in the concept of attitude.

Component	Content	Result
Cognitive	Thoughts, ideas and beliefs	Stereotype
Affective	Feelings or emotions	Prejudice
Behavioral	Tendency or predisposition to act in a certain way	Discrimination

Stereotyping, prejudice and discrimination are closely interrelated but do not always manifest themselves at the same time. Discrimination can be inhibited even in the presence of stereotypes and prejudice if the environment is unfavorable or non-permissive. Similarly, the manifestation of stereotypes or prejudice can be inhibited due to social desirability. When the stereotype is aligned with culturally shared values, it is naturalized and becomes a form of automatic thought [11].

In psychological practice the stereotype becomes an object of interest insofar as the clinical judgment of health professionals could be altered by the effects of social categorizing according to sex with the subsequent application of beliefs, ideas and thoughts that mediate this professional practice. One of the difficulties in assessing the presence of these stereotypes in professional practice lies in the weakness of the self-report instruments in obtaining information free from social desirability.

1.2 Parental Alienation Syndrome

The concept of the Parental Alienation Syndrome (PAS) was developed by Richard Gardner to explain a child's rejection to one of their parents in high-conflict divorce cases [12]. The rejected or alienated parent, in the syndrome's description, would suffer the effects of the negative influence of the other alienating parent on the child.

This syndrome was not recognized as a diagnostic category due to lack of empirical support, and was reformulated by Gardner's followers as Parental Alienation Disorder (PAD) [13, 14]. The American Psychological Association (APA) rejected its inclusion in the Diagnostic and Statistical Manual of Mental Disorders (DSM V), and the World Health Organization (WHO) refused to mention it in its International Classification of Diseases (ICD-10), in both cases for failing to meet scientific criteria of empirical support for the existence of such a syndrome.

This false syndrome has been useful in researching the effect of gender stereotypes on psychological judgments, because in practice it is women who are assigned the role of the "alienating parent", although theoretically this could be applied to either parent. Its discursive success can be confirmed, not only by the amount of literature it has generated but also in its application to court rulings and juvenile institutions despite having being rejected for a lack of empirical evidence to support its existence [15].

Why has this false syndrome caught on so deeply in psychological, judicial and socio-educational practice although it has been rejected by several institutions whose scientific authority to legitimize or delegitimize diagnostic categories is widely recognized? According to the authors who have studied the irrationality of this false syndrome, it owes its success to the fact that it connects with traditional patriarchal values that are present in the popular consciousness even if they have been "formally" rejected as a consequence of social changes [16]. Under the guise of the supposed neutrality of any mental syndrome, this false syndrome lends continuity to culturally shared and internalized values that penalize mothers who do not subject their children to the father's authority. The children's rejection of the father, based on his abuse of authority as they allege, is not called into question. Instead a syndrome is diagnosed to impose the presence of the rejected father based on the mother's alienating influence [16, 17]. To diagnose a person on the basis of another person's behavior is not a valid criterion to define a syndrome and has never been proposed as such in the case of any other.

1.3 Research Questions and Objectives

One of the problems faced by research on stereotypes is the difficulty of controlling the effect of social desirability in the answers. Questionnaires and self-report scales, which are common tools in quantitative research, have serious limitations regarding the detection of this problem. On the other hand, qualitative methodology allows more appropriate access to stereotypes by means of the analysis of the profound structure of discourse, but it fails to capture the full scope of the phenomenon being researched. The integration of both methodologies has thus been considered an appropriate strategy to seek answers to the following research questions.

How can qualitative methodology contribute to the designing of more powerful instruments to capture the effect of gender stereotypes on psychological judgments? Scale designs in quantitative methodology are based on the definition of the construct provided by experts in the subject under study. Based on their knowledge of theories and models on the research issue, they formulate a definition of the construct that restricts the design of the questionnaire or scale with which to approach the subject under study. On the basis of this conceptual delimitation and the indicators specified according to the

theoretical framework, they produce the items that will allow the quantification in a given sample of the magnitude of the construct which is the research subject [18]. The way in which these reactives are formulated, the language and terms used to draw up the items, will inevitably have an impact on the perceptions and cognitive processing of the people who will have to answer them. In the case of gender stereotypes applied to the incorrect use of a non-scientific diagnosis category, the effect of social desirability can exert a cognitive control on the answers due to two reasons. On the one hand, this is because of the social advances that have transferred to the popular consciousness the idea that sexist beliefs, which were expressed as natural until recently, are no longer socially acceptable, at least in certain contexts. On the other hand, as professionals of a scientific discipline that applies *neutral* criteria to psychological diagnosis, it is unacceptable for the professional's self-concept to identify perceptual biases in diagnoses as an effect of their gender stereotypes. It is therefore worth considering: *How could the formulation of reactives as they are expressed by the population under study contribute to the diminishing of the defensive effect of social desirability?*

In addition, the researcher's interpretation of the quantitative results cannot access the cognitive elaboration that motivates the reply of the person who answers a questionnaire; this person is reduced to being a *subject-informant*. Qualitative methodology, which is a qualitative paradigm for some authors, subverts this conception of the people who take part in a study. These cease to be subject-informants, mere providers of information, and are given a voice as *acting-subjects*, with a dynamic and committed role throughout the research process [19]. From this assumption this study attempts to answer the following question: How can the acting-subjects' participation enrich the interpretation of quantitative results and provide meanings to these results?

2 Methodological Strategy: Qualitative-Quantitative Integration

For the research questions and objectives stated above, a pragmatic integration of qualitative and quantitative methodological strategies was chosen, combining pluralism and compatibility according to the context of each individual study [20].

Three phases were designed for this process: (1) The obtaining of discursive utterances spontaneously produced in a natural context; (2) Assessment by means of a questionnaire of utterances transformed into items; and (3) Discussion with those participants who answered the questionnaire in order to interpret the results (Fig. 1). The integration of these phases meets the criteria that define this type of designs [20]:

(1) *Complementation*: It is expected that the qualitative results provide the utterances that allow the quantification of the way in which stereotypes work in psychological judgments, and that the quantitative results allow the assessing of the social magnitude of the stereotypes that emerge in group interactions.
(2) *Holistic vision*: It is expected that the textual analysis of the productions of discourse allow the capturing of the meanings that operate in the stereotypes, as they are expressed by the people in whom they operate, and that quantification in large samples allows the estimating of the magnitude of its effect.

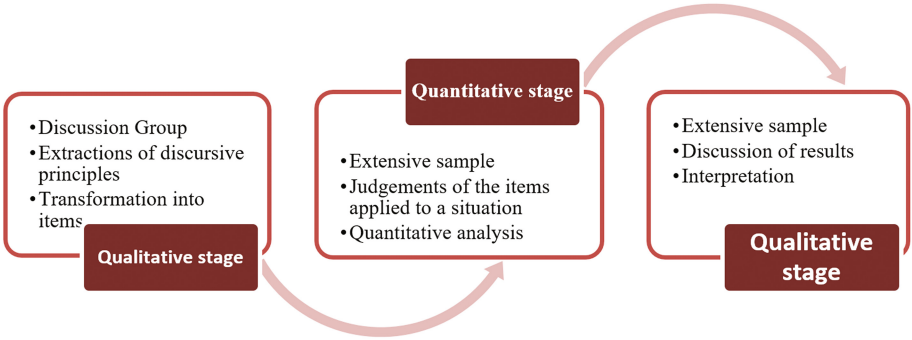

Fig. 1. Stages of the integrated design for assessing gender stereotypes

(3) *Development*: It is expected that qualitative results will support the design of the quantitative process when transformed into the material on which the data collection instrument is designed, and also the context for their collection.
(4) *Expansion*: It is expected that each of the strategies will expand the knowledge contributed by the other.
(5) *Compensation*: It is expected that the weaknesses of each strategy will be corrected by the contributions of the other.
(6) *Diversity*: It is expected that the confluence of data will provide a more complete vision of the problem studied.
(7) *Clarity*: It is expected that each of the methodologies will allow the visualisation of different aspects of the problem.
(8) *Credibility and improvement*: it is expected that the confluence of results from both methodologies will allow the consolidation of the arguments and interpretations of the same.

2.1 Qualitative Stage: Obtaining Discursive Utterances in a Natural Context

The use of qualitative methodology for research into Health Science was revealed, for example, in studies that allowed the detection of specific training needs in health professionals and the proposing of a suitable professional profile [21]. The objective of this research is to approach the map of the stereotypes that act in psychological diagnoses, to be precise the gender stereotypes that bias the application of scientific criteria when clinical opinions are expressed.

The stereotyped utterances were obtained by means of the textual analysis of socially shared meanings in the discourse; the technique of the Discussion Group was used because of its capacity to generate this kind of data in the interaction between subjects [22]. Two discussion groups were set up in which 16 students in the last year of Psychology with knowledge of psychopathology and clinical intervention took part as volunteers, 8 in each group. The sex distribution in both groups was 6 men (37.5%) and 10 women (62.5%).

Table 2. Case presented to the Discussion Groups.

Case taken from a service attending victims of gender violence
A man convicted of physical abuse was granted visiting arrangements at a Meeting Point for three children (minors) for whom the mother had custody. During the visits at the Meeting Point the minors refused to go in, as a result of which the mother requested the intervention of the professionals of the Meeting Point so as to comply with the visiting arrangements. The psychologist of the Meeting Point ruled out this intervention and issued a report to the Prosecuting Authorities diagnosing Parental Alienation Syndrome in the children. As a consequence of this report, the Prosecuting Authorities initiated a procedure to penalise the mother for inducing Parental Alienation Syndrome in the children

Discussion was initiated with the question on the action of each of the agents involved in the situation and an audio recording was made. The transcriptions were encrypted by means of a category system drawn up in vivo from the principles issued spontaneously by the participants in the groups (Table 3).

Table 3. Categories and discursive principles.

Categories	Discursive principles
Assessment of the syndrome	A syndrome that does not exist cannot be assessed
	Something that is not scientific must not be assessed
Meeting Point professional practice	It is unsuitable because it goes against the WHO
	It is manipulated by the father
	PAS is not a syndrome, but it may describe the situation
	PAs was diagnosed owing to poor training of the professionals
Prosecuting Authorities professional practice	The Prosecuting Authorities are acting incorrectly; they are persecuting the mother
	The Prosecuting Authorities must pursue the Meeting Point
	The Prosecuting Authorities must seek reports with a scientific basis
	The Prosecuting Authorities acted correctly; the report is responsible
Rights of the children	The children have the right to have their wishes respected
	The children should be listened to and their testimony should not be doubted
	The influence of the mother should be investigated
	The minors should not be forced by court rulings
	The father should not visit the children as he is an abuser
	The minors have no criterion; it is right to oblige them
Reasons for rejecting the father	The father's behaviour causes the children's rejection
	The mother influences the children's rejection
	The children were ill-treated by witnessing the abuse
Psychological intervention	Unprofessional behaviour by the psychologists
	The report on the PAS is not good psychological practice
	Psychology professionals should report the use of the PAS
	Poor psychological practice should have its consequences

After the process of the reduction of data by agreement between the judges as to the semantic equivalence, a situational questionnaire in Likert format was drawn up to assess the professional recommendations by means of opinions as to the correctness of the decision: 0 = Definitely NO, absolutely sure; 1 = NO with relative certainty; 2 = NO with doubts; 3 = YES with doubts; 4 = YES with relative certainty; 5 = Definitely YES, absolutely sure (Table 4).

Table 4. Questionnaire for assessing the professional recommendations concerning the case.

Items	Opinion
01 Assessment of each child to determine whether he/she has Parental Alienation Syndrome (PAS)	0 1 2 3 4 5
02 Not reporting the mother as PAS is not scientifically recognised	0 1 2 3 4 5
03 Reporting the Meeting Point for poor professional practice on alleging PAS in the report	0 1 2 3 4 5
04 Respecting the Meeting Point's report as it is a neutral professional authority	0 1 2 3 4 5
05 Respecting the children's wish not to see the father	0 1 2 3 4 5
06 The children should continue seeing the father to maintain the father-child relationship	0 1 2 3 4 5
07 Therapy for the mother so she can help her children to accept their father	0 1 2 3 4 5
08 Therapy for the mother so that she can accept that the children need their father	0 1 2 3 4 5
09 Therapy for the children so that they accept their father even if he abuses their mother	0 1 2 3 4 5
10 Reporting the malpractice of the Prosecuting Authorities for using a non-existent syndrome	0 1 2 3 4 5

2.2 Quantitative Stage: Application to an Extensive Sample

In the quantitative phase the questionnaire of professional recommendations with the same case presented to the Discussion Groups was provided (Table 2). 231 Psychology students took part, 51 men (22.1%) and 180 women (77.9%) who answered the questionnaire as volunteers. The questions of the questionnaire, in this case, were analyzed as independent items so it is not necessary to analyze reliability and validity.

The rational congruence of the clinical opinion was assessed by comparing the replies to item 01 *[Recommending assessment of each child to determine whether he/she has Parental Alienation Syndrome],* with the replies to the additional question on the mother's responsibility in the child/children's rejecting his/their father. As a requirement for the Parental Alienation Syndrome is that the rejection is due to the influence of the alienating parent (the mother in this case), it is logical that if this is not the case a diagnosis of the syndrome and its assessment is not applicable.

As can be seen in Fig. 2, of the 231 answers given 220 (95.2%) considered that there was no alienating parent (the mother responsible for the rejection) and 11 (4.8%) considered that there was an alienating parent (the mother responsible for the rejection). Therefore, only 4.8% of the sample would recommend an assessment of PAS in the

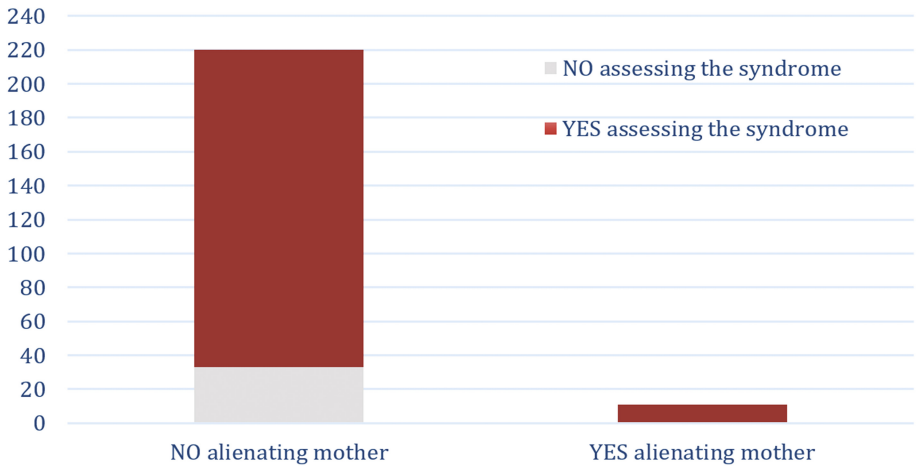

Fig. 2. Rational congruence in the application of clinical criteria

children according to the criteria of the syndrome itself. The results show however that of the 220 subjects who considered that the criterion of an alienating mother was not present, 187 (85%) recommended assessing the PAS. This incongruence did not occur in the opposite case: the 11 subjects (100%) who considered that the criterion of an alienating mother was present recommended assessing PAS.

Figure 3 shows the results of the certainty opinions of the professional recommendations. As can be seen, the position of the sample is favourable to all the recommendations, with the exception of reporting the malpractice of the Meeting Point (item 03), with the degree of certainty varying in the opinion.

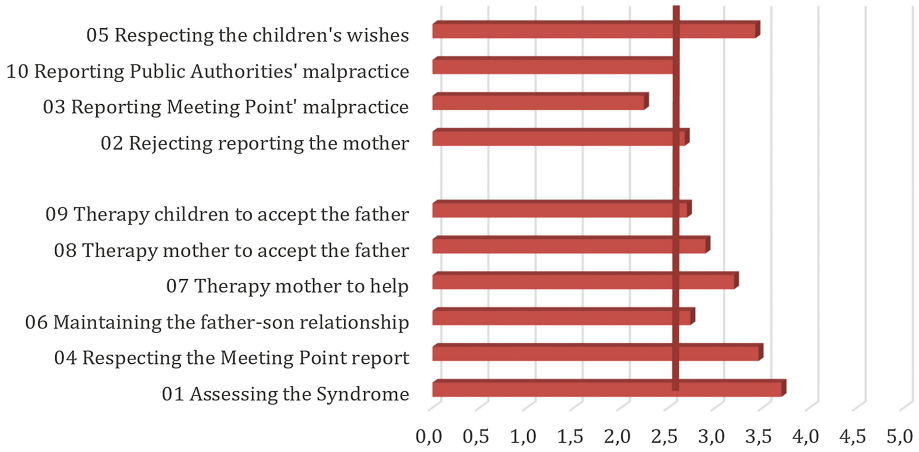

Fig. 3. Certainty in the professional recommendations

The content analysis shows a logical contradiction between the two opinions expressed with the most certainty. With the same certainty with which it is recommended that the wishes of the minor/s should be respected (item 01), there is doubt as to whether these wishes should be respected as assessment is recommended to detect the alienating effect of the mother (item 05), although she is not expressly considered to be an alienating parent (responsible for the rejection of the father). Another noteworthy aspect of these results is that it is the items referring to the reporting of the professional malpractice of the Meeting Point (item 03) and of the Prosecuting Authorities (item 10) which are given the lowest assessments: they would not be recommended even when there is doubt as to the decision. Respect for the action of the Meeting Point (item 04), which is recognised as being neutral owing to its professional nature, is one of the recommendations made with the most certainty.

2.3 Qualitative Stage: Discussion of the Results with an Extensive Sub-sample

The participation in the interpretation of the results of those who answered the questionnaire is in keeping with an epistemic position in which knowledge is conceived as a co-construction of meanings between the researcher-researched. The people who took part in the research are no longer subjects of study and are recognised as being acting-subjects with action and conscience that develop and redevelop within the research process [19]. 43 students of the 121 who answered the questionnaire (18%) took part in this stage. In an open session the quantitative results were presented in a graph such as that of Fig. 3 and their interpretation was invited. For the discussion questions were formulated around these matters:

(1) *What aspects of the results are most interesting?*

The interventions regarding this question were both descriptive (commenting on the results) and interpretative (formulating hypotheses to explain the results). References were made to the greater certainty in the recommendations of items 01 and 05, which in the opinion of all the interventions was normal because they treated the welfare of the minors directly. Assessing the syndrome (item 01) would allow the existence of a well-founded scientific opinion in order to know whether they were really being influenced by the mother; and respecting the wishes of the minors (item 05) was considered an ethical imperative insofar as their condition of minors does not deprive them of their condition as subjects with rights.

As for the recommendations of reporting the malpractice of Psychology professionals (the Meeting Point) and the legal system (the Prosecuting Authorities), there was agreement in the explanations of the result. In the case of Psychology professionals it was explained as unfair competition: *"it is entering a dispute with colleagues, with a post, or with a contract of employment, and that is not considered right"*. In the case of the Prosecuting Authorities it was explained by a feeling of impotence and the fear of reprisals: *"How would you confront a Public Prosecutor? You would be marked for life; even if you know that it is not scientific you cannot confront that"*.

Concerning the recommendations of therapy for the mother or the minors, the majority opinion explained this recommendation, adducing that therapeutic processes are always recommendable for resolving problems*: "with the trauma that the children must have the therapy will definitely be good for them; and moreover having a good relation with their father is important for their welfare"*. At this point there was an intervention against these recommendations: *"You are talking a lot about the children's welfare and that they should see the father because of the psychological factor and so on… but you're forgetting the important point that their father is an abuser; he abused the mother in front of the children, or even if he didn't it doesn't matter because they know about it…"*. At this point there was a discussion as to the suitability or otherwise of recommending therapy to balance the family system and maintain the abusive father linked to it. The discussion concentrated on the suitability of the compulsory reestablishment of the father-children relationship when the father is an abuser, with opinions being divided as to whether the minors were victims of abuse to the mother or whether only the mother was a victim.

(2) *How can it be explained that the sample, which does not perceive the mother as an alienating parent, recommends the assessment of the syndrome when the first requirement of the latter is for there to be an alienating parent?*

With this question the group was confronted with the contradiction of the results, which on the one hand recommended the assessment of the syndrome (item 01) and on the other did not consider the mother to be an alienating parent (not responsible for the rejection). After a moment of silence there were some interventions in favour of always assessing: *"The thing is, I hadn't thought of it that way… but assessment is always a good thing to know for sure what we have"*. Other interventions mentioned parallelism with other diagnoses to express the opposite opinion: *"That's true… that's not the objective; if a child writes well and has no problems for you to say that something is wrong with him, as the school psychologist you don't say he should be assessed for dyslexia, do you? Then this is the same thing, he writes correctly, you don't suspect dyslexia; well you don't see an alienating mother, you have no reason to suspect that syndrome; the thing is that we don't see it in the same way because we've put it down, the mother is at fault, we've put it down…"*. The round of interventions ended with the unanimous agreement of the group, that in effect it was a contradiction that concealed a prejudice that they had not even noticed, and that it was due to the seductive power of the apparent neutrality of the label syndrome: *"They tell us syndrome and with that no thought is necessary… as it sounds scientific we don't think any further; but years ago they used to dump in the asylum people who had other ideas, they said that they were mad, they labelled them, and that was that, off to the asylum; it was also an invented syndrome and this situation is the same"*.

3 Discussion and Conclusions

Methodological integration has been shown to be a useful strategy that is suitable for research into gender stereotypes in psychological opinions. The sequential combination of the data obtained from one methodology or another allows access to gender stereotypes and to the meanings that the *acting-subjects* themselves attribute to these stereotypes.

The revision of Anguera, Camerino, Castañer, and Sánchez-Algarra [23] systematises different taxonomies of mixed design in accordance with the qualifying criteria used by the authors. Among the systems quoted in the study referred to, the system proposed by Natasi, Hitchcock, and Brown [24] (quoted in [23]) is of particular interest for the objective of this study and the questions it aims to answer. The three dimensions of axes of this proposal connect with the epistemic position from which this study is put forward. The production of knowledge, socio-cognitive knowledge, is conceived as an interactive construction between social agents located in a social space adjusted to the three criteria of the aforementioned taxonomy: (a) *Collaboration between the researcher and the participants (acting-subjects)*, insofar as the interpretation of the results is the product of interaction between them both in each of the stages of the design; (b) *The cyclic or iterative nature of the research process*, insofar as each stage of the design is based on the previous one at the same time as it gives feedback; and (c) *The relevance of the research to the real world*, insofar as it not only reveals a problem of real consequences for people's lives but also affects the drawing up and re-drawing up of the *acting-subjects* themselves taking part in the research.

As for the results obtained in this study, the effect of gender stereotypes is seen in the reproduction of the patriarchal ideology under new *pseudo-scientific* formats. The case of the false Parental Alienation Syndrome (PAS) is a paradigmatic example of this problem as is shown by the results obtained.

What on a psychological plane is revealed as a stereotype is sustained on a social plane as a socially shared ideology [25]. The use of a Discussion Group as a technique for producing discourse is based on the idea that there is a correspondence between the micro level of language (discourses) and the macro level (ideologies) [26]. On a psychological plane gender stereotypes reproduce the ideology that sustains the patriarchal social structure. The discursive principles that are produced in the interactive context of the Discussion Group supply the appropriate linguistic formats to express the stereotypes that are self-censored owing to the effect of social desirability, providing the substratum for the quantitative approximation to the magnitude of the phenomenon. Finally, this quantitative approximation to the phenomenon is returned to the *acting-subjects* themselves to conclude the process of the construction-deconstruction of the discourse.

As a final conclusion, we stress the importance of the use mixed methodologies to explore gender stereotypes underlying the professional practice of psychology.

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Reflexivity of the Process of Construction of a Grounded Theory: Reasons for the Consumption of Advertising in Social Networks

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Abstract. The present article deals with the experience of using "Grounded Theory" as a qualitative-interpretative approach applied to the research of the stimuli driving behaviors of exposure to advertising messages in digital social networks. Its adoption allowed for the discovery of regularities that served to identify the main categories of actions of the studied phenomenon. In its development, some adaptations were applied. Here, we discuss the choices made regarding our approach to the object being researched, the data gathering criteria, the procedure of data analysis and the writing of the theoretical proposition, which started with the organization of the substantive results. With such a description, we aim to collaborate not only with the improvement of the techniques recommended by the approach in question, but also with a reflexivity model of the investigation process itself.

Keywords: Grounded theory · Meta-analysis · Reflexivity · Social research applied to communication

1 Introduction

In conducting any research, there exists a commitment on the part of the researcher to a methodological model to be adopted. For the development of formulations that would explore the reasons for the consumption of advertising on social networks in 2017, we sought the principles that guided our conducting of the proposed research in qualitative inductive research.

As the reader may suppose, the nature of the investigative procedure of qualitative research brings with it a relatively extensive variety of methodological approaches. These refer to the choices made on how to approach the object of study, the process of gathering data, how to analyze the data, and how to plan and execute the research project.

To carry out the study that seeks to understand the phenomenon of exposure to advertising messages on social networks, we adopted the "Grounded Theory"

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_15

approach, a complex set of inductive qualitative research procedures of social research which seeks to structure all phases of the study, supported by different elements of the models of the philosophical study of pragmatism and interpretationism.

In order to understand the nuances contained within the Grounded Theory (GT), we explain its fundamental proposal as well as the particular choices made with regards to the undertaking of the research, inferences, interests and positions, so that the reader can both understand the possibilities and limits imposed by the GT, as well as the potential bias that researchers can develop in a social research study.

On the latter aspect, we take into consideration the Alvesson and Skolberg reflexivity model [1], which proposes "levels of reflexivity" which must be considered in the report of the development of a research project. Reflexivity is a process of critical self-reflection about one's own prejudices, predispositions, and preferences; a recognition that the researcher is part of the context of the investigation of what they seek to understand and a means for the reader to review the research's entire development process.

2 What Is "Grounded Theory" (GT)

GT is a method of conducting qualitative research focused on the development of theoretical structures, constructed from the inductive analysis of information, which arise from the substantive data being investigated [2]. Through GT it is possible to elaborate categories that organize and interpret events, explain properties, and often demonstrate the origins and conditions from which actions emerge, vary and consequently result. The central idea of GT is that the result of the investigation be based on the data collected in the field, resulting in the understanding of the reality of a certain phenomenon through the perception of the individuals involved in it.

The procedures of its practice contemplate: 1. Simultaneous involvement in data collection and analysis; 2. Construction of analytical codes and categories derived from the data and not from the preconceived logic of deductive hypotheses; 3. Use of the constant comparative method, which involves all investigation phases; 4. Advancement of the theoretical development during each step of data collection; 5. Writing of memoranda to elaborate categories, to specify their properties and relationships, and identify knowledge gaps throughout the investigation; 6. Saturation of sample data, which considerer all the pieces of the "puzzle" of the investigation and, finally, 7. Conducting a review of the literature, which occurs only after the researcher carries out an independent analysis of its data [2].

The first strategic point in the methodological process follows from the understanding that data collection and analysis is integrated into the research. The strategy proposed by GT is to work with a theoretical sampling where the researcher collects, codes and analyzes information from sources that are likely to provide relevant data. In the process of discovering incidents through the analysis of the initial data obtained in the investigation, the research is directed towards other sources of data in order to discover new incidents and to broaden the knowledge about them.

The acquisition of information is considered sufficient when the data no longer offers new concepts, when it becomes repetitive and there is a "theoretical saturation of the data". The characteristics of the ideas that arise, which propose patterns of behavior

and events related to the phenomenon under study, are important for the theoretical sample criterion.

The second strategic point concerns the development of analytical codes that are categorized using the comparative method, which consists of an incident by incident comparison of the data. The construction of explanatory categories that can be connected with identified properties and dimensions is what prevails here, resulting in a substantive structure of the phenomenon that will later become, with its generalizations, the grounded theory or conceptual formulation of the investigated event.

The work of coding the categories involves three stages: open coding, axial coding and theoretical coding. The writing of memoranda is also constant and useful at all stages of the investigation, whether to hypothesize categories, identify relationships, knowledge gaps, as well as to map and develop conceptual diagrams.

The third strategic point refers to the writing of the theoretical proposition, where the development of the discovered conceptual work is expanded. The logical conceptual development based on the principles of deductive verification is conducted on the structure derived from the inductive study. This logical elaboration is then concluded with the gathering of external theories which have potential for the interpretation of the formulated concepts of the phenomenon under study.

By adopting the GT criteria, we conducted the research without previous references on stimuli driving behaviors of exposure to advertising messages in digital social networks, letting the individuals involved in the phenomenon under study relate their stories and experiences.

It was only after interpreting these stories that the review of relevant literature took place. Although unusual for academic work, such a strategy seemed appropriate for the privilege of analysis and formulation of the theoretical concepts of inquiry. The idea of this practice is to allow the researcher the possibility of discovering new concepts, problems and data interpretations [3], to develop new theoretical perspectives instead of just reproducing widespread theories.

The use of GT demands freedom from any related literature, the latter serving to interweave with GT by comparison, incorporating it into the results of to the structure initially developed by fieldwork as additional knowledge.

3 Criteria for the Reflexivity of GT in the Research Development

According to Engward and Davis [4], in a paper about being reflexive when using GT, it is stated that, since researchers cannot be entirely objective in the qualitative development of social research due to their ideological, political and cultural particularities, the description of their starting points and criteria for conducting all phases of research is especially relevant. According to the authors, this description should address the researcher's concepts, beliefs and motivations.

The reflexivity process must identify and acknowledge the favorable and unfavorable aspects of the research endeavor. To this end, it is useful to contextualize the development of all research phases, collection, treatment, analysis and the writing up of the results.

Guba and Lincoln [5] emphasize that being reflexive is to demonstrate the premises that implicitly and explicitly influence the research process. The lack of clarification regarding these processes can lead to distrust and discredit of the quality of the research: - the results of the grounded theory can, therefore, be more than the process of systematic analysis and can incorporate the philosophical/disciplinary context that the researcher brings to their research [5].

Alvesson and Skolberg [2] are the researchers who initially presented a practical model for rigorously developing "levels of reflexivity" that "ought to" be explored in a research project.

The model requires four levels of reflexivity: First, analyzing the empirical material, clarifying the way in which the data was generated, which guiding criteria were used to induce the researcher's choice of data collection and data processing tools; Second, revealing the interpretative nature of the researcher, reflecting how the researcher is analyzing the data and recognizing personal perspectives which may impact their analysis; Third, clarifying the possible political-ideological context, exposing potential ideological relationships which may impact how data is collected, analyzed, reported and potentially used; Fourth, considering relationships of representation and authority, reflecting, for example, how language is used in the production of research material, including claims of authority on behalf of the researcher and the selectivity of opinions in the final write-up of the research.

Following this proposition, we constructed a meta-analysis of the investigative process of the motives for the consumption of advertising through social networks, a study carried out in Lisbon between 2016 and 2017.

4 Reasons for Ad Consumption in Social Networks

Our motivation to study the stimuli driving the behavior of consumption of advertising on social networks comes from an interest in a complex context that challenges the current advertising model. In the WEB environment, more specifically on social networks, advertising messages can circulate as part of a paid model or as part of an unpaid one.

Videos ads on audio-visual materials on networks such as YouTube, which may or may not be skippable, True View In-Stream Advertising or Default Video; Display ads, which are placed to the right of a featured video as well as above, in the list of suggestions; Overlapping ads that appear as slightly transparent advertising on the bottom of the videos and occupy 20% of the player's video display area; Ads placed in the news feed or next to it as seen on Facebook; Promotion of Profiles and Tweets; Trending Topics, among many others, are paid ads.

Furthermore, videos and display ads can get more prominence when network users like, comment and share, so their propagation can take on epic proportions, without the advertiser paying anything more for the added reach.

Such dissemination becomes dependent on the engagement of the ads' sympathizers, but this condition is rare[1]. This is not new, advertising has long faced the difficult task of talking to those who do not want to see and hear. Today, approximately 200 million users worldwide use ad blocking software on the web[2], not counting other forms of avoiding this material such as the simple act of not acknowledging or paying attention to it.

In the sphere of exception, there are those who expose themselves and engage themselves with propagandistic content. But why do they do so? To answer this question, we conducted thirty-eight in-depth interviews in a qualitative inductive investigation adopting the "Grounded Theory" in the urban area of Lisbon.

Our choice of focusing on the advertising message comes from the understanding that advertising is an activity that essentially drives economic development and that communication of a political, educational and public health and safety nature is invariably focused on impacting specific audiences such as youths.

5 Obtaining the Data

The work of obtaining data took into consideration the theoretical sample criterion suggested by GT. According to its parameters, it is the researcher who decides the moment up until which it is necessary to proceed with the collection, taking into account the initially acquired data which guides the perception of the dimensions that still need to be studied.

The strategic criterion of the sampling is conceived as theoretical, since the number of subjects or situations that must integrate the study is determined by what the authors of the method denominate theoretical saturation, when the information collected starts to no longer integrate new concepts or add relevant information.

The aim of using a theoretical sample was to discover categories and properties, as well as to leave room for the emergence of connections among them, in order to formulate the theory of the phenomenon being studied. The use of this strategic criterion took into account the recommendations of Strauss and Corbin [6], who indicate that the data should be collected until: (1) no relevant data emerges, (2) the category is well defined in terms of its properties and dimensions, demonstrating variation, and (3) the relationship between categories is considered.

Regarding the indication of the sampling strategy, we also used another overlapping criterion. To ensure that we obtain the greatest possible variety of incidents, we planed in greater detail a sample with minimum diversity of elements likely to bring variations on the consumption of advertising on social networks.

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[1] Once the user comments, shares, or `likes" a display, a media algorithm makes the post appear on people's pages on your network. It is the interactions with the post that increase the chance of it circulating and being reposted successively within the network, to a more receptive audience. User referrals and recommendations act as an endorsement of brand satisfaction as well as celebrity brand loyalty, with the advertising message being disseminated according to a digital word-of-mouth scheme.

[2] See 2015 global report on ad blocking in https://pagefair.com/blog/2015/ad-blocking-report.

Because the sample needed to be rich in terms of the variety of events related to the studied phenomenon, the addition of this other sampling criterion would guarantee a minimal and non-random internal diversity of the subjects and situations that would provide us with the required data.

We idealized a stratified intentional sample of the urban population of Lisbon, outlined by socioeconomic classification and age. The consideration of these few conditions guaranteed the desired diversity. The criterion adopted for socioeconomic classification (which also takes educational levels into consideration) is the one developed by the Marktest Institute (an institution which collects data on the Portuguese media market), which applies this categorization model based on variables which can adequately capture the Portuguese reality. The model was developed through research on the national region and based on recommendations from ESOMAR (European Society for Opinion and Marketing Research).

Based on this model and taking into account the criterion of conceptual saturation, the sampling of the research was configured as follows (Table 1):

Table 1. Socioeconomic class

	A	B	C1	C2	D	Total
Age 18–21	4	4	4	4	3	19
Age 22–25	4	4	4	4	3	19
						38

This strategy was adopted with the purpose of ensuring that, even with the evaluation that no evidence of relevant data could still emerge, we would persist in fulfilling the previously planned consultation of the participants, with the aim of guaranteeing an equal opportunity for the surfacing of some "peculiarity" associated with ad consumption, which, at worst, would present us with a confirmation of previously detected cases.

The guidelines which helped us to collect and evaluate the data we obtained were based on the guiding questions provided by GT. Every time new material was collected, we repeated them to identify the key information: did we gather enough information about the experiences of the recipients, of the processes for understanding the complete portraits and variations in the contexts of studies? Do we have detailed descriptions of the variation of the points of view and actions of network users who are exposed to ads? Does the data provide what is established beneath the surface regarding the consumption of these materials? Did we gain new perceptions of the variation of participants' actions? Have we gathered data that allows us to develop analytical categories? [2].

With these questions and the experience of conducting the first interviews, we developed a better script of topics explored with the participants. We used the in-depth interview as a data collection technique for the research because it has many advantages such as: providing opportunities to motivate and enlighten the respondent, allowing flexibility in questioning the respondent, in determining the sequence of the questions and in choosing the most appropriate wording. Finally, it also dissolves

comprehension ambiguities, having a greater evaluative power regarding the validity of the accounts through the observation and identification of the verbal frame of reference and non-verbal behavior of the respondent [7].

Much more than "uh-huhs", with the in-depth interview, the interviewer can articulate the further explanation of questions which were not entirely understood as well as clarify meanings, drive the pace and momentum of the subject being discussed, examine previous events, perspectives, and feelings involved in the situations, as well as revisit essential points to reaffirm the accuracy of the researcher's understanding of the researched topic with the famous: - Okay, let's see if I understood correctly (…).

Furthermore, we were aware that interviews can be a form of social control that shape what people say, thereby conditioning the researcher's role of listening, reflecting on the information given, and asking relevant questions without directing the answers. We knew that an investigative incursion could affect participants as much as they might affect the researcher. However, our approach to the interviewees did not create dynamics of power since our aim was merely to capture participants' experiences; no power differentials between interviewer and interviewee were visibly present.

Everything was recorded and annotated in open records for each participant. Soon after each interview, we transcribed the accounts for analysis. While transcribing the data, we took due care in recording semantic variations and distinctions. The transcription of the material, while faithful to the textual expressions and linguistic variants, took into account the denotative and connotative differences implied in the accounts provided, resulting in additional annotations in the informants' records.

6 Data Processing

The procedure that followed the conducting and transcribing of the interviews was the analysis of the data using the constant comparative method. The analysis, which involved perceiving and identifying the incidents which were to be coded, was developed in a three-stage process: open coding, axial coding and theoretical coding.

The result of the coding processes is of two types, the substantive codes that conceptualize the empirical substance of the research, and the theoretical codes to which analytic schemes are applied in order to provide abstraction to the study, with the aim of moving from a descriptive framework to a referential one, in order to favor the theorization of the data in a later stage of the work.

In the open coding process applied to the research, the data was examined according to similarities and differences, divided and arranged into categories. Categorizing the data required, above all, that the information be labeled in such a way that it would be possible to simultaneously name, synthesize and organize the data. It was with the detailed study of the data that the nuances of the various categories were defined.

These initial categories were developed and redefined following new interviews and understandings, always considered according to their specific properties, primitively established by the simplified descriptions of the observed events.

The employment of this initial activity permitted the development of a work of interpretation that was becoming more and more accurate: the line-by-line examination of the analytical units which, as they were named, ought to convey a relevant meaning

of the network user experience and of the consumption of the advertising. At this stage, the incidents were encoded into many possible categories, bearing in mind that all data could, at this time, be coded.

Some guiding questions were essential to better identify the data that should be labeled and understood, such as: What happened here? What are the basic processes involved in the use of networks and exposure to advertising? How do these activities develop and how can they be defined? What does the participant think and feel when exposed to advertising? What could the observed behavior indicate? When, why, and how are such processes carried out?

In raising such questions, we observed the contexts under which specific actions, intentions, and processes emerged in the activity of exposure to advertising messages. Also, along with the emergence of categories and subcategories, we recorded memoranda, ideas and observations that took the form of theoretical notes, which could later be incorporated into the analysis paradigm. The idea behind the memos was to help reflect on what the data might be pointing towards. With their development, it was possible to bring greater prominence to variations and connections in the data, meanings and attributes of the constructed actions, emphases and nuances of the events, resulting in greater confidence in the understanding of the meaning of the information.

Through the separation of the data into categories, we continued the analysis in a phase known as axial coding, where relationships and/or connections between the categories are explored. This phase has the objective of integrating the relationship between categories and subcategories, properties, dimensions, as well as the gathering of information, giving coherence to the emerging analysis.

The most important process in this phase is the discovery of the relevance of the elements which emerged in the study from the point of view of its actors. To identify the codes which were to be included or excluded, the codes had to have several examples among the sets of data. The selection of coded data, the reduction and regrouping of categories into more general ones, as well as the organization of the relationship between categories, respected the criterion of relevance which was inductively clarified with the comparison of the incidents.

In the analysis, we gave emphasis to the consideration of the established connections for the solidification of the perspective of the studied phenomenon. Thus, the influencing, contextual and intervening conditions, the strategies and consequences of the auditions formed the relationships through which the categories were being related to one another.

The work at this stage, therefore, served the purpose of relating the substantive categories, thereby integrating them[3]. Such integration was essential for their analysis

[3] We use MAXQDA® content analysis software. With it, the ordering and visualization of information became more compatible with the search for the theoretical model, mainly because it allowed for the retrieval of data by numerous vectors, giving rise, for example, to the conception of the ``standard relationships'' of the data as well as the visualization of conceptual maps. With tools of Boolean, semantic and proximity/distance operators, for example, ``patterns of actions, contexts, constraints and results'' could be observed, permitting the verification of hypotheses on the constitution of the relationships under analysis, according to the reiteration and constancy of the data.

to spur the theoretical elaboration of the phenomenon in a third stage of data processing, the process of theoretical coding (or selective coding, as it is referred to in many studies)

In this third phase, in which substantive theory was already consolidated, it was necessary to transpose the data, in an integrated way, to a theoretical-conceptual base of the studied phenomenon. This procedure required a reflexive effort supported by the relationship structure of the already consolidated categories. The literature review was associated with the text from that moment on. As suggested by Charmaz [2], comparing the study with the evidence from other research, it was possible to identify the external ideas that illuminated the proposed formulation.

The analytical task, in writing, led to the establishment of connections between the existing literature and the argumentation of the study. The formulation that was developed was based on the data; however, it also encompassed other studies and theoretical concepts which broadened the understanding of the phenomenon, a typical combination of inductive and deductive approaches, fostered by the GT method.

The theoretical structure combined with the literature review recovered, located, evaluated and defended a perceptive position on the phenomenon of the consumption of ads. Thus, other studies also contributed to the lines of the text and traversed, in an imbricated way, the structure that emerged from the data. The deductive logic was also revisited more closely in the discussion of the results in a chapter of its own. With the theoretical constructs that explained the consumption of advertising together with the examination of related studies, the formal conceptualization of the reasons for the exposure to advertising messages by youths on social networks was constituted.

7 Writing of the Theoretical Proposition

In the theoretical coding, where the final concepts of substantive theory are refined and concepts from studies on the subject at hand are introduced, we were careful not to overturn the substantive formulation of the data. The writing of memoranda was crucial for the researchers' contemplation of the information and the reflection of the possible interpretive inferences. The role of the memoranda was that of organizing thoughts, how data fit and adjusted to the generalization of categories, and how literature from within the field could contribute to the final formulation of results.

It is important to note that one of the researchers, the first author, already had some experience in conducting the exploration of motivational studies on media consumption, having carried out in her PhD an investigation surrounding "telenovelas" (soap operas) from a GT methodological perspective. Undoubtedly, this experience was a guiding factor for the new project. Although there is the recognition that such experience facilitated the development of the several stages of the investigation, we took care not to let any preconceptions interfere with the process of data interpretation.

We believe that this experience could increase the sensitivity of the information analysis, but also allow for some bias in the interpretation of different perceptions of the data. It is therefore recognized that the researcher cannot be fully aware of how her experience as a scholar can influence the understanding of the data. However, by making the decision-making transparent and undertaking the comparative verification

of data alongside her colleague, we believe that we minimized the possibility of any biased inference regarding the modeling of the results.

When evaluating the final level of reflexivity put forward by Alvesson and Skolberg [1], about how the research is communicated, including how the language is used in the production of the text, as well as the selection of the voices in this material, we consider that the text should be as accessible as possible to researchers starting out in this field of study.

Considering that the potential reader may be a beginner or experienced scholar in the field, or a communication professional interested in the results of the proposed study, we tried to be as objective as possible in our use of language, without losing sight of the stylistic rigor demanded by an academic report.

For the presentation of the key categories resulting from our research question, we brought a selection of three distinct fragments of voices (not full narratives) which illustrated the emerging concepts. These voices, a result of the substantive undertaking of the research, ensured the presence of the transmutation of results, where the evaluation of their relevance could be arrived at by the reader.

Our focus was the explanation of the categories without losing sight of making the origin of the information explicit, thereby leaving room to reveal what was happening in the data. Also noted by Engward and Davis [4], the use of cutouts may seem to diminish the subtlety and nuances of data, especially because contextual and social conditions were omitted, which could give the impression that the theoretical text is too objective.

It is important to note, however, that the grounded theory indicates an attempt to explain patterns of data in a particular context; not seeking to explain all the social conditioning of the portrayed phenomenon. Thus, the lack of contextualization of the experiences in the text of the presentation of the results is compensated by the clear portrayal of the standard behaviors presented.

Finally, by being reflexive about the research process, we put our procedures and decision criteria to the test by experienced GT researchers, which can foster discussions that make their approach increasingly refined.

8 Final Considerations

Within the framework of qualitative research, GT presents unique characteristics. The emphasis on theoretical development in the field is undoubtedly its great distinguishing characteristic. GT forces the researcher following its rules to study the participants from their perceptions, to develop new theoretical views instead of reproducing the theories which are already available regarding a certain phenomenon.

Since GT makes us understand that literature review should create a dialogue with the substantive field of research, providing clarification of ideas, intriguing comparisons, relevant discussions, and showing how the study can transcend established knowledge [2], we can develop empiricism without passions, rigorous coding, and emphasis on the emergence of discoveries.

Additionally, other characteristics make it very pertinent. The analysis of the data that occurs immediately after its collection, providing the basis for subsequent data

collection; the basing of the research on the robustness of the developed concepts and not on the number of established contacts, providing the construction of the representation of the studied phenomenon; the constant comparison involved in all phases of investigation as well as the writing of memoranda that register one's insights and expand one's conceptions concerning the studied phenomenon; and the adjustment of its design by the researcher who should "respond to discoveries as they unfold" [8].

The method arises from the combination of two "competitive" traditions of sociology, pragmatism and symbolic interactionism. In an expanded perspective, when placed in a framework of the general structure of the different methodological perspectives of qualitative research [9], GT is found in the literature within the class of interpretative analyses, as a constructor of theory, alongside methods such as classical ethnography.

Although this is a classic perspective of the GT approach, given its emphasis and aim of generating and constructing theory, Weed [10] finds, in a more precise verification of its core, different shades rooted in GT, and demonstrates that its principles have as much of an inclination toward the positivist tradition as toward the post-positivist and constructivist-interpretivist of its recommendations.

Nowadays, such inclinations are often juxtaposed in the recommendations of the GT approach, and the outcome of investigative work may lean more toward one or the other tradition of thought, but its judgment will depend much more on the configuration of the key characteristics of the work than on the methodological interference of the worlds studied through research, as pointed out by Charmaz [2].

Research conducted following a GT approach will be successful if it generates theory, with a systematic and dense articulation, capable of portraying the studied reality. In the field of media, few studies rely on it, even though it has been used successfully in psychology, nursing, education and other prominent areas such as administration [11].

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In Case of Doubt See the Manual: A Comparative Analysis of (Self)Learning Packages Qualitative Research Software

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Abstract. One of the first precautions that a consumer/user has when acquiring a new product is related to how to use it. In this context, the user manuals can be assumed as one of the main communication channels between the companies that develop the products and the user. Regarding the use of software packages, literature indicates that one of the decisive factors for user's dissatisfaction is related to the difficulty in learning how to work with a software. In this context, Qualitative Data Analysis Software (QDAS) enterprises are increasingly looking to develop features that can decrease user's learning curve of their tools. In this way, this chapter illustrates a comparison of user support features, such as: support and typology of the User Manual; Training; Tutorials; Forums; Frequently asked questions (FAQ's); Workshops. Through a systematic exploration of the native sites guided by a dedicated checklist, it was sought to identify the singularities of the resources to support (self)learning of the different software packages. In order to systematize the offers that each user can find, enabling him/her to choose the package that provides the solutions that best respond to his/her learning style. It was concluded that among the different software packages there are no noteworthy disparities, only in two packages analysed there were shortcomings in the offer of formative and autonomous learning.

Keywords: Qualitative analysis software · User guide · Self-learning · NVivo · Atlas.ti · Dedoose · webQDA · MAXQDA · QDA Miner

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_16

1 Introduction

The current demands increasingly compel researchers to equip themselves with digital tools that provide speed and efficiency in research processes. This situation is even more prominent when we consider qualitative research as a methodology that requires more in-depth and contextualized research [1]. Hence, the provision of appropriate training for qualitative researchers could contribute to increased research quality [2].

The use of digital tools to support data analysis requires the researcher to master technical/methodological knowledge, which can sometimes be demotivating [3, 4]. This view is supported by Moudgalya [5] which states that self-learning tries to provide the student, as far as possible, with control of his/her learning process.

The existence of a large set of offers of qualitative data analysis software (QDAS) packages on the market may hinder the researcher to choose the package that presents the (self)learning tools that best fit to his/her learning style [6]. In this sense, the efficiency of researchers' learning depends on a teaching-learning process adjusted to the styles and rhythms of the learner researcher. Research shows that there is a relationship between learning styles and [6] and the performance of users in learning a software [7]. It further reinforces the idea that a good understanding of the relationship between user learning styles and training models can contribute to the design and implementation of more efficient and effective training courses [7]. In other words, an instructional model effective for some users may not be so for users with a distinct learning style [8]. Other authors such as Silver and Rivers [9] justify the adoption of specific learning models not only due to the technological specificities of the various QDAS, but also due to the diversity of experiences and expertise among users concerning the use of software. Therefore, some authors [10] suggest the use of the teaching/learning method, such as "Five-level QDA", as a method to take advantage of QDAS packages, regardless of methodology, software package or learning mode.

It may be questioned the feasibility of comparing qualitative analysis software packages, because there is always some subjectivity associated with its use, whether at the level of the data to be analysed, the methodologies associated with the research, or the experience in the use of the QDAS by the researcher. Certain procedures/tasks may prove to be more accessible in a particular software compared to other. In most cases users are able to find "alternative solutions" to carry out the operations they want [11]. The present study, contrary to previous ones [12], does not aim to present a comparative approach to the functionality of the QDAS, but rather intends to analyse and synthesize the (self)learning solutions made available by some of the main packages, in order to inform the researchers when selecting the application to use.

The rest of the paper is as follows. First, this paper familiarises the reader in relation to QDAS and some of the characteristics that differentiate some of the main QDAS packages. Next, it explains the methodology that supported this study and present a comparative analysis (self)learning tools made available, as well as the body of latent Internet data, regarding the topics of the forums of several qualitative analysis software packages. It culminates with final considerations, resulting from the analysed data.

2 Qualitative Data Analysis Software Packages

To meet the challenges and demands that qualitative research poses, the manual organization and analysis of the collected data can prove to be complex, inaccurate, exhausting and very demanding in terms of time expenditure. In this sense, it seems essential to consider the QDAS as an inevitability in the process of qualitative analysis. Currently the market offers more than 40 solutions dedicated to the analysis of qualitative data, divided between free and open source license packages and paid license packages [1]. The free usage QDAS packages include, among others, the following: Aquad; Coding Analysis Toolkit (CAT); ELAN; FreeQDA or Transana. On the other hand, from the packages with paid licenses stand out: NVivo; Dedoose; WebQDA; MAXQDA and QDA Miner.

The most commercialized packages, upon the needed customer acquisition, publicize sets of characteristics expecting to convince the consumer to prefer the solution they present. From forms of data presentation, data questioning and even collaborative work, there are options that can please users with different preferences.

In this section, some of the most used QDAS packages are presented in global terms, focusing on their main functionalities.

2.1 NVivo

NVivo is developed by QSR International and is probably the most well-known QDA package among researchers. The software accompanies research from the early stages of a research project, integrating tools oriented to project design and literature review, as well as to support the production of reports and other scientific papers.

This software can work with multiple file formats (text, images, audio and video) allowing diversity and richness of used data. It features the usual characteristics that allow for text searches, word frequency counting, matrix encoding and coding comparison searches. It also allows summarizing large amounts of data in outline topics and presents a wide range of viewing options that allow to observe patterns, tendencies and connections. It also has good import capabilities, for example, from SurveyMonkey questionnaires, and other data sets, or bibliography reference managers such as EndNote, Refworks or Mendeley. It is also possible to exchange data with more quantitative analysis packages such as Excel, Access or SPSS to conduct research using mixed methods [12, 13]. NVivo offers two distinct features that enable teamwork. With NVivo for Teams and NVivo Server (extra applications), it is possible to manage, access, and work on centrally stored NVivo for Windows projects at the same time, in real time. Through synchronous collaboration, team members can follow the project updates, monitor and keep track of the changes made, as well measure intercoder reliability. Both applications enhance data security, data storage, and data backup in standard NVivo. Although it has a broad scope, these attributes can only be used when installed locally, being lowly versatile and even dissuasive in other platforms. The downside of this software for collaborative work is the requirement to use NVivo for Windows, limiting users who rely on other operating systems [14].

2.2 Atlas.Ti

ATLAS.ti was created at the University of Berlin between 1989–1992, and its first commercial version was launched in 1993. It is distributed by ATLAS.ti Scientific Development GmbH [15].

Initially based on Grounded Theory, it has evolved to empower working qualitative data from other research designs [16]. ATLAS.ti capacitates the use of documents in multiple formats and includes a very solid multimedia analysis, allowing simple encoding of all types of data types, as well as many other features [12]. It facilitates the management of information through the organization of collected data, favouring the indexing, research, theorization and qualifying results [17, 18]. In ATLAS.ti it is possible to import data from Evernote, Twitter and reference managers for a literature review, and import entire surveys to analyse answers to open-ended questions. It also enables network visualizations with complex information shown through intuitive graphics [12].

In this way, it allows to discover and to analyse hidden phenomena in little or non-structured data, like text, multimedia and geospatial data. The software includes tools for finding, coding, and annotating items in documents, and then analysing their importance and visualizing relationships [12]. It is also advocated that helps researchers to focus on material analysis by providing functions that facilitate the management, editing, comparison and creation of hypotheses and theories from large amounts of data in a systematic, creative and flexible way [17].

It is noteworthy that ATLAS.ti has possibilities to work with multiple authors and to audit processes. The first is due to the ease in sharing projects and the possibility of use by different users simultaneously; second, it is possible because the whole analysis process can be consulted through the reports made available by the software [16]. Despite announcing collaborative features, the system's teamwork capabilities are still very simple, being restricted to simple project merging tools, simple user management, and shareable document repositories for each project [12, 19]. ATLAS.ti has cross-platform capabilities with versions for Windows and Mac OS computers, and Android and IPad tablets.

2.3 Dedoose

Dedoose is an application developed by UCLA - University of California, Los Angeles, which allows the analysis and interaction of data from qualitative and mixed methods in a collaborative environment [20]. It consists of a multiplatform, web-based application that allows the analysis of text, photos, audio, videos, spreadsheets and other formats. It is accessible through the web and includes the main analytical tools present in the modern CAQDAS packages. It has a simple user interface and is designed to facilitate the collaboration of geographically dispersed researchers who can work with Mac or Windows systems [21]. It is known for qualitative and quantitative data analysis methods in combination with interactive data visualizations [12].

Being a web application it can be accessed through any device with an internet browser, knowing no compatibility issues across platforms. This option is safeguarded with a large investment in security with multiple levels of encryption and password

protection. Performs nightly backups for the convenience of users [22], being this option debatable with the variability of time zones. If connectivity issues arise, one can use Dedoose Desktop App, an alternative way to access Dedoose servers that bypasses problems that may appear when using a browser to connect. Currently, the Dedoose application can be run on Windows, Apple and some Linux versions. Dedoose can also be run through the Photon browser on iPads and Android tablets [20].

One of the strengths of Dedoose is the ability for several team members to work simultaneously, in real time, from any device connected to the Internet. Given its strong collaborative component, Dedoose also has possibilities to gauge intercoder reliability, allowing the work of a second researcher on a document already codified by another researcher, but whose codification is unknown.

In this field, Dedoose presents advanced management of users with different privileges according to their competence to work on the project [23].

2.4 WebQDA

WebQDA is the result of a partnership between the University of Aveiro - Portugal and local companies. It emerged in the market in 2010 with Esfera Crítica and is currently supported by Microio and Ludomedia. Like Dedoose, it is a web-based software that supports the analysis of qualitative data in a collaborative and distributed environment. Being web-based and requiring only a browser to use it, it ensures a very easy use and compatibility between operating systems. Since no installation is required, this feature enables users with very low computer science knowledge to be able to fully use WebQDA on their research projects.

WebQDA enables the analysis of non-numeric and non-structured data (text, image, video, audio), individually or collaboratively, synchronously or asynchronously [24]. Besides allowing the incorporation of files of different formats in its own repository, it allows external connection to different types of sources, such as YouTube or cloud storage systems such as Dropbox. It supports the organization of data in groups and sets and provides automatic backup capabilities. It also enables exporting in a wide range of formats such as text, tables, images, pdf and xml [12].

The software is based on cloud computing. So, it empowers communication, coordination and joint analysis with other researchers, offering two possibilities for participation: (i) visualization of data without change; and (ii) total and unrestricted collaboration.

By using this software it is possible to organize, encode, recode, annotate and interpret different types of data, export different outputs, systematize the analysis through a category tree, keep a detailed record of the entire research context, and question the data, classify relations and construct models [25].

2.5 Maxqda

MAXQDA is developed by Verbi GmbH, which presents it as a software for qualitative, quantitative and mixed research. The capability of data analysis varies according

to the version acquired by the user. Therefore, the Base version allows only the qualitative analysis of text. From the Standard version it is possible to conduct more advanced qualitative data analysis and, with the MAXQDA Plus version, there is room for quantitative text analysis. With the Analytics Pro version it is possible to conduct statistical analysis of data [26].

The software enables to organize, evaluate, code, annotate and interpret various types of data, create reports and visualizations, and share the analysis with other researchers. It is assumed as an integrated solution with tools for conducting qualitative research, but also presents a set of potentialities for the accomplishment of mixed or quantitative analysis [12].

Like all the software packages analysed in this paper, MAXQDA also enables to work with files that can integrate text, image, audio, and video. Additionally, it presents different aspects such as the "linkage" of the data, being notable Geolink. Other features include the possibility of direct import of different formats and also SPSS data, SurveyMonkey, focus group transcripts, twitter tweets, Endnote bibliographic data, and others [12, 27].

MAXQDA also announces the ability to support teamwork. However, there is only the total or partial sharing of projects and the merging of copies of projects among the members of the team. The manufacturer even announces that MAXQDA is a single-user, non-multiuser program and warns that simultaneous use of the same project file is not possible, consequently, it is not possible for multiple researchers to make changes into the same file at the same time [27].

2.6 QDA Miner

QDA Miner is a product developed by Provalis, which advertises the tool as a software for analysing qualitative data, which enables to encode, annotate, retrieve and analyse small and large quantities of documents and images [28]. An important feature of this software is to integrate a mixed approach to data management and analysis, enabling the user to conduct qualitative and quantitative analysis [29]. The software makes it possible to combine coding results with statistical information, something important for those who wish to adopt a mixed approach in the analysis of information [30]. This ability to integrate qualitative analysis of information with quantitative analysis assists in the identification of data patterns.

QDA Miner works with different types of data, including text files, in ASCII, HTML and PDF. It also works with spreadsheets and databases in Microsoft Access and Excel files, SPSS files, Sav and in Triple-S format [29]. The program shares features with both ProStats WordStat and SimStat. It can perform direct import from Web search platforms, social media, major primary email clients and bibliographic reference managers [31].

QDA Miner calculates coding frequencies, coding co-occurrences, supporting the definition of conceptual maps or graphical representations of the conceptual proximity of ideas (nodes) or cases. It also enables to conduct searches based on keywords or segments, and conduct analysis based on the coding sequence [29, 30]. This turns possible, for example, to observe which ideas tend to arise sequentially in a given document.

It has the potential specifically for conducting research on structured documents. It has query storage capabilities and analysis results, tables, graphs, research notes and citations in one place, making it easy to visualize the data.

It features innovative characteristics such as Geotagging and Time-tagging to associate geographic and time coordinates to text segments or graphical areas, retrieves encoded data based on time or location, and plot events in space and time, and also creates dynamic maps and interactive timelines [31].

Provalis informs that this software can be used between different operating systems, which can be misleading information, since the use beyond the Windows system requires the installation of virtual machines that, inevitably, must use Windows [32].

Finally, as far as teamwork is concerned, QDA Miner also announces this possibility, although limited to some of the previous software packages. Refers to the possibility of gathering the activity of several coders, as well as assessing the inter-coder agreement. But it seems to be limited to a single local installation where the control of user privileges such as access to selected features, modification of documents and access to visualization codes is managed [33].

3 Methodology

In order to carry out this study, it was adopted a methodology that favoured the identification, registration and analysis of QDAS tools related to the (self)learning process. The six software packages, previously selected, were reviewed, taking into account, among other options, their transversality in terms of: operating systems; type of access (Desktop or Web); language in which they are available; and typology of licenses. Considering (self-learning) tools, the offers available for the various packages were analysed with regard to: User Manual; Methodological Manual; Tutorial Videos; Frequently Asked Questions (FAQs); Forum; Blog; Training; Workshops; Webinars; Consulting; or other tools. These data were scrutinized through a systematic search in their respective websites.

In a second phase, and with the aim of complementing the revised data, attention was focused on one of the (self)learning tools - the forums. It was conducted a corpus analysis of the internet data [34, 35] with the objective of carrying out a secondary investigation through the data existing in the forums of the various software packages. Given the large volume of data corpus existing in these forums, it was understood - for a better systematization - to analyse only the topics corresponding to the last month prior to the production of this study. A total of 114 messages from users, trainers, moderators, authors of user manuals and technical support of the forums of the packages were analysed. Of the 114 messages analysed, 62 belonged to NVivo, 25 to Atlas.ti, 12 to webQDA, 11 to MAXQDA and 4 to QDA Miner. Dedoose forum messages were not analysed due to the fact that it was disabled at the time of this study.

In the analysis of the latent data of the Internet, three areas were focused: (i) the typology of questions made by the users; (ii) answers with instructions from the trainers, moderators, technical support or authors of user manuals; (iii) suggestions for improvement, referenced by users, to be introduced in the analysed packages.

Regarding the typology of questions posed by users, three categories were defined: (i) "Executive Issues", allusive to all questions related to doubts for the execution of a certain action or process in the course of using the software; (ii) "Methodological questions", concerning doubts about the sequence of actions (codification, matrixes, functionalities, etc.) more appropriate to certain projects; and finally (iii) "Technical Issues", concerning all questions associated with anomalies (system bugs, etc.) arising from the execution of operations. Concerning the answers to the questions asked in the forums, the instructions given were considered, and if the questions were answered in the forum itself or if they referred to other sites.

Collaborative answers were also analysed, that is the answers given by users in support of questions posed by other users and not by forum moderators or technical support elements.

Finally, some of the messages that contained proposals for improvements were analysed considering: (i) usability; (ii) support; (iii) instructional clarity; and (iv) technical matters. The "usability" proposals refer to the improvements needed for a more efficient use of the software, while the suggestions of "support" concern the need for improvement in the support to the users. "Instructional clarity" is related to improvements in the instructions (text or figures) of the steps to be performed, while the "technical issues" point to functionalities, or technical procedures, that the software should provide. The analysis of the suggestions messages in the forums was aimed at understanding the needs of users who were not effectively answered by the (self) learning tools provided by the various packages.

The analysis of the messages of the forums was based on the collection from the various forums, later placed and organized in a QDAS software, where they were analysed qualitatively.

4 Analysis of the (Self)Learning Tools of Qualitative Data Analysis Software Packages

In the current context of rapid technological progress and commercial competition, QDAS package developers look at the technical capabilities of their competitors, seeking to integrate them (adapting and refining) into new versions of their software [11]. In this way, the current software packages do not differ much in the level of the functionalities that they deliver. The great contrast between QDAS packages may be essentially the cost of licenses and the difficulties associated with usability and learning [3].

Table 1 presents, in a general way, the list of (self)learning tools in the six analysed packages, considering the latest versions of the applications at the date of this study. In the following sections are discussed the tools analysed in terms of their function and assistance in the various QDAS packages.

Table 1. List of (self)learning tools in the analysed QDAS packages

Ferramentas	NVivo	Atlas.ti	Dedoose	webQDA	MAXQDA	QDA Miner
Methodological manuals	√	–	–	√	√	–
Video tutorials	√	√	√	–	√	√
FAQs	√	√	√	–	√	√
Forum	√	√	–	√	√	√*
Blog	√	√	√	√	√	√
Training	√	√	–	√	√	√
Workshops	√	√	–	√	√	√
Webinars	√	√(free)	√	√(free)	√	√(free)
Consulting	√	√	–	√	√	√
Other tools	–	Resources for methodology classes	–	Methodological E-books	MAXQDA Analytics Pro	–

*Available only in a LinkedIn closed group

4.1 The User Guides and Methodological Guides

According to the analysis made, it is possible to verify, as it would be expected, that all the packages provide a manual to the users. The User Manual turns out to be one of the resources that the users most resort to in case of doubts in the execution of some task [36], so it is not surprising that it is available in various media (paper, PDF and HTML). However, it is noticeable the increasing lack of interest of QDAS developers in producing User Manuals on paper, so that of the six packages analysed, only NVivo still provides paper manuals (see Table 1).

In addition to the User Manuals, the Methodological Manuals present themselves as excellent (self-learning) instruments, contextualizing procedural indications with methodological orientations, thus creating a complement that can more effectively help the user's understanding of "how" and "when" you may be able to use certain actions while using the software. This idea is supported by some authors [37] when they sustain that the effective use of QDAS is related to the methodological awareness, combined with the expertise in the techniques of analysis.

Of the six packages analysed, it is verified that half provide these contents (NVivo, webQDA and MAXQDA). It should be noted that in the case of webQDA, the Methodological Manual is available in several thematic e-books (Case Study, Content Analysis, Reflective Interview, etc.).

4.2 Tutorial Videos

As with user manuals, tutorial videos are among the most commonly used features in case of any doubt in the execution of any process arising from the use of the software. According to Moudgalya [38], the main reason for the wide acceptance of Spoken Tutorials is the self-learn capability. All the analysed packages provide videos

organized by themes, thus enabling a more assertive and clear consultation of how to perform certain operations. It should be noted that, in the case of Dedoose software, the tutorial videos are part of the user manual in HTML format, complementing the existing step-by-step instructions. In the remaining packages, with the exception of webQDA, the tutorial videos are made available on YouTube channels (in the case of NVivo) or in specific links on the internet pages of each software.

4.3 FAQs

Frequently Asked Questions (FAQs) are presented as a solution to the most general and frequent questions of users. This is an efficient way for QDAS packages to be able to "answer" to users' questions without requiring individualized, personalized support.

Similarly, this tool is presented in almost all analysed packages. However, its generalist nature may prove to be inefficient in situations of more specific doubts.

4.4 Blogs

One of the good resources for (self)learning related to methodological issues is blogs. All analysed packages provide their users with blogs with diversified information.

Blogs can also be viewed as a platform where the various QDAS packages publicize and promote the capabilities and tools of their applications through demonstrations or sharing of studies conducted by other researchers. In this sense, blogs can present themselves as a valid tool for (self)learning, providing the user with valid demonstrative resources on how to develop a research project using that software.

4.5 Training, Workshops, Webinars and Consultancy

The self-learning tools mentioned above are characterized by being asynchronous, thus limiting the interaction of users in case of doubts or difficulties in the execution of a particular operation. The trainings, workshops, webinars and consultancies, appear as synchronous resources, allowing a greater involvement and intervention of the user in the learning process. It may not make much sense to speak in self-learning in the context of training, workshop, webinars or consulting, but rather in learning, since these environments essentially privilege transmissive teaching, and may be somewhat devoid of exploratory element on the part of the user.

Of all the analysed packages, the Dedoose was the one that revealed greater shortage of offers at this level, not unveiling the existence of training, workshops and consultancy in its webpage, identifying only the offer of webinars. With regard to the remaining packages, all offer this range of training services in full.

Training and consultancy, due to the content presented and the number of hours available, can be presented as more consistent solutions for the acquisition of knowledge. However, they are paid services, which in some situations may be a deterrent to user learning. As an option, some software packages (e.g., Atlas.ti, webQDA and QDA Miner) run free webinars as a way to make their products known, their potential and in some cases

methodological demonstrations with the use of their applications. In other situations, workshops are promoted, which may, in some moments, be equally gratuitous.

4.6 Forums Analysis

As mentioned above, this research used the forums of the QDAS packages in order to collect data complementary to the information described above. The data corpus provided in the forums presents itself as the only content available on the pages of the QDAS packages that allows to identify the real difficulties and doubts of the users of the various packages.

The first point that was analysed concerns the typology of questions that the various profiles of users place, being relevant to know the motivation with which they ask for help. In Table 2 it can be seen that 46 out of the total 83 questions in the forums are related to executive issues, that is, how-to-do questions. This reveals that, on more than half of the forums' questions, users are looking for solutions that answer the "way" to perform certain actions.

> *"Is there a way to use linked documents in the Mac version?"* - ATLAS.ti user
> *"Could you let me know how i can quickly see how many nodes I have? Also how many documents I have. I know its very basic but I don't seem to be able to find/see this very quickly. Many thanks"* - Nvivo user

The users who place the questions are characterized by being almost entirely users with Basic profile, with only two references to advanced user questions. An interesting fact to note is that QDAS packages trainers also turn to forums to ask questions about executive issues

> *"(…) Does anyone have a way to do this at the moment you need to click between the two document from OPEN ITEMS there is no tab as there is in WIN version but actually being able to view side by side would really help. Any suggestions or work arounds people can suggest?"* - Nvivo Trainer

Issues related to technical anomalies (24 references) also occupy a good part of the messages list of the forums.

> *"I am currently running NVivo 11.2.1.616 Windows 64-bit on a computer with a high resolution display (MacBook Pro Retina 15", Windows 10 Home 64-bit, Apple Boot Camp). The display is currently set at 175% scaling. The fonts and graphics in NVivo 11 do not appear to scale with the resolution settings, with all UI elements appearing blurry."* - NVivo user

Table 2. Questions placed in the forums according to the type of user

Type of user	Type of questions		
	Executive questions	Methodological questions	Technical questions
Basic	44	13	23
Trainer	1	0	0
Advanced	1	0	1
Total	**46**	**13**	**24**

Table 3. Typology of questions placed according to the QDAS packages users

User's packages	Type of questions		
	Executive questions	Methodological questions	Technical questions
NVivo	19	5	14
Atlas.ti	11	0	9
webQDA	9	7	0
MAXQDA	5	0	1
QDA Miner	2	1	0
Total	**46**	**13**	**24**

Besides the questions posed by the various users, it seems pertinent to identify to which QDAS packages these questions pertain. Table 3 indicates that, for NVivo and ATLAS.ti users, there is a high balance between executive and technical issues. This data suggests that the users of these packages are those who most feel difficulties related to the technical side. Another relevant issue concerns the questions of methodological forum.

Although the forums are spaces made available by the various QDAS packages for the sharing of ideas and doubts of this nature, it is verified that of the 83 questions analysed, only 13 were methodological. And the users of webQDA are the ones that ask more questions (7) compared to the other packages. The problem of the apparent misuse of the forums may also be due to users who, instead of reporting technical anomalies in more appropriate spaces, use forums when in many cases they are designed to discuss only issues of methodological nature and execution of procedures.

> *"Thank you for the suggestion, but please remember that the forum is not a support channel as such. It is a platform for users to discuss "how to" and methodological questions. For actual technical problems or questions, it is best to contact our support directly. Hope this helps. All the best"* - ATLAS.ti moderator

After the analysis of the types of questions posed by the various users of QDAS packages, the responses that the moderators, technical support and authors of user manuals present in the forum were considered (see Table 4). The analysis sought to explore whether user responses were actually answered in the forums themselves, or whether other solutions were suggested to resolve doubts.

Table 4. Answers to user questions per QDAS package

Packages	Answers to user questions							
	Answers in forum	Answers with links from forum	Refer to support	Refer to the user manual	Refer to webinars	Refer back to external websites	Refer to the help page	Refer to FAQs
NVivo	21	1	4	0	0	0	15	1
Atlas.ti	6	0	2	0	0	0	0	0
webQDA	5	0	0	1	0	0	0	0
MAXQDA	5	0	3	0	0	1	0	0
QDAMiner	1	0	0	0	1	0	0	0
Total	**38**	**1**	**9**	**1**	**1**	**1**	**15**	**1**

We analysed 67 responses, categorized by the "location" of resolution or instruction presented. It should be noted that the apparent discrepancy between the number of questions asked (83) and the number of responses analysed (67) does not mean that there has been a lack of response from the moderators. This is due to the existence of several similar issues in some topics, sometimes resulting in a single response from the moderators.

As would be expected, most of the questions (38) were answered directly in the forums, and no QDAS package left unanswered questions. And the only answers sent to the help pages (15) refer to NVivo software. This situation can be better understood if we recall that the NVivo forum is the one that presented a higher index of technical issues (see Table 3), so it is understandable that the responses of the moderators go to the "Help" pages. However, it should be noted that in some cases these "referrals" functioned more as a complement to the responses presented in the forums.

"You can find some more details about auto coding by source style or structure at the following link: http://help-nv11.qsr…ent_sources.htm*"* - NVivo moderator

Another interesting fact is the small number of answers that refer to FAQs. This seems to highlight the unique nature of users' doubts and the role of forums as privileged spaces for acquiring learning, by not referring users to an environment of preconceived answers, instead investing in a more personalized response.

Table 5 presents the collaborative responses per QDAS package. That is, when a user (other than the forum moderator) takes the initiative to answer a question posed by another user, as a way to help him/her in his doubt. Of the 114 messages analysed, only 5 corresponded to collaborative responses. These data are of special interest if one takes into account that, for some users of QDAS [36], resorting to more experienced users in case of doubts is the second most frequently used option after consulting the User Manual. Though, given the modest number of collaborative responses collected, it seems clear that forums are not yet an alternative for users who favour more collaborative learning. This may be due, in all likelihood, to the rapid and expectant responses from the technical support and forum moderators, which may discourage the input of other users. This may also be due to the fact that users access the forums in order to see their questions answered, not getting involved in the doubts and difficulties of other users. However, this situation seems to detract somewhat from the concept of forum as a collaborative learning environment [39], making it a space that most resembles technical support.

Table 5. Number of references of collaborative responses per QDAS package

Packages	Collaborative answers
NVivo	2
Atlas.ti	3
webQDA	0
MAXQDA	0
QDA Miner	0

Table 6. Number of references to suggestions for improvement by users

Type of user	Improvement suggestions			
	Usability	Support	Instructional clarity	Technical
Basic	4	1	1	10

Finally, some suggestions for improvements mentioned by users in some QDAS forums messages were observed. It seemed pertinent to see if these messages presented suggestions or requests related to instructional or learning improvements. Of the 83 questions analysed, 16 mentioned suggestions for improvements, and those of a technical nature were the ones that were mentioned the most (Table 6).

"It would be fantastic if NVivo were able to more easily recognise the formatting/syntax of.srt files." - Nvivo user

It is curious that in 16 references of improvements, only a suggestion of instructional characteristics existed. This fact seems to demonstrate that, at this level, the QDAS packages analysed seem to respond to the instructional needs of their users.

"I suggest that the illustration on p. 45 is misleading as it indicates 2 hard returns in between the two paragraphs of Alexander's long comment. The summary on p. 47 is much clearer." - ATLAS.ti user

5 Final Considerations

When searching for the (self)learning tools of the various QDAS packages, as well as the various messages present in the forums, there are few disparities between the various packages with regard to their (self)learning tool proposals. As with technology resources, the learning features offered by the analysed packages are all very similar, covering almost all dimensions. The only two safeguards relate to autonomous learning and formative learning, with Dedoose presenting some limitations at the formative level and webQDA revealing more limitations in the provision of autonomous learning tools.

It is also noted that QDAS users present more questions related to the execution of tasks, to the detriment of methodological issues, which are placed on a third level, behind technical doubts. This fact seems to show that, as far as QDAS learning is concerned, users feel more compelled to look for information on how to work with QDAS, than to know the methodologies that support and justify the performance of certain QDAS operations. This may be due to the fact that users view the QDAS learning support platforms only as a technical support rather than as methodological guides, leaving that part to be consulted in other sources of information.

The data presented in this paper may have been subject to some limitations. First of all, the restricted sample of QDAS packages analysed, as well as the latent data from the forums, which reproduce only one month of records. However, it reveals that there is a considerable demand for information from users regarding the execution of processes in QDAS, and that the various packages analysed, although they offer a very

diverse range of learning offers, do not guide the user towards the (self)learning tools that best fit his/her learning style.

It is concluded that it would be pertinent to develop studies that seek to systematize these (self)learning tools in order to articulate them with the learning styles of the users of the QDAS packages. These studies could result in knowledge that could provide users with a more effective and efficient experience in (self)learning qualitative analysis software packages.

Acknowledgements. As an epilogue, we would like to thank the Foundation for Science and Technology (FCT) and the Centre for Research "Didactics and Technology in the Training of Trainers (CIDTFF) for the financial support granted in this study.

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A Design Framework for Science Teachers' Technological Pedagogical Content Knowledge Development

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Abstract. Technological pedagogical content knowledge (TPCK) represents the professional knowledge needed to integrate technology in the teaching and learning process. The purpose of this study relates to the creation of a design framework for the development of science teachers' TPCK (initial and in-service). A qualitative methodology, following a design-based-approach, was adopted to describe the strategies for science teachers' TPCK development, and design and assess an in-service science teacher education course. Data was obtained through interviews, questionnaires, using participant observation and analysis of in-service science teachers' professional portfolios. Results show that integrating technology with a research teaching perspective could be a way to develop innovative science lessons for students. A detailed description of the research methodology and findings is given.

Keywords: Science teachers · Technological pedagogical content knowledge development · Training · Design framework

1 Introduction

Recently it has become commonplace to recognize that students should urgently play an active role in society regarding scientific and technological issues. To achieve this objective, the scientific community of science education research has recommended the development of students' scientific literacy [1]. Additionally, one of the premises of the "Perth Declaration on Science and Technology Education" is to consider the challenges brought by technology to science teachers' daily work [2]. Technology has increasingly been perceived as a privileged didactical resource for the teaching and learning process and could play an important role in promoting students' active participation in inquiry-based learning activities [3, 4].

For generations, students have been learning science through different technology (e.g., both hardware, such as sensors for data collection, and software, such as simulations). Technology has allowed speeding up time via simulations of natural events; saving time through data collection devices and/or recording data that would otherwise be hard to gather; seeing things that could not otherwise be seen; organizing data that

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_17

would otherwise be hard to organize; searching for information in databases; observing things that would otherwise be difficult to observe; and manipulating models of scientific phenomena [5–9].

Science teachers have a crucial role in planning and managing science learning activities with technology. For instance, science teachers should know how to use technological resources to: observe things that would otherwise be difficult to observe (e.g., digital microscopes); speed up or slow down the representation of natural events (e.g., geological animations); create and manipulate models of scientific phenomena; record data that would otherwise be difficult to gather (e.g., digital probes); organize and see patterns in their data that would otherwise be hard to see (e.g., spreadsheets, graphical visualization models) [10].

For many years, higher education institutions have been facing the challenge of effectively preparing science teachers with professional competences on "how", "where", "when" and "whether" to use technology in science teaching contexts [11]. In this context, [12] presented the model of technological pedagogical content knowledge (TPCK) which consists of the articulation of teachers' 'pedagogical content knowledge' (PCK), 'technological pedagogical knowledge' (TPK) and 'technological content knowledge' (TCK). PCK represents teachers' knowledge of "strategies" for teaching topics (i.e. science) and assessing students' learning of these topics. TCK refers to the knowledge of how technology can create new representations for scientific content. TPK is an extension of general 'pedagogical knowledge' which is related to knowing how technology can support specific pedagogical strategies in the classroom. TPCK means knowing how to teach a subject integrating technology in the teaching and learning process.

In this context, focusing on a learning segment which includes practical science activities, several authors [13–16] proposed a set of principles and components for a framework for developing TPCK. For instances, [13] analysed the pedagogical role of the teacher using two metaphors, architect and manager. Teacher as architect, i.e. selecting or designing activities for students: selecting technological resources for science teaching; gaining a vision of affordances of software; identifying competences to exploit learning benefits; designing activities to optimize motivation and learning; integrating the use of technological resources in the curriculum. Teacher as manager, i.e. creating a context for activities and linking them with other activities: understanding and responding to students' prior knowledge and competences; identifying traditional teaching competences relevant to the use of technology but which might need adaptation; employing new ways facilitated by technology of organizing and managing learning.

TPCK requires that science teachers have as professional competences using technological resources (hardware and/or software) to enhance a wide variety of teaching and learning activities [14, 15]. TPCK requires science teachers to know how to: find and use online animations that effectively demonstrate a specific scientific principle; use the Internet to discover common learner misconceptions related to a science topic; use digital technology to facilitate scientific inquiry in the classroom; use digital technology that facilitate topic-specific science activities in the classroom; help students use digital technology to collect scientific data, to organize and identify patterns in scientific data, to observe scientific phenomena, to create and/or manipulate models of scientific phenomena [16]. [17] studied early-adopting science teachers' perceptions and use of an online web 2.0 technology, a wiki, to support professional

development. Teachers revealed that they tended to favour face-to-face interactions in course training, although they did see value in the wiki to fill in the intermittent gap between such meetings.

As it happens, TPCK implies curriculum knowledge and pedagogical strategies for teaching topics with technology [18–21]. [22] described that in the domain of science education, four elements are critical for the development of science teachers' TPCK: knowledge of science; knowledge of students' preconceptions; knowledge of science pedagogy; knowledge of technology.

However, and crucially, use of technology in science teaching and learning has remained irregular. The main obstacles have been the lack of technological resources available in many schools, teachers' technophobic attitudes and insufficient teacher education courses [23]. One way to overcome these obstacles requires rethinking the designing of science teacher education courses (initial, in-service and postgraduate).

A meta-analysis performed by [24] highlighted that there are few studies in Portugal concerning the use of technology in the science teaching and learning process. Our study assumed that teacher education courses should contribute with innovative ways of developing science teachers' TPCK. Consequently, a design framework for science teacher' TPCK development was developed and evaluated. This framework would be useful to the scientific community, practitioners (teacher educators, science teachers), and policy makers alike and could be adopted in science teacher education courses (initial, in-service and postgraduate).

2 The Study

Our study followed a qualitative research methodology [24], from a design-based research (DBR) approach [25], to make both a theoretical and a practical contribution. The purpose of this study related to the creation of a design framework for the development of science teacher education courses (initial, in-service and postgraduate) aimed at developing science teachers' TPCK. The study aimed to answer two questions: What curriculum components must be privileged within Teacher Education Courses to contribute to the development of competences concerning the integration of technology in the science teaching and learning process? What is the contribution of a Science Teacher Education Course in the promotion of pedagogical-didactic practices among primary science teachers?

The study was divided into two phases, with the following aims: (i) to understand how to promote science teachers' understanding of available technology, and how those resources can be used to enhance a wide variety of science teaching activities; (ii) to implement and evaluate the effectiveness and mid-term impact of the in-service science teacher education course on TPCK development.

The first phase occurred from January 2009 to November 2009 and included two data collection moments. In the first, 23 'Educational Technology' (ET) curricular plans were analysed from an exploratory point of view. Data was obtained from Basic

Education[1] degrees (1st Bologna cycle), offered by Portuguese public higher education institutions (7 universities and 13 polytechnics) offered in the 2008–2009 academic year. In the second moment, 4 national ET researchers were interviewed. The researchers were all experts in the development of teacher education courses (undergraduate and postgraduate degrees), and one of them was specialized in science education.

Throughout the first phase, document analysis was a technique used to collect information (curricular units of ET) deemed necessary to triangulate with the information obtained from the participants' interviews (four ET researchers). Consequently, the researcher adopted a non-participant role, taking notes during the interviews, trying to adopt a distanced stance to be as objective as possible, not allowing personal subjective impressions to interfere with the answers obtained from respondents (Fig. 1).

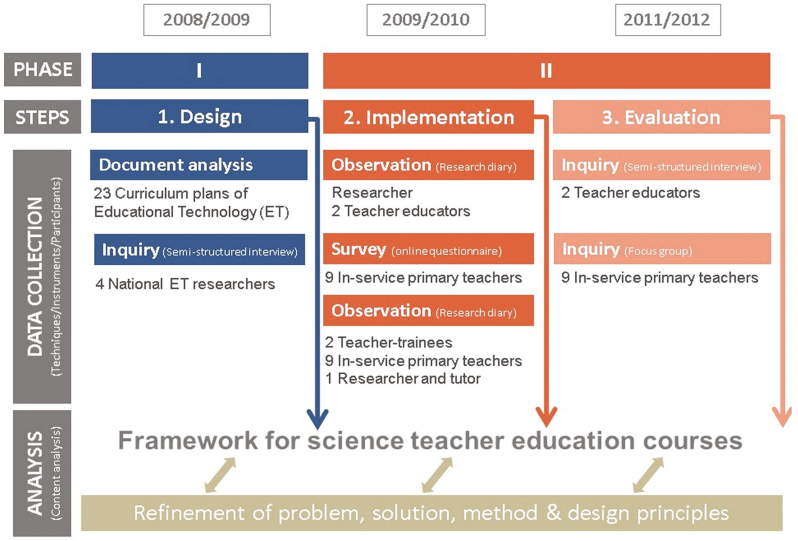

Fig. 1. Strategies for the development of TPCK in science

In the second phase, a case study was undertaken at the University of Aveiro, in the Master in Science Education degree (2nd Bologna cycle) in the 2010–2011 academic year. The Master's degree was specifically designed for in-service primary science teachers who wanted to develop/improve their professional knowledge related to science teaching and learning practices. Two curricular units – "Science Teaching Methodologies" and "Technology in Science Education" – were redesigned to contribute towards the development of primary science teachers' TPCK.

This phase comprehended three data collection moments. In the first one, occurring from December 2009 to January 2010, collaborative work between the researcher and

[1] Students aged 6 to 14.

two teacher-educators of those curricular units occurred in four face-to-face sessions and through online interactions on a social network platform (NING). The second moment occurred at the beginning of the course, where an online questionnaire was administered to nine in-service primary science teachers[2] with the purpose of establishing their TPCK level. In the third moment, an open interview with the two teacher-educators and an online questionnaire with the nine in-service science primary teachers were implemented at the end of the course (August 2010). Approximately six months after the teacher education course (February 2011), a focus group interview was implemented with six in-service primary science teachers. During the second phase, participant observation performed by the researcher led to the development of several research diaries.

Data was analysed from an exploratory point of view through content analysis methodology [26], using Nvivo7 software, to identify the advantages and constraints in the implementation of the teacher education course (Fig. 1).

3 Results

3.1 Phase I - Trends and Patterns in the ET

The first phase of the study showed underlying trends and patterns in the ET curricula and in the four researchers' perceptions concerning the curricular areas of ET that could be articulated with the Science Teaching Methodologies curricular unit. Results also show that there are three levels of competences that are relevant for teacher training in this context, namely digital competence – i.e., related to information search, selection and organisation, pedagogical competences with technology – i.e., planning, implementing and assessing teaching and learning activities with technology and, technology advanced competences in education – i.e., critical reflection about pedagogical practice. The curricular contents which emerged in the content analysis were: 'locating and adapting technology for use in the science classroom' and 'using the Internet (i.e. social networks) to extend collaboration and communication among teachers, their teacher-educators (or other colleagues)'.

The teaching strategies were divided into scenarios and methods where educational activities could take place. Depending on the scenario, science teachers could take on different roles. In face-to-face activities, the scenarios could be: theoretical lessons (a lesson focused on theory, i.e., a lecture); practical lessons (a lesson focused on practice, i.e., in a lab); training periods (a period where students could develop/improve their competences in a work environment experience, i.e., in a school); tutorial lessons (personal orientation sessions given by the science teachers). For other types of activity, the "environments" could be: autonomous work (students' competences to individually organize their work, coordinating available time, priorities and deadlines of task proposed by the science teacher); group work (students' competence to organize their work in groups).

[2] Students aged 6 to 9.

Learning strategies were the set of decisions taken by the science teacher when deciding on which "procedures" are better suited to the development of students' competences. Different methods could be: inquiry-based learning approach (questions and problems are used by the teacher in order to provide contexts for learning); problem-based learning (students are confronted with a real-world problem and work in groups in order to identify learning needs and develop a viable solution for the problem); project-based learning (students, individually or in groups, engage in designing, problem-solving, decision-making, and investigative activities); case-based learning (students analyse case studies of historical or hypothetical situations that involve solving problems and/or making decisions).

The most common means of assessment are: formative and summative. The central issue in formative assessment is feedback, which implies permanent interaction between students, and the science teacher. Formative assessment involves assessment of learning products, such as online presentations, digital portfolios and fieldwork reports. Summative assessment implies that the science teacher assesses students' achievement at the end of, or part-way through, a course, and students may receive only their mark or grade, rather than feedback from the science teacher.

3.2 Phase II - Development of In-service Primary Science Teachers' TPCK

3.2.1 Implementation of the Course

The curricular areas of "Science Teaching Methodologies" and "Technology in Science Education" of the Master's degree in Science Education (2nd Bologna cycle) were redesigned to contribute towards the development of nine in-service primary science teachers' TPCK. Collaborative work between the researcher and the two teacher-educators consisted of reflexive discussions on designing, implementing and assessing several technology-rich activities into those curricular areas. They considered the "Guidelines" that emerged from the first phase, the literature review about the subject area, along with the learning outcomes previously mapped-out for each curricular area.

The in-service primary teacher education course was taught in a Blended-Learning scenario, comprising two face-to-face sessions per week – one for each curricular unit. In between those face-to-face sessions, distance work took place throughout the week.

Firmly grounded in the realities of Portuguese primary science classrooms, the aim of the course was to promote the in-service primary science teachers' deep understanding of the multiple technological tools (hardware and software) available (in their educational contexts and online), and to show them how those tools can be used to enhance a wide variety of activities in science teaching and learning (Table 1).

In-service primary science teachers were asked to conduct 'research projects' about educational problems related to science teaching and/or learning processes. These projects were articulated with professional practices of the in-service science teachers (i.e. students' learning difficulties). They identified an educational problem related to real science classroom contexts (e.g. students' lack of scientific literacy) and developed a research project in a real school context. The aim of this activity was to motivate in-service primary science teachers to collaboratively design, implement and evaluate a

Table 1. Technology-rich activities explored with in-service primary science teachers.

Activity	Tool	Aim
Social networking	NING	To communicate (synchronously and asynchronously) with primary teachers, teacher educators, and researcher of the study
	Box.net	To share educational resources (e.g. videos, podcasts and literature)
Individual work	WordPress	To conceive digital portfolios to integrate primary teachers' critical reflections about teaching and learning process
Collaborative work	Sensors Mobile phones	To develop practical and experimental sciences activities
	MindMeister	To design online mind-mapping about the research
	PBworks	To conceive a scientific paper about the research projects

'case study' using the potential of technology to improve students' science learning. A symposium was prepared, to coincide with the end of the course, to publicize the results of the 'research projects', and share and discuss the strategies implemented and validated/assessed with the national community of science teachers and researchers.

In-service primary science teachers' learning outcomes followed continuous and formative assessment approaches, and was based on the learning products developed by the in-service primary teachers, specifically: a concept-map (MindMeister), a scientific paper (PBworks) and a digital portfolio (Blog). These products served as palpable representation of the teachers' TPCK development, the process by which each of them had adapted the learning activities, shared in the social network, and accomplished their research projects (e.g. integrating technology in designing experimental science learning activities with their students).

3.2.2 Evaluation of the Course

At the beginning of the course, all nine in-service primary teachers showed lack of confidence in the integration of technologies in their science classrooms. However, once they acquired the critical digital competences for usage and could benefit from them in an innovative and pedagogical way in their classrooms, they were provided with opportunities to implement small research projects in their science classroom contexts. See further on [27–29].

Two of the 'research projects' were already presented by [27] in a special number of Primary Science. Some examples of the 'research projects' and technology-rich activities explored with these two in-service primary science teachers will be given.

Teacher A (senior professional) taught students aged 6 and 7 at a state primary school in the north of Portugal. She had 15 years teaching experience but little digital competence in the integration of web 2.0 tools in the teaching and learning process. During her involvement in the course (from January to July 2010), she explored two innovative and emerging technological tools in authentic science teaching and learning

contexts: the 'Cientistas de palmo e meio' (Junior Scientists) Blog[3] and the Online Mind Mapping and Brainstorming tool, MindMeister. She aimed to develop her students' ability to find and select information about current scientific and technological issues from the real world. The activities she designed had a science, technology and society orientation with the final aim of developing students' scientific literacy. The Blog was used to involve students' parents in the teaching process, giving an opportunity for their participation in the learning development, improve students' digital competences (i.e. effective communication), disseminate students' work inside and outside the classroom, including sharing and collaborating with other schools. She chose the MindMeister tool to enable students to represent science concepts (Fig. 2), and has an activity (number 8) posted on the 'Cientistas de palmo e meio' Blog. Although initially very reluctant to use web 2.0 tools, this teacher went on to write her thesis on the topic, and continues collaborating with another primary school teacher in a Blog called 'Pequenos Curiosos' (Inquisitive Kids)[4].

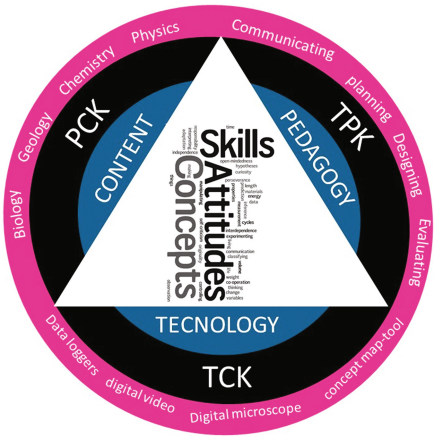

Fig. 2. Strategies for the development of TPCK in science teacher education courses

Teacher B (junior professional) had less than two years teaching experience. She taught students aged 6 to 10 and was studying for a PhD in Education at the University of Aveiro. Whilst attending the course she designed a technology-based science activity and explored a web 2.0 tool that enabled sharing online photos using Flickr. Her aims were to develop students' understanding of the scientific and technological aspects of the landscape in Aveiro. Students took photos of the city and explored the role of physical and natural landscapes using photographic analysis. The students placed the photos on the Flickr platform that then served the double purpose of storage and promoting their analysis, discussion and reflection about environmental aspects of Aveiro, such as the water quality of its lagoon.

[3] Available at http://cientistasdepalmoemeio.wordpress.com.

[4] Available at http://pequenoscuriosos.wordpress.com.

4 Final Considerations

One of the main obstacles to science teachers' integrating technology in their practice is the lack of technology-related training in science teacher education courses. This study presents an innovative way to develop science teachers' TPCK. A qualitative methodology following a design-based-approach was adopted with the intention of developing a technologically-enhanced science education framework for the TPCK professional development of science teachers. The study was divided in two sections: first, to understand how to promote primary teachers' TPCK in the sciences; second, to develop, implement and assess the effectiveness and mid-term impact of the in-service science teacher education course in the participants' science-related TPCK development.

Results that emerged from the first and second phase of this study allowed to propose a design framework, which was already presented in [29], with the intention of contributing towards the development of science teachers' TPCK in science teacher education courses. Following a Research Teaching Perspective (RTP), this framework combines the formative dimension of scientific subjects (content) with research-based learning approaches (pedagogy) and with technological resources (technology). It also implies the integration of TPCK for the development of professional competences of students/in-service science teachers in science teacher education courses (initial, in-service and postgraduate). Figure 2 shows the strategies for development of TPCK in science according to the RTP.

The development of TPCK in science teacher education courses (initial, in-service and postgraduate) should include "guidelines" such as collaboration throughout action-research projects, intended to support students' understanding of key scientific concepts (content) through use of technology (technology) and its application to solve real-world educational problems (pedagogy). The strategies for development of TPCK in science, according to the RTP, presented in Fig. 2, highlights that science teachers should, specifically: reflect on teaching and learning processes with technology, and relate them to the school context; design an appropriate work plan, taking into account the availability of technological resources, the feasibility of the tasks, the time available, information, and knowledge of the subject matter; use appropriate software to manage project progress, as well as record-keeping software to register attendance, submit grades, and maintain student records; work across the curriculum efficiently, securing critical resources available in a digital society and applying them selectively; assess educational software packages and web resources for their accuracy and alignment with curriculum standards, and match them to the needs of specific students in support of project-based learning within the subject area.

This framework assumes that TPCK can be related to a higher level of professional competences of science teachers, such as "technology advanced competences in science education" (see Sect. 3.1). These competences could be related to: reflexive thinking (to reflect upon their own practice, which may lead to new and innovative ways of thinking about the teaching and learning process); research competence (to be familiar with and able to use the latest research outcomes, both within their respective subject areas as well as in terms of pedagogical knowledge, in order to carry out innovative teaching activities); collaborative teamwork (to collaborate with different

elements of a team, sharing tasks and negotiating agreements and decision-making). This could help develop students' critical thinking, incorporate research in science teaching and learning activities, and expand pedagogical innovations in the classroom within the educational community [28, 29].

Funding This work is financially supported by National Funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., under the project UID/CED/00194/2013.

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Novice Researchers' Nightmare Journey of Paradigms and Methodologies: 'It's Hard to Know What Is Right or Wrong'

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Abstract. This paper provides my narrative of the challenges of journeying through the development of a research design for a study as part of my Doctorate of Professional Practice. The focus for the study was mental health student nurses and their first practice placement and whether these students could be better prepared prior to this first placement.

This paper is intentionally written as a personal narrative of my experience into the field of qualitative research and within this account I discuss the uncertain, iterative and, in the end, emancipatory process of selecting the most appropriate ontology, epistemology and methodology to align with the aims and research questions for this study.

Throughout the paper and in the spirit of narrative inquiry, I have included student nurses' quotations from the data in the headings. These quotations seem to reflect the similar journeys on which both the students and I have been.

Keywords: Mental health student nurses · First practice placement · Qualitative research · Narrative inquiry · Interpretivist paradigm · Methodology

1 Introduction

This paper presents my narrative journey of the challenges I faced when identifying a suitable research design for my Doctorate of Professional Practice (DProf) studies and these include issues relating to formulating the aims and research questions, selecting the ontology, epistemology and methodology and then reformulating the aims before formulating the research methods. The research findings are not discussed in this paper because the data analysis is not yet completed.

1.1 Why Am I Going on This Journey?: *'I'm Kind of Going in Blind'*

I am a psychologist, lecturer and DProf student from a University in the South of England. When I started my doctoral studies I was working within a faculty that educates Bachelor students to become nurses. As part of my role I was the Academic Adviser for two groups of students studying to become mental health nurses. The role of the Academic Adviser is to provide pastoral and academic support to groups of

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_18

approximately 45 students. Whilst I was capable of supporting these students with their academic work, I was not confident at helping them to prepare for their first practice placement. At the same time I was preparing to study for a Doctorate and this seemed to me to be a very relevant area on which to focus. First, I searched the literature to find out whether there was much published research relating to mental health student nurses' first practice placement.

In the literature I discovered four research papers specifically relating to adult nurses' first adult nursing practice placement [1–4] and five papers that focussed on adult nurses and their first experience of a mental health placement setting [5–9]. This contrasted with finding only three papers relating to mental health student nurses and their first practice placement [10–12]. The latter studies were focussed on mental health student nurses in Taiwan, South Africa and Southern Ireland respectively and not the United Kingdom. The students indicated that whilst most student nurses reported having had a positive first practice placement this was not the experience of all. When students appear to have had a more negative experience they reported having been made to feel, for example, unwelcomed [9, 11] unsupported by their mentor [12, 13] and not sure what to expect from their first mental health placement [10, 14]. Searching and reading the literature suggested to me this area was a gap worthy of further exploration.

2 Planning the Journey: 'We Need to Get Stuck in Don't We?'

The paucity of literature relating to mental health student nurses' first practice placement in general, and absent in the United Kingdom, combined with student nurses not always having a positive first practice placement experience made me curious to find out more about the experience of the mental health student nurses' first practice placement. My reasoning was that if I explored the experience of mental health student nurses' first practice placements, I would be able to identify if they could be better supported prior to their placement. I was beginning to plot my narrative journey.

The next step was to formulate a suitable aim and research question to explore the students' experiences. The aim of the research study was two-fold and this was because one of the requirements for the DProf is that there will be a contribution to practice development from the research findings. The first aim was developed to address the area of research and this initial aim was: To explore the experiences of mental health student nurses' first mental health practice placement and to identify whether they could be more fully prepared prior to placement. The second aim was: To inform the practice development. The research questions developed from the aims and asked: What are the experiences of mental health student nurses' first practice placement and how can they be more fully prepared prior to their first placement? In this I started to develop the scaffolding for my 'characterisation'.

2.1 What Might Get in the Way?: *'It's Going to Be an Adjustment'*

Having formulated the aims and research questions I began the complex process of designing my research study. An unexpected complication was my psychological

background and the extent it was entrenched in the positivist paradigm of scientific values and objectivity. However, this 'plot disruption' offered an important force to my narrative journey. Extricating me was a slow, painful and emancipatory process, slow and painful because it was so difficult changing direction after 20 years on a well-trodden and familiar road and yet emancipatory because it opened so many previously unknown lanes to explore. Every decision I made concerning the most suitable research paradigm, ontology, epistemology and methodology involved long periods of confusion and uncertainty. I was involved in a demanding, gripping narrative in developing my doctorate.

When deciding on the topic for my study, I naively thought that having a better understanding of the experiences of mental health student nurses first practice placement would enable me to support the students more fully. I did not anticipate I would be embarking on my own challenging journey and, whilst writing this paper, I have become aware the students' experiences of practice placement seem to mirror my own experience of grappling with the design for this study. In the spirit of narrative inquiry, I have chosen to illustrate these journeys in the headings for this paper in which I have included some quotations from the students. These headings seem to précis the journeys we have both been on in constructing this emplotted narrative.

This next part of this paper discusses each stage of this transformational and iterative journey.

Which route shall I take?: *'You don't want to be doing things you shouldn't be doing'.*

As my research focus was to explore the experiences of mental health student nurses first practice placement, I decided that a qualitative approach would be more suitable because an interpretive and qualitative research design enables rich and descriptive information to be gathered [15]. Selecting the most suitable route to take involved interweaving the interpretivist approach with the ontology, epistemology and methodology. As mentioned and discussed below, I found this to be an uncomfortable and challenging process; a complex scene-setting before beginning the focal storyline.

The interpretivist paradigm asserts there is no one reality but that there are multiple realities. These ontological realities are considered to be socially constructed from the individual's own experiences and interactions with other people [16]. I considered relative ontology to be the most suitable for addressing my aim and research question because of my newly found understanding that there is no single truth when considering human experiences and each student's understanding would be unique to them at that time and in that particular placement. This process of me understanding there could be more than one reality took several uncomfortable twists and turns. Eventually, it culminated in me challenging this taken-for-granted belief as I gradually became aware that as a psychology student all those years ago, I had passively accepted the positivist and realist understanding of there being only one reality, or truth. Initially, I found this idea of more than one reality disturbing, but once I began to assimilate this, I found it to be more of a revelation; a twist to the direction of my doctoral narrative.

I faced similar realisations coming to terms with the different types of epistemological beliefs concerning knowledge, what it is and how it is known. Again as a psychology student I had adopted a more empirical approach to knowledge based on scientific

principles and the philosophical belief of John Locke that knowledge is learned through experience [17]. After much reading, I slowly developed enough understanding to align my research questions and ontology with a constructivist epistemology whereby understanding and knowledge is a dynamic and constructed process. Within my research study the meanings and knowledge were negotiated and renegotiated between the students and myself during the data collection when I asked them questions to check my understanding of what they had said. Whilst my understanding of their experiences could never be the same as their reality, meanings could be constructed to help make sense of their experiences and to see the process as a developing narrative of self and others' experiences.

Wrestling with the options: ***'It's a different kind of learning'***

As noted above I was more familiar with the scientific and positivist paradigm of quantitative research than the subjective and interpretivist paradigm of qualitative research. I had some limited knowledge about grounded theory, case studies, ethnographic research and phenomenology, but no understanding of narrative inquiry research. At this stage in my research design, I was fairly sure I was interested in the individual experiences of the student nurses, but was less sure whether the focus was the student, the culture or a combination of both. I needed a coherent and encompassing stage set and scenery to develop the storylines.

Turning to the different approaches, I was concerned that grounded theory had begun as a more positive, objective and empirical approach that sought to develop new theories from the research study findings [18]. Prior to exploring the most suitable paradigm, ontology and epistemology for this study, I would have felt comfortable adapting the former to weave in with a grounded theory approach to address the research question. This more positivist, objective and theoretical emphasis bothered the 'new' me because I wanted to explore what the students said about their placements. I then read that the focus of a grounded theory approach is social processes and that these are grounded within the individuals' reality [16]. Whilst I was comfortable with the understanding of individual reality, I felt uncomfortable because this approach did not seem to focus on the students' experiences. It also appeared to reduce the stories into categories which seemed to remove their context and I wanted to keep the stories as intact as possible.

I then read about using case study as an approach. This approach requires an in-depth examination or analysis of an individual, or group of cases which may include communities, practices or organisations [19]. The focus for the researcher is the case, or cases [20]. Whilst this approach would have enabled me to explore the students as individual case studies, or the placement environment as a case study, this did not seem to fit in with how I envisaged the research. I was not interested in an in-depth analysis of individual students or of an in-depth exploration of the practice environment. I was also reluctant to focus only on a small number of students because I wanted to find out from a larger number of students what they were expecting their placement to be like.

Next, I turned to an ethnographic approach and this also initially appeared to be plausible. Hammersley and Atkinson [21] explain that ethnographic research requires the researcher to spend time within the environment they are interested in exploring.

Using an ethnographic approach was tempting and it would have provided me with access to the students in their practice environment. Immersing myself in a mental health environment would have been difficult as I am not a mental health practitioner, although I could possibly have placed myself in the role of observer and then it may have been possible to take notes of the students whilst they were at their practice placement.

I had concerns about entering a mental health environment to observe students though and these ranged from me potentially agitating possibly confused patients by what I was doing and also concerns for my safety if the patients thought I was observing them. Furthermore, observing the practice placement could have made the students feel anxious and self-conscious. There was also the limitation that observation would only provide a partial view of what I was able to see and this was problematic because it was the student who was the focus of my study. Logistically, this could also have been very difficult for me to manage as the students' placements span across three counties and I also had other work commitments at the university.

Stemming, yet again, from my psychology background I thought I had a reasonable of understanding of what was meant by phenomenology. This was not so and I initially found it exasperating trying to make sense of the many different ways of working within this large 'umbrella' term. There were appealing and not so appealing qualities to applying a phenomenological approach to my study. Most appealingly, phenomenology would have weaved neatly in with the ontology of my study that there is no one truth and there are multiple realities.

Denscombe [15] stated that a phenomenological approach requires the researcher to seek to understand and to describe peoples' experiences of a particular phenomenon. This approach was initially appealing because it would have enabled me to collect the rich descriptions of the students' lived experiences of their first practice placement and from these I could have revealed the meanings and the essence of this experience. Using a phenomenological approach would have meant me trying to bracket my preconceptions of the area of focus and to look at the information with fresh eyes (Moustakas 1994). I was concerned though with the extent I would be able to successfully remove myself from the study because of the developing joint journey between myself and my students. I was also concerned that whilst I could have explored the phenomenon, I was not comfortable placing the focus on a phenomenon when it was the students' experiences I was interested in placing the focus on. If I had been interested in the students' in-depth descriptions of their experience of placement, then this approach may have been suitable.

From the phenomenological approach, I then considered the hermeneutic approach which would have added an interpretive element to an understanding of the descriptions of the subjective experience. This approach would not have required me bracketing my preconceptions and whilst this would have alleviated one of my concerns with the phenomenological approach, I still did not feel this was how I wanted to address my research question.

I then started reading about narratives and found this disconcerting because I was unable to understand the differences between narrative and narrative inquiry. From my reading of the different research methodologies, I knew most involved some analysis of what was being said, but I struggled to define what made narrative inquiry unique.

Clandinin [23] acknowledged the complexity of the distinction between narrative and narrative inquiry and cautioned regarding how the terms are used. Whilst this was reassuring, it did not help me to solve the puzzle.

As I continued reading and thinking about how best to address my aims and research questions for the study, I slowly became aware that it was not the students' experiences of their first practice placement that was the focus for my research, I was more interested in their stories and how and what the students would tell me about their placement experience. My focus was turning from the experience per se to the individual student' stories. Instead it was the students' accounts of their placement experience that I was interested in, I wanted to read and hear their stories and to explore the meanings of these stories with the students.

Narrative inquiry is described by Clandinin and Connelly [24] as a 'way of understanding experience' and its' social context from the collaboration between the inquirer and the individual over a period of time. This approach is more than the experience, it is about the individual and where and when the stories are created. It is also about the re-construction of these stories and the making sense of the meanings that are co-constructed between the researcher and participant. This was a key development in my thinking because it clarified why narrative inquiry was more suitable than the other methodologies I had read about. Using narrative inquiry, I could explore and analyse the students' accounts of their practice placement experience and how the students identified and positioned themselves in that environment.

Reformulating the journey: '*We're going to have to adapt'*.

Whilst keeping aligned to the interpretivist paradigm, an ontological belief of multiple realities and an epistemological understanding that knowledge is co-created between the individual and the researcher, I reformulated my initial research aims and questions and changed the word 'experiences' for 'accounts'. The aim for my study now stated: 'To explore the accounts of mental health student nurses' first mental health practice placement and to identify whether they could be more fully prepared prior to placement' and the research question became: 'What are the accounts of mental health student nurses' first practice placement and, how can they be more fully prepared prior to this placement?'. There was no need to alter the second aim relating to the practice development because this will comprise of a resource that will be developed in response to the research findings.

Focusing on the 'accounts' of the student nurses' made clear my interest was not the experience of practice placement, it was what and how the students talked about their placement that was important. This realisation transformed my study and for the first time it felt like it had solid foundations and I stopped feeling uncertain. As a character in my narrative I became confident and purposeful; my plot gained its teleology.

3 Selecting the Transport: *'Putting It into Practice'*

The next process was to select research methods that aligned suitably with Narrative Inquiry and this was less challenging because I knew early in the development of my

research design that I wanted to find out from the student nurses what they were expecting their first placement to be like and what it was actually like. As my study is part of a DProf programme and there is an expectation that there will be evidence of a development in professional practice, I felt it was important to find out what the students were expecting placement to be like because it may highlight things the students were unsure about.

To address this, I selected focus groups as an appropriate method for finding out what the student nurses' expectations of their first placement were. Focus groups are useful for small group discussions about a particular topic [25] and are most often used early in the research process [26]. Whilst focus groups facilitate the collection of qualitative information, they do not strictly align with narrative inquiry and one reason for this is the creation of a collective narrative from the group discussion [27]. As Riessman [28] has noted, narrative inquiry researchers usually follow a small number of individual stories. The advantages of the focus groups were that they enabled the students to talk to each other as openly as they wished in a confidential environment. This in turn provided a group narrative with plenty of rich and detailed description and created the background and context for the next two stages of data collection. An alternative was to invite individual students to take part in face-to-face interviews. I decided not to do this because it may have made some students feel uncomfortable if they were not used to being interviewed and had little or no previous experience of a mental health environment.

The second part of the data collection was designed to explore the accounts of the students' experiences and this aligned neatly with narrative inquiry and made use of diaries and face-to face interviews. I kept the instructions regarding how to complete the diaries brief, so the students could choose how they wished to complete them, although I did recommend entries were regularly made. The function of the diaries was based on my adaptation of the diary: diary interview whereby the diaries acted as the cues for face to face interviews with each of the students when they returned from placement. This method was originally designed by Zimmerman and Wieder [29] who wanted to explore environments it was difficult to gain access to.

Throughout the research study and similar to my students I have also compiled a diary; a reflective account of my journey through this process.

4 Concluding Thoughts: 'Putting Everything Together'

Within this paper I have presented my narrative of the reflexive and iterative process of how I have wrestled with, and analysed, the most suitable ontologies and epistemologies to explore the accounts (experiences) of mental health student nurses' first practice placement. Aligning the methodology with the ontology and epistemology created further uncertainties and the biggest difficulty has been grasping the idea that each of the methodologies discussed in this paper enable narratives to be collected. Trying to understand what makes narrative inquiry unique has been a real struggle, but now I have a deeper understanding of narratives, have reformulated my aims and research questions,

I now know narrative inquiry will enable me to explore the students' stories and from these accounts identify how the students position themselves within a practice setting.

As mentioned at the start of this journey the information from the interviews has not yet been explored, but the initial findings from the focus groups suggest that most of the students were unsure what to expect during their first placement regardless of whether they had any previous experience of working in a mental health environment.

Whilst this has been an uncomfortable journey that has required me to firstly confront and then extricate myself from my immersion into the positivist paradigm, it has also been an emancipatory and fulfilling experience. The stage is now set and the journey continues.

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The Use of Software ATLAS.ti and Narratives in Mapping the Mentorship Processes Developed in an Online Training

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Abstract. The mentorship is a type of continuing education that is developed through school-centred processes involving an experienced teacher and a beginner teacher. Our objective is to present the contributions of the use of ATLAS.ti Software and the analysis of narratives produced by mentors teachers to highlight the mapping of mentoring processes performed by these individuals. We have collected data from 10 activities drawn up and posted in the VLE tools by the 4 participants selected, as main source of data and analysis content. The contents of these activities are understood, in this study as narratives. Narratives were transformed into Portable Document Format (PDF) files and imported through ATLAS.ti software (version 7.0), totalling 24 primary documents (PDs) which have composed the Hermeneutic Unit of the analysis project. During data treatment, in the stage corresponding to categorization of analysis' content, the narratives were coded, taking into consideration the methodological contribution on content analysis . The codification corresponds to a transformation (following specific rules) of raw qualitative data of the text. This transformation is what allows to reach a content representation, or the expression of its characteristics. In addition to the use of narratives in the qualitative investigative process, the ATLAS.ti has proved to be a software that potentiates the process of organizing a large amount of data, assisting in coding and decoding the analysis data. It also contributed significantly in the methodological conduction of a qualitative research of this size.

Keywords: ATLAS.ti · Narratives · Mentoring · Online training

1 Introduction to the Scenario and Study Problem

1.1 Scenario

This text was organized with data obtained from a doctoral thesis [1] developed under the Online Training Program of Mentors (known as PFOM). Considering the need of cut-out for this article composition, our objective is to present the contributions of the use of ATLAS.ti [2] Software and the analysis of narratives produced by mentors teachers to highlight the mapping of mentoring processes performed by these individuals. For a better systematization of the questions studied we will initially explain the mentoring processes and how these are configured in the context of school-centred continuous training.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_19

Teaching is a profession exercised by a considerable number of people, which demands an initial training, and a continuous training in-service when these individuals begin their activities in the teaching profession. This last training is recognized in the literature [3] as an important way of supporting the work developed by teachers in their school context, besides being a possibility to contribute to professional development.

The mentorship is a type of continuing education that is developed through school-centred processes involving an experienced teacher and a beginner teacher. Its organization starts from a set of activities having as fundamental purpose to contribute to the training of teachers in their first professional teaching experiences [4]. This formative model has been defended as one of the most outstanding components of teaching initiation programs [5]. According with Tancredi and Reali [6] mentorship corresponds to a relevant activity in the process of school-centred continuous training. In their research, authors have identified that in many countries, this model is recognized "as a promising way for the professional development of young teachers as well as of those working as mentors". The mentoring development has demonstrated aspects that collaborate to disrupt difficulties faced in the school-centred continuous training. Among them, the possibility of a formative process carried out in a more horizontal way and with the involvement of both sides (trainer and individual to be trained) in the structuring of steps, in addition to, evidently, the attendance of real training needs presented by the participants.

This model has been a widely-used strategy in induction programs adopted in Portugal, United States, England, Spain and Canada [4]. Miglioranca [7] clarifies that the mentoring actions are already part of the school context of these realities and, in these countries, school is organized to develop the monitoring and support needed and, to contribute to the professional development of the beginner teacher. Regarding Brazil, Tancredi and Reali [6] enlighten that there are no consolidated public policies on the monitoring of beginner teachers.

However, mentoring programs have been developed and implemented in Brazil by researchers from the Federal University of São Carlos (UFSCar), such as the Online Training Program of Mentors (PFOM). Within the scope of these programs are being developed intervention and research actions linked with training of beginner teachers and with professional development of experienced teachers.

In the development of mentoring processes, the objective is not to evaluate the teacher and his knowledge base, but to offer them support [4]. Systematized actions aim to contribute to the improvement of teachers' practices in the classroom context, as well as in school organizational dynamics [8] avoiding or ameliorating the traumatic moments that surround the daily life of beginner teachers in the teaching work environment, subsidizing teacher professional apprenticeships in early years of their careers, as well as professional development of those working as mentors [7].

Generally, mentorship processes are developed by a more experienced teacher who works as mentor. He accompanies and gives support to the beginner teacher [8]. Although mentoring processes can be directed to other stages of the teaching career [4].

The mentor corresponds to categories of teacher trainers that in accordance with Vaillant [9] and García [10] advise, guide and supervise beginner teachers, who are considered part of these categories to take over a formative aspect in their actions [11].

Based on what Migliorança [7] explains, the role played by the mentor is guided on training of beginner teachers, developing the following actions: guidelines on school routine and classroom management, stimulus, reflection, and discussion regarding school curriculum, teaching methods and strategies, and sharing of successful or non-successful experiences.

In the continuous training in-service, we understand from the studies of Dal-Forno and Reali [12] that, when taking over the role in mentorship processes, this experienced teacher needs to shape his/her professional experience to formative demands of teachers and to school needs, and not only those of students. Thereby, the authors emphasize that being a trainer, in this context of mentoring, implies broadening the role of teacher to the one of teacher of teachers, requiring a series of changes in his/her identity and professional repertoire, that is, the learning of new content.

The mentor as teacher trainer has his own identity, built over his personal and professional journey, which is influenced by the experiences achieved through roles assumed and exercised in management and teaching [13]. They present a knowledge base for teaching, which consists of a body of comprehensibility, knowledge, skills [6]. For this reason, he is a source of models, beliefs, values, preconceptions, and attitudes that, together with other contents given and mediated by him, constitute his repertoire. In this sense, Mizukami [14] states that these concepts are closely linked to his teaching professional identity and will be part of the teaching-learning process that will be held in the mentorship.

1.2 Practical Perspectives of Mentorship Processes

Based on a data survey presented by Migliorança [7] we have highlighted some possibilities of this training practice. The first is a school-centred action, in which the mentor organizes a formative process intended for the professional development of teacher, albeit, in accordance with the necessities experienced in the school reality where he takes part.

Another possibility is the counselling of mentors. In this case, the mentor assists the teacher in overcoming reported training needs and, to this end, he can use different strategies to help the teacher to overcome challenges experienced. In addition, it is possible to carry out mentoring actions aimed at the reflection and critical analysis of the practice itself. In this way, the mentor's role is to stimulate the reflection of beginner teacher starting from questioning about narratives of practices, in the light of theoretical references.

Another role is that of a guide. In this case, the mentor contributes to the socialization of the beginner teacher in school environment. In this model, the mentor only helps in case the teacher finds it necessary. In another role, the mentor can be the agent of change and, his intervention, aims to discuss and collaborate with the teacher in face of needs presented, not having only one focus. In another format, the mentor indicates pathways, and the teacher makes choices, but mentor does not give the answer to the problem, encouraging the teacher to seek and develop his/her autonomy. And, lastly, mentor gives emotional support, even if it is not during the entire interaction, in other words, it can occur at the beginning or at specific periods.

This data survey carried out by Migliorança [7] showed a diversity of possibilities, contents and aspects that involve the mentorship processes. Nonetheless, the author noted that despite diversity, they all have in common "to alleviate difficulties presented by teachers at the beginning of teaching profession". In addition, the author warns that the choice among the different perspectives presented, as well as models, needs to consider several factors, including favorable conditions to its realization.

Common elements found in the organization of mentorship training processes are: diagnosis of needs, follow-up, strategic planning of teaching practices, evaluation of learning outcomes, and, when necessary, reorientation of strategies [15] always aiming to help the beginner teacher "to insert himself in the school culture" [8]. As a complement, authors [16] elucidate that some "programs imply the frequent encounter between mentor and beginner teacher". However, the authors emphasize that "it is not so much the frequency of encounters that counts, but the quality of the interaction established". In addition, there is a need to "adopt a concept of teaching and training […] a conception regarding the teacher learning, knowledge about beginner teachers' dilemmas and the training of good mentors" [7].

2 Qualitative Methodological Design

2.1 A Subsection Sample

Please Methodological approach used in this study is based on qualitative approach. Having as base Bogdan and Biklen [17] we justify this choice since this is an investigative proposal presenting the following characteristics: natural environment in the context of school-centred continuous training, as direct source of information; data collected correspond to narratives about the mentorship processes performed and are predominantly descriptive; the analysis of mentorship processes is placed in a privileged field in relation to the product, in other words, the result of formative action; the manifestation of significances presented by participants is highlighted and followed up by its analysis and interpretation.

Aiming to collaborate with this analysis, we have used the descriptive and analytical method [18], through which we sought to understand the occurred events. In this case were preserved the reflective records (written narratives), capturing the experiences lived by participants in the development of their mentorship processes. Although for the clipping of this article, only a few excerpts will be presented as narratives examples.

The present study had as context the Online Training Program of Mentors (PFOM), which is articulated to the Online Training Program of Mentors: Knowledge Base, Professional Identity, Practices, funded by the National Counsel of Technological and Scientific Development (The project was approved by the ethics committee of the Federal University of São Carlos, in 2013, under the opinion number 482.325). The PFOM was instituted and performed through UFSCar Teachers Portal (Access address to the UFSCar Teachers Portal: http://portaldosprofessores.ufscar.br/) and was through this portal that the participants (who will be presented later) enrolled to participate in the Program.

For the organization of the pedagogical and methodological proposal of PFOM, the Virtual Learning Environment (VLE) used was the Moodle platform where were implemented, in 4 modules (Module I (30 h): Digital literacy and beginning of teaching profession: first ideas; Module II (60 h): Mentorship program and the mentor's support for the beginner teacher; Module III (60 h): Hands-on: starting the interactions with beginner teachers (BT) and Module IV (60 h): Mentorship work: Action Plan development with beginner teachers. Reflections about learning in the program.), theoretical and practical activities totaling a workload of 210 h. Of the 27 participants who completed their studies in the Program, 25 are women and 2 are men, aged between 31 and 63 years. Of these, 81% have initial training in pedagogy with one or more specializations, 3 have master's degree in education and 1 has doctorate in education. 45% are pedagogical coordinators, 33% are school principals, 11% are teaching supervisors, 4% are area coordinators and 7% are teachers. For the cut out of this study, was selected a professional from each area who works in the continuous teacher training in their educational networks, totaling 4 participants (1 pedagogical coordinator, 1 school principal, 1 teaching supervisor and 1 area coordinator).

2.2 Content of Analysis and Procedures of Data Collection and Handling

Considering the universe of this research, that is, the context of PFOM presented previously, we have collected data from 10 activities drawn up and posted in the VLE tools by the 4 participants selected, as main source of data and analysis content.

The selection criterion of activities has considered those that represented the moment when intervention was carried out by the mentors (participants in this research). Thereby, we focused on the activities (2.1, 2.2.1.1) of module III, activities (1.3, 2.2) of module IV and on the Mentorship daily, since these contained narratives and carried elements that could support our analysis in relation to mentorship processes developed by participants. The contents of these activities are understood, in this study as narratives, considering the theoretical contributions regarding the use of narratives in qualitative research processes presented by authors as: Bolivar [19], Oliveira [20], Reali; Tancredi; Mizukami [21] Monteiro; Fontoura; Canen [22] and Cunha [23].

Narratives were transformed into Portable Document Format (PDF) files and imported through Archiv fuer Technik, Lebenswelt und Alltagssprache - ATLAS.ti [2] software (version 7.0 - English), totaling 24 primary documents (PDs) which have composed the Hermeneutic Unit of the analysis project. Each file was saved, initially, with a locator's nomenclature to identify its location within the PFOM (context) and authorship (emitter of the narrative). Thereby, we create the following sequence: Module (M); Module numbering (1,3 or 4); Activity numbering (At.2.3) and authorship (participant). Example: M3-At.2.2-Meire. During data treatment, in the stage corresponding to categorization of analysis' content, the narratives were coded, taking into consideration the methodological contribution on content analysis proposed by Franco [24], Bardin [25] and Richardson and Col [26]. According to these authors, the codification corresponds to a transformation (following specific rules) of raw qualitative data of the text. This transformation is what allows to reach a content representation, or the expression of its characteristics.

Proposed rules were: homogeneous, exhaustive, exclusive, objective and pertinence. First rule has meant that the chosen documents were understood as homogeneous, that is, they obeyed precise choice criteria (as presented previously) and they all converge to the same objective, allowing us to obtain global results or compare individual results among themselves. Second rule was used because, once had been defined which primary documents were part of data, it was necessary to consider exhaustively the whole "corpus", that is, the whole set of documents considered to be submitted to the analytical procedures, without leaving any of these documents out, exhausting also the whole text itself. Third rule employed was the exclusive, which means that the same content element cannot be classified randomly into a different category. Fourth rule was used assuming that different encoders should come up with results with the same end. Lastly, the pertinence rule states that retained documents must be suitable as source of information matching the goal that triggers off analysis and, should reflect the proposed research.

This process has incorporated deductive actions over which were listed, a priori, the analysis categories, having as base the theoretical reference and the proposal to highlight mentorship processes, being them: Intervention's objective; Instruments used to diagnose training needs of beginner teacher (BT); Assessment of the mentorship process performed by BT; Difficulty faced by the mentor; Strategies used. These turned into codes to assist in the process of encoding and decoding via ATLAS.ti software. From the narratives' extraction (Quotations = codified content), through the Analysis Query tool and the elaboration of graphical representations (networks) of ATLAS.ti, it was possible to identify patterns, repetitions of interest, relations and particularities among the mentorship processes developed by the participants.

All documents (coming from the activities) were coded in two moments. In the first one, they were coded with participant's name, module and activity (narrative's context) and with the authorship classification of narrative.

In a second moment, each primary document was coded with the categories related to the mentorship processes carried out. The coding and grouping in families corresponds to analysis in the textual field. Through this procedure, segmentation and codification of texts are performed, with reduction of data into expressive fragments [27].

Categories corresponded to coding units, which, in ATLAS.ti software, are recognized as "code". The context units used were the abbreviations of Modules and of PFOM activities. Such units corresponded, according with the content analysis referential, to the message segments, whose dimensions serve as comprehension units to encode the record unit.

It is worth clarifying that the context unit, although it does not take into consideration the frequency of information (in this research), allow to understand the significance of obtained items, associating these to their context. The context unit serves as an understanding unit for encoding the record unit (which may be of a diverse nature: semantics, theme, words, etc.) which corresponds to the message follow-up [25].

For the inference, or result analysis, the following aspects were considered: context (enunciate of program activity), emitter (participant), message (categorized content), code (information) and significance (clarification about mentorship process). Hereinafter will be presented the analysis (The excerpts or, narratives of participants involved

will not be included considering the number of pages established for the article) of mentorship processes developed by the participants who have been mentors along with beginner teachers.

3 Mentorship Processes: Diversified Practices in Conducting Interventions

We understand, from Reali; Tancredi; Mizukami [21], that the intervention carried out by mentor implies the need of knowing the reality where the beginner teacher works. Moreover, through this practice, this professional need to understand what the beginners in the professional teaching think, what they do and why they do it, in order to, together with them, reflect on situations experienced in constructing their confrontation methods. Thereby, it was in this perspective, that mentors structured and developed the monitoring plan of beginner teachers.

Although participants experienced their training process online, their practice in the process of mentorship development was implemented in a face-to-face context, along with beginner teachers having formative meetings in their schools or in the secretariat that governs their educational system.

In these follow-ups, the 4 mentors (M1, M2, M3 and M4) performed consulting, counselling, orientation and supervision activities, as well as organized study sessions and emotional support to those involved. We have noted that functions performed by mentor were articulated to activities that the beginner teachers were developing in their reality.

In the analysis of these processes, actions were related to: situations of students' indiscipline by the M1; handling and routine of literacy processes, situation accompanied by the M2; routine of care for students with disabilities, as was the case followed-up by the M3 and school curriculum in early childhood education and professional recognition, discussions and reflections made by the beginner teacher accompanied by the M4. From the mapping of practices, carried out by mentors, we noticed that each one developed their own way of carrying out the mentorship process, including methods and strategies, demonstrating therefore, their own interpretations of mentorship in practical terms. This process reveals that during this interpretation, the demands from reality and of their acting context, as well as the role exercised, influenced in their decision-making. Figure 1 shows the relationships that existed at each stage of the processes, their associations, premises and causes.

After analyzing these interpretations, or in other words, the different plans developed by each mentor, we have highlighted below some of their most striking aspects highlighting the leading role of those involved.

It is evident in the narrative of M1 that mentorship process undertaken by her, were limited to informal conversations and emotional support for the 3 beginner teachers accompanied. She had difficulties in the conduction of a more systematized formative development, as oriented by the PFOM. It was also evident the lack of coherence between her formative actions (strategies) and the difficulty in identifying individual needs of the beginner teachers that she followed-up.

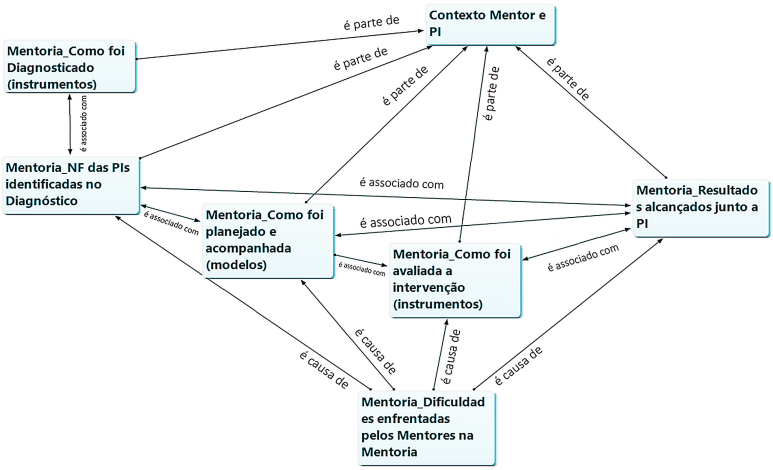

Fig. 1. Network resulting from codes analysis: Hermeneutic unit ATLAS.ti. Source: Retrieved from the Hermeneutics Unit of the research project

The mentorship proposal put into practice by M2 has a direct relation with demands experienced by the network where she acts. In the face of that and based on the difficulties experienced by the two beginner teachers followed, she sought to balance her actions, developing a mentorship process with focus on school and in students' literacy processes. Her actions, from planning to execution, presented well-defined and precise elements during the support to beginner teachers.

M3 developed her role in the mentorship process by seeking the support of experienced professionals in the schools where the 2 beginner teachers were working, seeking to guide them in their initial doubts regarding the care routine to students with disabilities and the preparation of reports.

The mentorship plan carried out by the M4, in mutual agreement with one beginner teacher, has shown that studies and dialogues promoted under the themes and examples presented contributed given the dilemma experienced in her reality. These bases are fundamental for a process of reflection and transformation on both sides (M4 and Beginner Teacher). These actions allowed them both to face reality; on one hand actions developed in the secretariat (mentor), on another the school (beginner teacher) with theory, mobilizing knowledge and expanding theoretical and practical repertoires. Appropriating new knowledge, these individuals began to interpret in a more befitting way, the experiences, dilemmas and difficulties that they experienced.

We have noticed that mentors had the opportunity to plan and establish strategies for their own actions accomplished with beginner teachers, providing them with favorable conditions for their development and, meeting their real needs. Beginner teachers were involved in the training process, contributed to proposals design and collaborated so the intervention practice was carried out satisfactorily.

The analysis of participants' narratives has shown that partnerships achieved by the mentors within educational systems were fundamental for conducting actions and for

the fulfilment of demands presented by the beginner teachers, in accordance with their context of acting.

4 Considerations Regarding the Use of ATLAS.ti Software and Narratives in the Qualitative Research Process

In this study, narratives were used and discussed only as an investigative resource or, as Cunha [23] explains, as an instrument for collecting qualitative data, understood in this study as the main raw material.

The use of narratives in education can also be used as a formative resource, through which the narrator takes up his stories and has the possibility to build and rebuild his reality. Whilst for those who use them in investigative process, narratives provide access to this reality from the vision of their protagonists [20].

Having as basis what Bolivar [19] explains, we understand that researches using autobiographical and narrative approach in education have been produced since the 1960s, and through them, the positivist instance moves to an interpretive perspective.

From this perspective, the education actors are considered as central focus of qualitative research. Values and meanings are given mainly by the self-interpretation of these individuals, who narrate in the first person, assuming a temporal and biographical dimension as primordial aspect.

Therefore, the choice of this resource constituted an instrument of analysis, which made it possible to reveal the thinking of participating trainers [20].

The narrative approach, for Bolivar [19], prioritizes dialogic aspects of communication, considering its relational nature, in which subjectivity is considered through its social construction. Such approach is composed by the communicative discourse and becomes a privileged process of knowledge construction. In this sense, Reali; Tancredi; Mizukami [21] explain that narratives provoke reflections, since they allow a vision of the human experience, considered from individual or social point of view, with regard to stories lived.

Still considering the narrative approach as content of analysis, we have concluded based on Bolivar [19] that this is a particular reconstruction of the experience, by which, individuals attribute an explanation to what happened or to what they lived, through a reflexive process.

Considering what has been stated, we evaluate narratives as a resource with gain potential for this research. According to the research made, we understand based on Bolivar [19] that narratives are made up of three components: history, discourse and significance. The first one contemplates the characters involved in certain events, in a certain time and space. The second corresponds to specific manner how the situation experienced is presented. The third concerns second-level interpretation obtained from the interrelationship of history and its corresponding discourse.

Regarding the study developed, we agree with Cunha [23] that narratives were not mere descriptions of reality; they were, mainly, knowledge producers which, at the same time they became vehicles, have formed the conductors [23], in other words, they form and transform those who narrate and, also those who use them to rebuild and address

these stories. Therefore, the author clarifies that individuals' narratives constitute their representations of reality and, as so, they are full of meanings and reinterpretations.

In this significance, Cunha [23] considers that the written narrative in analysis shows that every knowledge construction about oneself presume the construction of relations both with oneself and with others, and the researcher's interpretations are aggregate to this, as a privileged way of accessing the narrator's consciousness. That is because, as people become visible to themselves through their narrated reflections, they also become visible to others. In this way, we understand from author's perspective, that the use of narratives in this study, reconstructing the stories narrated under an analytical perspective, taking into account the researcher's experiences, demanded a dialogical relation. The author makes us reflect on this relation, thus we understand that, as we discover the other (or what contains in their narratives) the phenomena reveal themselves in us and, consequently, over our perspective of writing and data interpretation.

In addition to the use of narratives in the qualitative investigative process, the ATLAS.ti has proved to be a software that potentiates the process of organizing a large amount of data, assisting in coding, and decoding the analysis data. It also contributed significantly in the methodological conduction of a qualitative research of this size.

Therefore, it is worth highlighting some advantages that we identify related to its use: regarding the reach in generation and structuring of qualitative data, given the large amount of textual data, as well as in the face of different documents (narratives of activities) deriving from different VLE tools; regarding its application in longitudinal analysis, considering that was used the time period of PFOM for data collection; regarding the analysis and presentation of the results, making possible the construction of semantic networks (webs).

In addition, throughout the analysis, interpretation and discussion of results, the software made it possible the resumption to each excerpt's context, since with one click on the reference code, the primary document was automatically taken to the exact location where the excerpts were.

The software ATLAS.ti made possible the establishment of relations between the texts fragments, as well as the elaboration of some graphic representations of the components and their relations.

We believe that developing a research from a large amount of qualitative data is a great challenge and requires a lot of work of organization and systematization with a great care regarding what will be selected. When this process is tied to a methodological theory of data processing, as in the case of "content analysis", this situation becomes even more complicated since we have to follow its rules.

To overcome all these procedural obstacles, we have noticed that the use of ATLAS.ti software in the assistance of narratives' handling, contributed in a way that allowed us to interpret and infer in a more articulated manner with what is proposed by the theory of content analysis. In this way, the narratives (raw data) addressed with the assistance of ATLAS.ti software, were transformed into significant contents in this investigation process.

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Gender Bias on Tinder: Transforming an Exploratory Qualitative Survey into Statistical Data for Contextualized Interpretation

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Abstract. Tinder is an online dating application that enables human-human interaction. However, the ease of connection brings to light some concerns about possible harmful gender dynamics, which can enhance bias within technological developments and threaten women's empowerment. This research aims to investigate whether the application meets women's expectations, whether there is gender bias and sexist behavior during the users' experiences and what is the relation between the findings to the graphical user interface. The research employs to a mixed method design in order to achieve its goals.

Keywords: Online dating applications · Gender bias · Mobile interfaces

1 Introduction

Interface design is an area of inquiry deeply influenced by aesthetic response. The aesthetic of interfaces to interactive systems is expressed partly in the graphical user interface (GUI), which guides users through human-device dialogue. Interactive systems offer users an opportunity to interact with each other and the world through complex symbolic representations [1].

Aesthetic judgement is quintessentially qualitative. However, one may meaningfully and productively also address quantitative questions in relation to aesthetic judgements, perhaps most obviously exploring the extent to which such judgements are shared and demographic or environmental variables that correlate with judgements of particular categories. One may also look to the internal properties of such judgements and their relationships to other judgements. In pursuing such analysis of qualitative questions, it is useful to develop a method that supports the integration of quantitative information. This does not reduce qualitative judgement to quantitative response, but informs the context of interpretation for the qualitative judgement. Indeed, this is the methodological integration of quantitative methods into qualitative research for which we argue:

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_20

quantitative method informs the context of interpretation for qualitative methods. Equally, it is important to emphasize: the integrative method is not reductionist of qualities to quantities. Emphasis on the context of interpretation is perhaps an aspect of this methodological approach that sets it apart from other qualitative approaches informed by quantitative analysis. To clarify our discussion further, we ground the ideas in a case study of design for human-human computer mediated communication interfaces.

Online dating application use is a current trend among young people, and its success can be attributed to the ubiquity of mobile technology, to the ease and privacy of virtuality and to the eternal importance of human relationships. Tinder is a popular example. However, the concept of relationships mediated by mobile applications leads to reflection on gender differences and the concern about possible sexist behaviors. We discuss findings regarding sexist behavior evidently established through the Tinder GUI and which have design implications that, if acted upon, could improve the experience of women users of Tinder.

The idea of this study emerged from informal observations and conversations with female users about Tinder in general, not directed to feminist discussion. It was clear that they experienced contradictory feelings regarding the application—they indicated that they would encourage others to use it although they had frustrating experiences; they would install and uninstall it multiple times; they would express directly opposing responses: some moments of total excitement (beautiful people, new matches, nice dialogues) and others of massive complaint (ugly people, no interaction, time-wasting, disrespectful approaches). From this observation of conflicting responses emerged the hypothesis that Tinder might not consider female needs and might be a space for the reinforcement of sexist behavior that is expressed through the interaction logic and its GUI.

We defined three research objectives that would address this question. The first objective of the study reported here was to learn how women perceive their experience on Tinder. The second objective was to investigate whether there are sexist patterns of behavior during the Tinder experience. The third objective was to check which elements of the interface contribute to a good or bad experience regarding gender dynamics. Some findings show positive aspects of the application and other findings show its negative sides. The idea was to provide foundations for a holistic view of perceptions of the system.

The first objective would guide the research to understand how women feel during their experience on Tinder, in general, so we could evaluate if there is a problem to solve through design or not (with consequences to the continuation with further studies), the second would point out whether there are sexist behavior that diminishes the overall perception of the experience and the third objective would enable to understand which aspects of the interface design contributes to the establishment of a imbalanced gender dynamic.

2 User Experience and the Graphical User Interface

Interaction with mobile devices can be understood as a form of multimodal communication in which users and devices interact with each other through different

dimensions. These dimensions of interaction happen through different communication channels such as speech, audio, touch, gesture, and graphics. Mobile devices can process sounds, gestures, gaze movement and touch. They can return other sounds (audio), vibration (haptics) and visual information (graphics). This computer feedback is based on human visual, auditory and tactile sensory capacities [2]. This relation between inputs and outputs characterize the multimodal interaction. However, interaction with mobile devices still relies on tactile (input) and graphic (output) communication, which is established in the GUI. Through the analysis of the Tinder interface it is possible to explore which elements contribute to the application's interaction approach and to the establishment of an imbalanced gender dynamic (if any exists).

To understand how women feel using Tinder it was necessary to conduct a qualitative inquiry where the participants could describe their experience. Through this inquiry we could have a panoramic view of their experience. We posed open ended questions (see below) without a preconceived notion of a comprehensive catalogue of response categories they would elicit. However, inspection and reflection on the responses revealed patterns for individuals and across questions. The results enable quantification, which reveal, for example, the experience of offensive behavior related to gender bias by 70% of the participants. However, we also wanted to understand how the gender dynamics is manifested through the GUI and to point out which elements of the interface design contribute to the positive and negative side of their experiences.

To find out how users' impressions are related to the GUI we consider some theories related to design perception. According to the appraisal theory, people reveal their feelings through their appraisal of an event or product—in this case experience with the application. That is, their assessment of the experience reveals what they expect to feel while using the application, which enables the researchers to evaluate the Tinder experience through female users' eyes. Appraisal of the achievement of a positive or negative experience depends on expectations being fulfilled or not [3]. Therefore, we focused on understanding women's expectations in order to analyze if the application meets their needs. In our study, the evaluation of the design relies on comparing the interaction process through the GUI with the users' expectations, impressions and feelings.

We also want to know how the interaction "affords" gender neutrality and pleasant experiences. How users perceive the interaction reveals not only their feelings but also the applications' affordances [4], which encompasses the design qualities [5]. In our study, we have identified a high frequency of offensive behaviors towards female users and have understood that this sort of behavior might be encouraged by the design of the application.

Gender bias can be intensified with Internet because people feel free to express their opinions with a certain level of anonymity.[1] According to Wajcman [7], technology is an extension of a patriarchal structure that is shaped by men to exclude women. From her perspective, there is a tendency to reinforce gender hierarchies

[1] However, anonymity does not, in itself, assure negative social consequences; positive social consequences also derive from anonymous communications [6].

within the realm of technological developments. Considering this scenario where women feel free to benefit from technological advances in a world still influenced by gender hierarchy, how should an application provide easy interactions and at the same time provide women empowerment, safety and respect?

3 Methodology

3.1 Research Philosophy, Design and Methods

Considering women's empowerment as a central subject matter of our study, we adopt a "transformative" [8] philosophy to guide the research, since the long-term goal (in establishing the impact of this and future research) is to draw attention to gender imbalance hidden in the shadow of technological developments that threatens women's confidence and do not provide an overall pleasant experience.

The research has a mixed methods approach incorporating both qualitative and quantitative data [8]. The approach would be considered qualitative regarding the subject and purpose of the study; however, we decided to integrate the quantitative approach to the analysis of the findings, which would help to establish facts about the distribution of perspectives on sensitive matters (female perception of an online dating application). The qualitative analysis made it possible to understand the gaps, problems and frustrations through female users' eyes. However, without the posterior qualitative analysis we would not be able to judge if there is a problem regarding the experience and the presence of sexism in interactions. Because we first conducted the qualitative research and then use the quantitative approach to support the qualitative findings, our research may be characterized as exploratory sequential mixed methods research [8].

The research method involves data generation [9] through the use of a structured interview with open-ended questions, text analysis of responses, the transformation of the interview information into statistical data and the analysis of the results. Although an unstructured interview might be recommended due the qualitative nature of the research questions [10] we considered the structured interview the best option to retain focus. The open-ended response approach enables elicitation of different points of view around each question [11]. We did not seek a broad analysis of user experience on Tinder, *per se*; rather, we wanted to investigate particular points regarding gender bias and gender dynamics. We conducted the interview via email, with a set of standard questions intended to elicit open-ended reply and to invite further interaction, to which participants could respond asynchronously, at their leisure. We reasoned that this would ensure the maximal amount of reflection and also reduce demand characteristics [12], along with other practical qualities of internet mediated research [13].

3.2 Data Generation

Our first step was to consider which would be the strategy to obtain the information we needed. Initially we considered a questionnaire. However, after reflection

we decided that to create a questionnaire we would need to have already a deep understanding of the issues and anticipate all sorts of possible experiences to provide appropriate response categories. Thus, we considered a questionnaire as good tool for a later research stage, after collecting more information about all the possibilities of answers. However, the nature of the research is to understand how women feel about the application, and, considering this exploratory nature, we could not plan the later step without the findings of the first stage. Due to this, we decided to conduct a survey through structured interview. The design and administration of this interview (including recruitment methods and consent forms, etc.) were approved by the Research Ethics Committee of the School of Computer Science and Statistics of Trinity College Dublin. The recruitment was managed via online social media (OSM) and delivered by email.

3.3 Recruitment

Recruitment was conducted through Facebook. The first call for participants was posted in a Facebook closed group of Brazilian females living in Ireland. The group had 8,074 members at the time of recruitment (April, 2016). The call was posted only one time in this group. The invitation described the research topic and what would be involved in participating. Women interested in participating in the survey were asked to leave a comment or an inbox message with their email address. 111 women expressed interest. Another call was posted to friends in the personal Facebook page of one of the authors. From this call 14 women expressed interest. Some of these 125 original women invited another nine women to participate, and their emails were given with the permission of those nine. In total, 134 women expressed interest in participating in the research. The consent form approved by the ethics committee was sent to them all. However, not all responded with consent to the research terms and conditions and even fewer women have responded to the interview subsequent to providing informed consent. From the 134 total women that gave their emails only 40 were interviewed. Participation was voluntary, without remuneration.

This high drop-out rate could be attributed partly to the length of the information sheet and consent form that is necessary for proper ethical conduct. Attrition may also be partly attributed to the lack of immediacy in conducting interviews by email. Despite this, the interviewees are easily reached by email, and it compensates for the drop-outs. We believe that in general the benefit of using the email to deliver the interviewees compensates for the losses.

3.4 Participants

The sample is qualified as a nonprobability convenience sample composed of forty Brazilian women who have used Tinder at least once to meet new people through the Internet. The convenience sample defines the unguided selection made through Facebook, since anyone could volunteer. All the volunteers had the chance to be interviewed. Although the findings cannot be extended to the whole population of women who use Tinder it reveals significant numbers that give a

picture of the gender dynamics on Tinder. Age and education level were not taken into consideration in the selection of participants (we did not ask participants to provide such information about themselves), nor was gender preference; however, from the 40 women interviewed, one indicated looking for homosexual interaction. Nationality is a variable that may interact with outlook on the topics studied here, and our idea is to have a sample with mixed nationalities in future studies. However, due to the opportunity sampling (target population available and willing to take part in it) we used the sample of Brazilian women.

3.5 Structured Interview

The interview was planned by email since we believed women would feel more confident to communicate about their experiences through writing. Email administration of the interview afforded interviewees privacy to talk about the delicate themes involved. We also believed participants would have more time to think and remember their experiences before answering, since mediating interviews via email enables participants to respond at their leisure, with all of the opportunity for reflection that they might wish.

The interview guide was meant to be brief, to encourage people to answer completely. The interview was planned to be as neutral as possible. The questions were posed to elicit ample information. We reminded participants about the motivation of the research (to understand how women feel during their experience on Tinder). We then provided, in Brazilian Portuguese, the following questions at once to each participant, as a way of opening communication for further discussion. Below, we provide the questions in English translation, and indicate the motivations for each.

Question 1 - Why did you install the application? To analyze if Tinder is meeting expectations we need to know first what users expectations were. With this question we want to know their goals in using the application. However, this question focuses on a prior step, on the decision to install it rather than its use, because we wanted participants to reflect about the moment before installation, too. One may easily install software without intending to use it, or with the intention of deferring use. One might wish to have something as a matter of principle, regardless of whether one uses it.

Question 2 - Did you have to ponder before installing it? Why? We wanted to know if there was any preconceived idea about the application, concerns or fears that could discourage installation. This question would yield indications of the level of influence that third parties would have on their choice of using the application (friends, partners, family, society in general).

Question 3 - When you started using it, what was your first impression? How did you feel about your first matches? The idea of this question is to know whether they like Tinder or not in the very first moments and, more generally, how they felt in their first experiences in recalling them.

Question 4 - How did you feel about the application's approach and the match-based interaction? This question aims to reveal what users think about the interaction and the interface.

Question 5 - Which are the positive aspects of your experience? Tell me about some remarkable situations. We hoped participants would respond to this question with indication of what they saw as positive in their experience on Tinder. Those answers were compared to the expectations pointed out in the first question, in a later analysis.

Question 6 - Which are the negative aspects of your experience? Did anything unpleasant happen? With this question we wanted to learn categories of negative experiences on Tinder. Given our anticipation of sexist response among those negative experiences, we imagined that we would be able to identify the percentage of women who report having experienced a sexist behavior and to anticorrelate this with the feeling of being respected.

Question 7 - Did you feel respected as an individual and as a woman? Explain. This question was intended to elicit thoughts about feeling respected, not only by the application but also by the other users. Through this question we wanted to investigate whether Tinder creates a virtual space where sexist patterns of interaction are avoided or reproduced, and whether there is a clear relation between the response to this question and expression of positive and negative experiences. We wanted to know whether participants would "accept" some negative experiences related to gender bias and still feel respected, as gender dynamics is not only concerned with the male approach but also how women feel regarding to sexist behavior.

Question 8 - For how long have you been using/ have used the application? We hoped to measure expectation satisfaction with the partner-finding application in relation to how long it would be retained.

Question 9 - If you have stopped using the application, what is the reason? We hoped responses to this question would reveal the reason to uninstall Tinder, the relation between expectations before the use and the fulfillment or not of their needs during the use, and the overall feeling of the whole experience.

Question 10 - Do you think the developer was a man or a woman? This question could reveal if the application was perceived as developed with consideration women's needs or not, considering the hypothesis that male dominance in technological development. We also wondered if participants would suggest that it was developed by a woman or mix-gendered team.

Question 11 - Do you see any difference between what man and woman expect from using the application? What are they looking for, in general? We ask about difference of general purpose to help us understand the relationship between their own purpose (expressed in response to the first question) and their expression of general purposes of use for each gender.

Question 12 - Do you have female friends that are using/have used the application? What did you heard from them? The idea of this question is to have an overall view of group of friends regarding the application. This provided an opportunity to relate their own use and experience of Tinder to the experience known in participants' circles of friends.

Question 13 - How could your experience be more pleasant? Users would point out the improvements they would like to see in the interface so

they would have a better experience. The question was phrased in a way that would not rule out responses suggesting alternative contexts of use. However, in general, the responses attended to the interface rather than its context of use.

Question 14 - Apart from Tinder, have you used another relationship application? Which one do you prefer? We wanted to know how familiar the notion of online dating applications is to participants and how the Tinder experience rated in comparison to others.

3.6 Data Organization

The empirical analysis and careful interpretation of the responses characterizes the qualitative approach to understand the female users' point of view and define the first stage of the research which is followed by a quantitative approach to handle data and interpret it statistically.

To understand how women feel during their experience on Tinder is a purely qualitative process. However, we needed to analyze the responses quantitatively, so we could judge whether the overall experience is pleasant or not and whether the occurrence of gender bias was representative. We wanted to identify the percentage of women who gave similar answers to each question so we could determine whether Tinder was good for those users. We also wanted to know of patterns of response across questions. Due to the design of the study, in which we asked for detailed written responses, and for which the answers were broad and open-ended, we could not quantify the response with the raw data, but only in a categorization of the raw data.

The categorization process was to iteratively summarize the interviews responses, reducing paragraphs of reply to one or two sentences. The original fourteen questions were split into seventeen questions (since some of them had more than one constituent question) for analysis purposes. After that we repeatedly read the interviews to develop an exhaustive (but not mutually exclusive, in that a single person's response may include more than one category) categorization of answers. For example, for question 1, related to the purpose of use, found six response categories that we deem to encompass all 40 of the answers. The process was about narrowing down the options each time, grouping similar purposes and reducing them to the minimum number of options. In the process we tried to make sure that all the responses were well represented by the options, regardless the number of responses in each category. For example for question 1, one of the, interviewees indicated using Tinder to forget an ex-boyfriend. This response differed from all the others'. To maintain rigor regarding this classification we could not infer that this respondant wanted to make friends or find a new relationship in order to reduce to five categories. We applied the category "other" to this response. Thus, we maintained six categories of response. We also reduced the six categories to a few words of description for each. For example from question 1, a sentence like "I've install the application because I was single and wanted to meet different people; I was looking for any kind of relationship, casual or not" was split into two categories "meet new people" and "find a relationship". After that, to handle the data conveniently in a statistical

analysis package (R), we reduced that description to the word "relationship". Finally, we had to check if that group of answers would really encompass all the answers. It was necessary to return to the raw interview texts and verify that the options fit and certify that the information was not lost in the process of reducing paragraphs to words. After that, it was possible to organize the interview answers in a spreadsheet that was used to calculations: each participant in a separate row and the questions in separate columns.

After this transformation of the raw interview responses in a coded data set, we calculated the result of each column, that is, the sum of the equal replies for each question using R. As said before, the answers for each question were reduced to words and although the tabulations could have been done manually, we benefitted from using with R since it would be more reliable, besides providing the opportunity to find correlations through cross-tabulations.

For the questions in which a response fit more than one category, that question column was split into more columns, with each answer type in an individual cell for correct counting; otherwise, R would treat the compound entry as a new answer. Using this counting method, "find relationship and/or friends" is encoded with two columns, one for "find relationship" and another for "find friends". Creating additional columns enabled appropriate multiple response counting. After splitting all the possible response categories in columns, we could find the results for each question through a formula to make the sum of each category of answer in each question. For example, in question 5, regarding the positive experiences, there were women who pointed out four different "gains" and we could count the four columns in a unique result.

However, to make comparisons between two different questions it was necessary to use the original configuration of the responses (such as "find relationship and/or friends") to ensure that each response would represent one woman. Otherwise, if we considered the total of responses (for "find friends" plus "find relationship" for example) we would have a higher number of women since each of them could have given more than one response for each question.

4 Analysis and Findings

As the purpose of this paper is to explain our mixed method research strategy, we do not highlight all of the results and findings. However, an overview is necessary to make clear the relation between the procedures and the results.

We calculated the percentage of each answer category and organized the data in tables for analysis. For example, we cross-tabulated responses to question 1 (purposes of use) and question 11 (the feeling about differences of purposes by gender). In this comparison we check if there is a correlation between the women's purposes and what they think regarding the difference about women and men's purposes in general. It shows that, from the women looking for relationship and/or friends but not for casual sex (31 women), 20 believe that men are using the application for different a purpose than theirs. Thus, 2/3 of the women who are only looking for relationship and/or friendship believe that men are not.

This result suggests that Tinder can have a "sexual" approach that does not fit in their needs and expectations (regardless their gains during their experience) since 39 women from the original sample were looking for heterosexual interaction.

The results showed that 52.6% of the female users had a negative first impression, and the superficiality of the interface was the most rated problem. The superficiality was related to the ease of Internet that is emphasized by Tinder with a very simple interaction based on choice restricted to between two options: "yes" and "no". This approach which can be "simple and easy" for some users, highlights the concept of liquidity of relationships [14] mediated via the Internet. The fragility of emotional bonds is related to the superficiality of relationships, and superficiality in turn can directly affect feelings of respect, politeness and social dynamics. This idea is magnified in online dating applications due to the perception of Internet as a "free- zone" (virtual social context), where people feel more free to say what they would not dare to say in other circumstances (and real social contexts). Harassment, for example, brings to light the "predator-prey" dynamic in which women are considered "vulnerable". This dynamic is created during childhood when "little innocent girls" are often "in danger" and should be protected from sexual abuse [15]. Nonetheless, the distorted idea of "vulnerability" has implication in adult life, and it is continued when women are taken as an object of uncontrolled male sexuality. For example, in our research 70% of the participants reported offensive behavior regarding gender dynamics and pointed it out as the worst aspect of their experience.

When asked about feeling respected, only 9 women from 28 respondents expressed feeling mostly or fully respected, the other 21 expressed feeling "more or less", "mostly not" or "not" respected. This results shows that the majority do not feel "mostly" or "fully" respected.

Regarding their overall feeling after use it became clear that Tinder does not meet their needs, in general, although it is efficient on delivering "fragile relationships". From 35 women who answered the question, 20 have uninstalled the application due to a negative experience (frustration, loss of interest and bad feelings after repressed by other users); two due a mix of negative experience and the start of a relationship; and 13 have quit the application only because they started a relationship. The 57.1% who removed the application exclusively because of a negative experience constitutes a majority of the interviewees.

In relation to the first objective of the research (understanding how women feel using Tinder), it was possible to identify that Tinder does not provide an overall pleasant experience to women, since all these results point to the feeling of frustration: the results of the first impressions about the application, the analysis of negative experiences, the feeling of respect, the comparison between user's motivations and the perception of difference of motivations between men and women, and the reason to uninstall Tinder. Concerning the second objective of the research (identifying the existence of gender bias), the results of the negative side of their experience (related above), the feeling that it was designed by a man by 85.3% of the respondents, the feeling of not being mostly or fully respected by the majority of the respondents, and the 35.90% of respondants

that was concerned about installing Tinder due to its sexual approach and bad reputation all point to gender bias on Tinder. We also have noted patterns of response suggesting that the Tinder GUI and interaction encourage negative experiences (cf. the third objective of the research): the GUI which encourages the discarding of people and reinforces superficiality; the gesture set is merely binary, leaving no way to express nuance; and so on. However, because the focus here is to illustrate our method of forming qualitative assessments, informed by quantitative analysis of qualitative data, we will limit the descriptions of the findings and analysis to the paragraphs above.

5 Contributions, Limits and Challenges

The research reported here is exploratory as an initial study of gender and online dating application that requires further development to ensure quality and rigor. However, it is the first of its kind that we know of. Our findings support the hypothesis that Tinder harbours sexist behaviors, though it is possible that conclusion exemplifies confirmation bias. The research requires a following work to investigate the gender bias more deeply and with a vastly larger number of participants. As the study includes only 40 women it is not enough for a generalization of the experience. We have not quantified the dimensions along which users did not experience gender oriented challenges at all, nor the dimensions the contributed gender-oriented support. Further studies would require carrying out other experiments as focus groups, user tests, user diaries and empirical evaluation to deepen the understanding of the gender dynamics through the use of online dating applications.

The results of this research bring out some reflections about the dynamic established by an online dating application that would enable future improvement of the system. However, this first investigation gives an overall idea of the problems that affects women's experience. It addresses design implications to thwart sexist behavior and to improve women's experience. Besides the problems revealed by the research, Tinder has proven to be effective in delivering romantic relationships and friendship and to be a powerful tool to connect people. Some boundaries are mitigated through the application, enabling serendipitous engagements that address a positive quality to the use of technology in the realm of relationships. The results of this first survey indicates that the topic (gender bias) is important and it should be better developed and explored to enhance women's empowerment within technological field and its products. The graphical user interface guides the interaction and can be a source for balancing the gender differences in everyday interactions.

Acknowledgements. The researchers have no conflicts of interest with Tinder nor any comparable platform. The first author wishes to acknowledge the Brazilian government's CAPES program. This research is supported by Science Foundation Ireland (SFI) through the CNGL Programme (Grant 12/CE/I2267 and 13/RC/2106) in the ADAPT Centre (www.adaptcentre.ie).

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Development and Implementation of Dashboards for Operational Monitoring Using Participatory Design in a Lean Context

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Abstract. The need to increase employees' productivity in a hypermarket online delivery services is the persuader of the present work. A costumer' request, through the hypermarket website, initiates the process of collection and delivery of the ordered products. This process briefly comprises to gather the products from the shelves and to report the right indicators, at the right time, to store supervisors. To present the corresponding data and to follow this activity, quantitative dashboards were developed. These dashboards contained all the key indicators through graphs facilitating the reading and comparisons. Also, a dashboard in real time with the identification of employees without activity over a predetermined period of time and indicating the percentage of daily objectives already achieved, helping managers, was developed. All the actors, the project team, decision makers, designer, were involved in the design of the dashboards in a sharing process with the identification of aspects that should be reported or improved. At the end, dashboard enhances decision-making and has a positive impact in operational monitoring.

Keywords: Lean office · Visual management · Dashboard · Participatory design · Action research

1 Introduction and Motivation

Currently, the Internet is a useful tool used for almost everything that people want to do or need to do: find a place or person, contact people, divulgate events, research, etc. Additionally, people do not need to go out to shop. According to a study developed by Association of Digital Economy (in Portuguese: ACEPI Associação da Economia Digital) and by International Data Corporation (IDC) of 2014, about 7.8 millions of portuguesePortugueses use the Internet and by 2020, about 9 millions will use it [1]. According to the same study, from these 7.8 millions, 3.2 millions (40%) make their shopping online. In 2020, about 50% of users will be online shoppers.

There are many reasons for the online shoppers, namely, the food shoppers, benefit from it [2]. Shopping online is more convenient and requires less effort both in terms of time spent to make purchases and the level of trips to the supermarket. In addition, the freshness and quality of the products are guaranteed since they are kept and transported

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_21

in temperature-controlled vans since they leave the shelf until they arrive at the customer's home [2]. However, despite the timesavings for households in home shopping and the fact that they are conveniently delivered to their homes, online retailers cannot reach all potential customers, as there are consumers who like of the shopping experience in the physical stores [3].

Presently, in order to reduce infrastructure costs and inventory and to keep the risk as low as reasonably practicable, an online hypermarket use its physical stores to pick up the products ordered by its customers. This supply model has some drawbacks, namely in terms of employee productivity and service-level. The layout of a physical store is defined in order to boost sales and encourage purchases and not in order to promote the efficiency and productivity of pickers, i.e. employees responsible for collecting the products in the store for the online costumer. Another factor that negatively influences productivity is customer service. Although there are physical store employees responsible for these issues, it is often the pickers who end up giving such clarification. Also, it can be said that the customer of the online store and costumer of the physical store compete for the same products. Thus, it is necessary to improve and monitoring the effectiveness of these operations. This was the motivation for the study presented in this paper that aimed to improve the monitoring of the pickers operations of a main distributer. For this, was proposed an operational dashboard that towards the need of information consistency, key performance indicators (KPI) monitoring, new objectives planning and effective communication between all interested parties [4]. The dashboard design must be functional and visual. Functional in the sense that it is perceivable its purpose, i.e., what it serves and what decisions-making trigger. On the other hand, it must to effectively and efficiently display information to their users [5]. The use of real-time indicators is for any company an advantage for the business, since it allows decision-making and triggers actions more quickly [6]. In this way, providing real-time alerts to all store supervisors and operations managers is a need for better use/allocation of resources and to increase their employee's productivity. When the information presented is not clear or is presented in a complex way, it leads to the existence of administrative waste, i.e., questions are asked that were not necessary and necessary decisions are not taken [7]. Applying a Lean visual management system ensures that information waste and visual confusion will not be present in the creation of the dashboard. Involvement of dashboard potential users in its creation by a participatory design, beyond a requisite of Lean Thinking philosophy, is mandatory to reduce the risk of providing an unwanted and unused tool by the clients, creating more wastes.

This paper is divided into five sections: following the introduction and motivations of the work is a brief description of Lean Thinking principles and Lean Office tools (e.g. Visual Management). In Sect. 3 the methodology is presented, followed by the process description, and analysis, discussions and assessment of the proposals, in Sect. 4. Finally, Sect. 5, some considerations are presented.

2 Lean Thinking Principles and Lean Office

Lean Production [8], with its roots in Toyota Production System, it is considered by some authors, namely, Detty et al. [9] as an organizational management that allows to structure, control, manage and introduce improvements in a continuous way in production systems, in order to reduce wastes. Nowadays, due to a recognizance of Lean Production as a culture and as a philosophy, is known as Lean Thinking [10]. Lean Thinking principles are five: (1) Value; (2) Value Stream; (3) Flow; (4) Pull production and (5) Pursuit perfection.

Lean Office is the application of Lean Thinking principles to the office, in order to eliminate the waste in the administrative process. Since, in these processes, most of the activities are related to information production, the identification of waste can be more difficult [11]. Some examples of such wastes are incorrected use of procedures; standards missing; more information than it is needed (overproduction); frequency of documentation errors; among others. The adaptation of the Lean methodology to the office is important in that between 60% and 70% of the activities necessary to satisfy clients' needs are administrative activities [12], and only 1% of the information generated from these activities adds value.

Visual management is one of the techniques used in Lean production systems and in offices. The main purpose of using visual management is to simply and easily display all-important information so that anyone can detect and correct errors at an early stage. Any communication mechanism used in the workspace that tells us, at a glance, how the work should be done and what deviations exist relative to the standard is considered a visual management tool [13]. The most important requirement of this type of tool is, in addition to being intuitive, to present reliable information that always transmits reality, so that everyone can have confidence in the system [14]. Visual management is directly related to standardization of work and transparency in the processes. This potentiates the involvement and decision-making of all the workers of an organization and allows a more proactive monitoring of the state of all tasks and processes [14]. Dashboard is one of the visual management tools. So, it is important, to define and clarify the concept of a dashboard. According to Few (2006, p. 26) [15], "the dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance".

A dashboard is a graphical representation of key indicators, displayed on an A4 sheet or on a computer screen. Although there is no rule of how a dashboard should be and what it should do, it is expected that a dashboard should collect, summarize, and present information from various sources so that the user can see, at one time, several performance indicators [5]. In order to build a successful dashboard, first, it is necessary define the requirements. It is necessary to clarify who the target audience is, what data sources to use, what performance indicators, how often they will be updated, what visualization mechanisms will be used. A dashboard can be evaluated according to the way it facilitates the coding and decoding of the information, i.e., there must be a perfect balance between the visual complexity and the usefulness of the information presented [5].

In order to distinguish or recognize goals more quickly and intuitively, colors are often used to identify them. However, although the use of colors helps in the visualization process, its overuse can distract users and have the opposite effect to that expected [5]. The same applies to the effects added to the graphics used: 3D effects, shadows and limits can lead to a lake of attention to important information [5]. The main challenge in dashboard design is the need to consolidate all the necessary information in a small space, in a simple way and easy to understand [15]. In order to ensure a simple and effective design, there are some actions that can be taken [16].

According to Caldeira [17], three steps must be followed to implement a dashboard: (1) initial preparation; (2) select, relate and location of information; (3) operationalisation of the information. The first step is related with the identification of the dashboards number needed and which data can be shared. Knowing how the business works, decision-making process, objectives and clients are also fundamental in this step. Second step is related to the key performance indicators identification, relation between them and how they should be presented in the dashboard. The third step is the operationalization where some questions must be answered: (1) where, how to extract and the data type; (2) how and who provides the data; (3) how and in what format will the dashboard be presented (e.g. computer screen, physical board, pdf document, ppt or paper).

3 Methodology

The present work, in order to fulfill the main objective (to improve the monitoring of the pickers operations of a main distributer in a efficient way), used Participatory Design and Action Research methodologies in such a way that all the stakeholders involved participate critically in multiple iterations to report data and in order to improve the process under consideration.

Participatory Design methodology arose from the participatory Action Research and on which it is based [18]. Participatory Design has arisen in the area of software development where the participation of all the different stakeholders in the technology development processes was encouraged [19]. Action Research, as the own name says, combines action and research in a way that when facing the problem it at the same time, encourage change through action. Also, it assumes that the researcher is a key part of the research.

Two main phases were considered. The first phase consisted in understanding what type of information was important to stay visible in the dashboard and the periodicity that it should be reported. For this, data were collected in two different ways: (1) employees' questionnaire to evaluate the current situation, and (2) data collected from the available database information, regarding the operations employees' productivity. All data were colletected during first five days of January 2016, in three stores. The questionnaires were distributed to the store supervisors, operations managers and the operations team analyst. At the end of this first phase, it was possible to identify the problems/wastes allowing proceed to the next phase. The second phase comprised the dashboards design. Six meetings, attended by all the stakeholders, were held with the aim of improving both monitoring and decision-making process, of approximately 30 to 60 min duration each. This phase lasted approximately three months.

4 Process Description and Proposal Discussion

In this section the picking process is briefly described, followed by the problems identification and critical analysis, the participatory design in the development of the dashboard and the results obtained.

4.1 Picking Process

Picking process consists in taking and collecting articles in a specified quantity before shipment to satisfy customers' orders. The in-store picking process starts with an online order. Depending on the customer's address, the order is allocated to a store and it receives an internal number consisting of two parts: (1) shift identification for delivery: "M" (Morning), "A" (Afternoon) or "N" (Night); (2) three-digit order number, in line with the order of placement on the website. Then, it is divided into tasks, that is, an order is divided by type of products, and each type is associated a certain space in the store. These processes are automatic and are represented in Fig. 1.

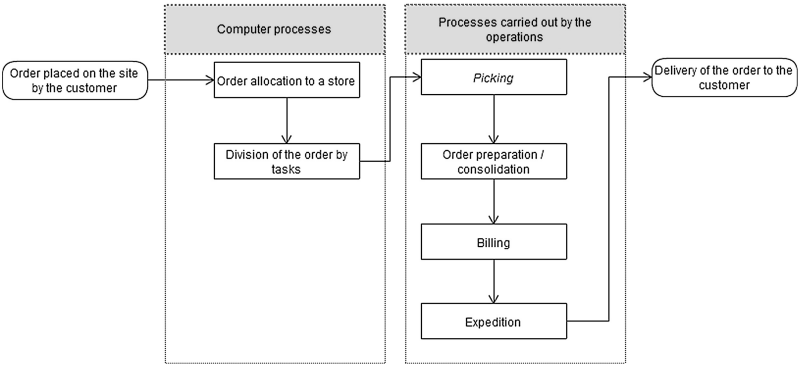

Fig. 1. Picking process in a store.

In addition to the automatic processes, there is a set of processes that have to be ensured by the operations, namely, the picking in the store, where all the products ordered are collected from the store shelves, and the processes where the order is consolidated and prepared for shipment, and later delivered to the respective address.

The picking is performed in three shifts: morning, afternoon and evening. In order to guarantee the freshness and quality of the products that will be delivered to the customer, the delivery of orders are prepared on the preceding shift, i.e., the morning deliveries are prepared on the night shift of the previous day, and so one. The orders are divided and prepared by tasks in order to reduce the time that pickers spend in displacements and to make specialized work. This reduces waste and increases productivity.

4.2 Problems Identification and Critical Analysis

This section presents the critical analysis carried out with the objective of perceiving what type of information is important, with what periodicity it should be reported and still understand what has led to the creation of operational monitoring systems.

At the beginning of the study, supervisors used eight different types of reports in order to keep track of the process: (1) diary incidences; (2) diary operational dashboard; (3) diary ruptures; (4) diary occupation rate; (5) diary delays; (6) weekly operational quality; (7) weekly ruptures and (8) monthly costs.

In order to analyse and evaluate the documents/information reported at an early stage, a questionnaire was carried out to understand how the users of this information evaluated the current eight reports in terms of (1) confidence; (2) quantity of information; (3) quantity of visual indicators and, (4) time spent for analysis. Questions were asked so that the documents were evaluated on a scale of "1 to 5" ("1" very unhappy and "5" very satisfied). The questionnaires were distributed to 13 store supervisors; 2 operations managers and the operations team analyst with 8 shop supervisors, 1 operations manager and 1 analyst responding. The results of this survey are summarized in Table 1.

Table 1. Results of the preliminar questionnaire about the current situation.

Report	Users	Confidence	Quantity	Visual indicators	Time
Diary incidences	8 (80%)	4	3,4	3	3,2
Diary operational! dashboard	10 (100%)	3,9	3,7		3,9
Diary ruptures	9 (90%)	3,9	3,7	3,4	3,3
Diary occupation rate	7 (70%)	3,6	3,7	3,9	3,8
Diary delays	3 (30%)	3,7	3,4	3,3	3,4
Weekly operational quality	7 (70%)	4,0	3,9	3,9	3,9
Weekly ruptures	6 (60%)	3,6	3,4	3,1	3,2
Monthly costs	3 (30%)	3,9	3,8	3,9	3,8
Average		3,8	3,6	3,5	3,6

Generally, it can be concluded that there were reports used by only 30% of the respondents, that is, there was clearly overproduction of information. There were data worked on and reports produced that were not being used to make decisions or contribute to continuous improvement, since they were not even analyzed.

The most negative aspect identified by respondents was linked to the lack of visual indicators in the information received. Visual indicators help to a quickly and intuitively perceive the KPI's current situation (above or below target). In this way, it is not necessary to spend so much time analyzing indicators, giving more time to perform other tasks, such as thinking and taking measures to correct potential deviations. It was also possible to detect a proportional relationship between the satisfaction with the quantity of visual indicators and the time spent on analysis, that is, the higher the value assigned in the classification of the visual indicators, the higher the value assigned in the time classification. A more detailed analysis was made per report, addressing the points that were considered most important.

After the initial assessment of the information that was initially reported and the achievement of objectives, problems/wastes were identified. It was identified two main wastes related with the shared information to be analysed by the operations team: (1) overprocessing and (2) overproduction. These are related with the excess of produced information, non-existence of a tool to transmit effectively the operations KPI and all reports were based on tables without or very few visual indicators. Thus, there was information that was being worked on and was not generating value, that is, it was not helping in decision-making. Regarding the evaluation of the fulfillment of the objectives, it was detected that there was a large percentage of employees who did not fulfill the daily objectives. The lack of more frequent (daily) monitoring of this KPI was considered a cause for this problem. This leaded to a waste: defects. In this situation, defects were understood as the low performance of employees, who were not reaching their maximum potential.

4.3 Participatory Design

The proposals for the problems identified above will be presented. These proposals essentially are the development of two dashboards, with different information and frequencies in order to meet the company needs and the proposed objectives. Table 2 presents the proposed solutions for trackling the challenges identified.

Table 2. Proposed solutions to face the existing problems and meet the planned objectives.

Problem	Objective	Proposed solution
Excess of information	− Report the right key performance indicators, at the right time and at the right way to the supervisors; − Implementation of monitoring/action dashboards regarding operational activity;	Monthly dashboard
Disperse information		
Inappropriate layout and design Lack of visual indicators		
Failure to meet goals		
Excess of information	− Real time alerts; − Improve pickers productivity;	Real time dashboard

The first proposal was to develop a monthly dashboard since some KPIs are not calculated weekly. The second involved the development of a dashboard in real time, since it meets the proposed objectives and it is still expected that, with this tool of control, it will be able to increase the number of pickers that fulfill the daily objectives. These dashboards development were based on the Caldeira book referred [17] and developed in Excel tool for its ease of use.

Monthly dashboard development. The main objective of the monthly dashboard was to display on an A4 sheet/computer screen all the performance indicators of store operations so that supervisors and operations managers can quickly and efficiently see the status of each KPI (above or below target). Also, it was intended that relationships between indicators are established and corrective decisions of deviations are made.

As previously mentioned, the clients of the monthly dashboard were the supervisors and operations managers of the store. However, the dashboard will be fixed monthly in the team boards so that the results could be shared with everyone involved, from the preparation to the delivery of the orders. The dashboard would have an operational role; the data will be quantitative and belong to several domains, namely sales, production and quality. The dashboard would be shared with the department and updated monthly. It would have no interactivity, that is, it would be static and would not lead to external and/or additional data. Finally, graphs were used in order to obtain faster readings and facilitate comparisons between stores.

Since the dashboard is limited in terms of space, i.e. no more than an A4 sheet, it was important to define which KPI's should be represented. Eight of the ten store operations performance indicators were selected (net sales, orders, occupation rate, productivity, ruptures, incidences, transports costs, preparation costs). After the selection, it was needed to know how to present the information. The first step was to design a layout and the types of graphics that could work on a dashboard.

For this design, an A4 sheet of paper was used to position the indicators and six spaces were planned (two of the indicators were joined: net sales & orders and transport & preparation costs that are related). The types of graphs were selected according to their objective (e.g. columns, bubble, among others). Then, the identification of where to display the data (e.g. stores, database, informatic system) and the extraction mode was defined. This was discussed and established in the first two meetings with operations and project managers in order to understand the aspects to be introduced (as a client need, being these managers the clients) and improved. Figure 2 presents the initial and final solution. Once the final proposal was developed, a standard [20] was established to update the monthly dashboard so that anyone with access to the database could quickly and easily update it.

The members present at the meetings were motivated and willing to use the new tools because they believed that it would brings an added value on the performance of their tasks. However, they had some doubts about the adopted approach in order to achieve the best and desired results, for example: "how could be built a dashboard in real time?", and "how could all the indicators per store be shown in detail on an A4 sheet?".

With the introduction of the first iterations of the monthly dashboard, all the members realized that would be really possible to obtain every detail, without the dashboard becoming confusing. Thus, the confidence in the work being developed increased significantly, being all very pleased with the progress achieved during the meetings. At the end, they were very satisfied with the final result and recognized that the use of the dashboard brought significant improvements in the time needed for the analysis and interpretation of the monthly indicators.

Real-time dashboard development. Other main objectives of this project was to implement a tool that would trigger real-time alerts of deviations, such as non-active pickers for a length of time established, helping increasing their productivity.

As previously, it was necessary to define three aspects: (1) objectives, (2) clients and (3) requirements of the dashboard. This was discussed and established in two meetings with the collaborators that are daily in the operations store and must act when some is wrong or not according the plan. The dashboard would have an operational

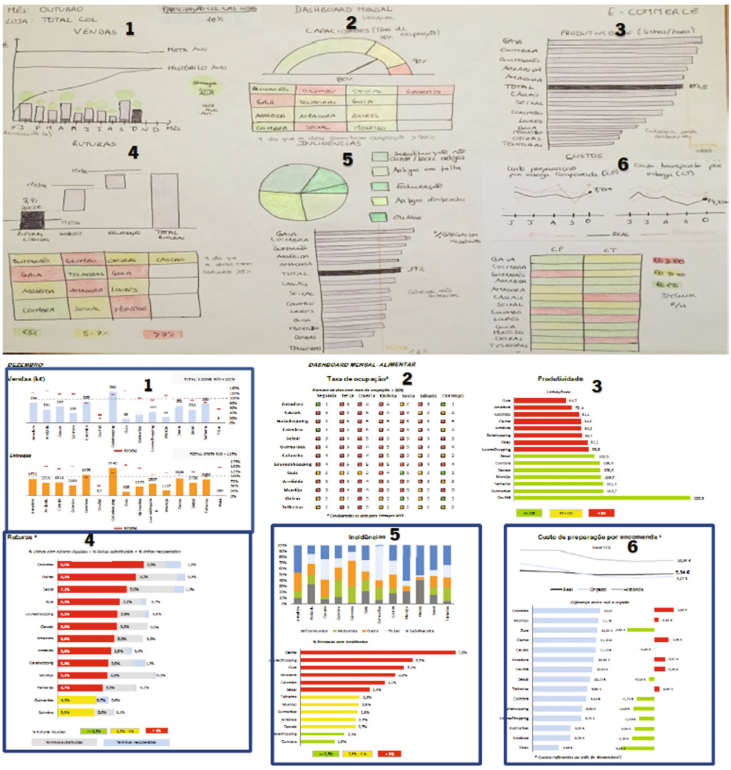

Fig. 2. Initial and Final dashboard solutions.

role; the data will be quantitative and belong to the production domain. The dashboard will be shared with all the involved operations online stakeholders. The dashboard will be updated in real time, and will not lead to external and/or additional data. Finally, text using visual indicators will be used. In this, only one indicator will be presented: pickers individual productivity. This will have a trigger to alert for non-active pickers for a length of time established.

With the development and presentation of the real-time dashboard all the participants recognized that the adopted methodology was simple but effective in their elaboration and with its implementation a step forward to increase the productivity of the pickers will be given and thus be able to respond to the ever-growing demand.

According to the needs, a prototype of the real-time dashboard was designed (Fig. 3). The layout of the dashboard was designed appropriately for each screen in each store operations depot showing daily activity of all pickers (by picker's name), the task he/she is currently performing, the time of the last pick, how long it has not tingled, and the total number of streaked lines. Visual indicators will also be introduced helping to identify more quickly the employees who have been inactive for the longest time and who are or are not meeting the objective. In order not to overload the database, an update period of 5 min was established. So, a green flag for time without

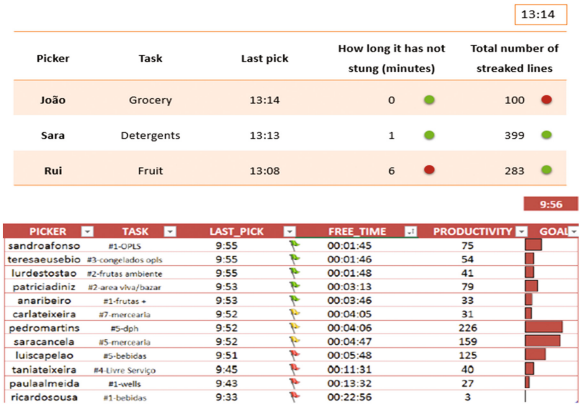

Fig. 3. Initial and final prototype of the real-time dashboard.

picking <4 min, it is considered acceptable to stay for up to four minutes without picking, a yellow flag for time without picking between 4 and 5 min and a red flag for time without picking >5 min, since it is no longer considered acceptable, unless there is a justification, being so long without picking.

This tool allows supervisor to know the pickers that have been out of activity for more than 5 min and act to correct the deviation. In addition, at the end of each employee's shift, the supervisor has immediate visibility into the lines produced during working hours, and has the opportunity to talk to the picker to understand why he/she has missed the goal.

4.4 Results

The results of the implementation of the proposals presented are analyzed. To do so, a questionnaire to evaluate employee satisfaction in terms of confidence and quantity of information, quantity of visual indicators and in terms of the time spent for analysis, for the monthly dashboard was implemented. The same 5-points scale of satisfaction was used. The data regarding the quantity of e-mails and documents that needed to be queried to analyze all KPIs and how much time was spent to do this analysis using the dashboard created, was also collected.

When comparing the scores assigned to the previous reports with the scores assigned to the monthly dashboard, there was a significant increase at all points under assessment, namely for the visual indicators with a score of 4.1 against 3.5 previously obtained. The least valued aspect in relation to the previous reports was the time spent for analysis: with a score of 3.9 against 3.6, corresponding to the dashboard aspect that makes users more dissatisfied. This may be due to the fact that most respondents had contact with the monthly dashboard at the time of responding to questionnaire, so being unfamiliar with how the data is represented. In order to improve this, training should be given in how to interpret the monthly dashboard data.

Three questions were asked about the dashboard as an innovative tool that enhances decision-making and also to understand the impact of the dashboard on operations. Responses were received from ten supervisors. All considered that the monthly dashboard enhances decision-making and has a positive impact. Regarding the innovation potential, only one answered negatively. One possible explanation for this fact may be related to the way he interpreted the question. While some respondents may have answered in the light of the information presented and the design of the dashboard, namely the use of graphics and colors, the person who answered no, may have considered that the dashboard in general: it is not an innovative tool, since there is already a diary. Table 3 summarizes some of the comments obtained.

Table 3. Comments obtained regarding dashboard as innovative tool.

Previous reports	Monthly dashboard
The information is dispersed by several reports/mails. It becomes difficult to have all this information when analyzing KPIs in different locations	*Easy to analyze ai! KPIs at once. We have achieved in terms of analysis to relate values of KPIs that complement or are directly related to each other*
The information was very dispersed and it was time consuming that sometimes it was not properly consulted	*Mote objective KPi analysis. Ease of analysis and visualization that helps a iot making decisions*
We cannot get a view of the whole, because we analyze the different KPI's without integration between them. Example: A store may have a high% of breakages because it has a low sales volume	*East easy to read., integrated and very good for companson of results between stores*

When asked to analyze all the operations indicators, the comments were favorable. According to developers, dashboards make it easier to analyze all KPIs at once, establish relationships between values, and compare results more easily between stores. Employees had to consult only one email and one document, making the search information in 1 min. The time in analysis was also reduced considerably to 5 min against the 30 min to search and analyze all the information, since it is only necessary to consult one email, unlike the previous seven, and one document, unlike the previous three.

Regarding the real-time dashboard proposal, a test was carried out at one store. Several observations were made and it was concluded that the values presented were correct showing the dashboard reliability. In order to understand if the tool increased productivity, the average productivity values were analyzed during one day of the week in which the test was performed. Although the objective of the test was not to prove that with this tool the productivity would increase, but to give a proof of concept. It was decided to collect the data regarding the average productivity of pickers of the store. The test was performed on January 8, 2016 and when compared to the average productivity per employee in that week, the day of the test was the day with the highest productivity (Fig. 4). Just having a day where the real-time dashboard was in action could not be significant to conclude that the tool will certainly boost productivity. However, there is a proof of concept that can be implemented.

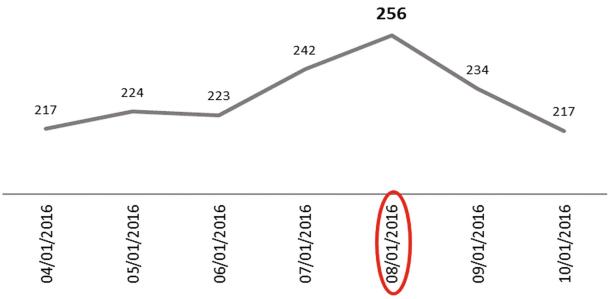

Fig. 4. Average productivity (number of streaked lines) by picker.

5 Considerations

The main objective of this work was to develop and implement an operational monitoring system using dashboards for online operations and real-time alerting mechanisms in a Lean context. For achieving this goal, a participatory design and action research methodologies were selected and used. This methodology allowed the researcher to be part of the dashboard development but also all stakeholders involved helping in the identification of problems/wastes and participating critically in multiple iterations. Two proposals were developed: a monthly dashboard that monitors all operations indicators, and a real-time dashboard that monitors the daily productivity and activity of in-store pickers. The proposals were successfully developed using existing software in the company, namely Excel and SQL Management Studio, resulting in a very low cost solution.

The monthly dashboard assembles all the key performance indicators on an A4 sheet, allowing the analysis of all indicators in one place, and needing to consult only one email and one document, making the search time in one minute, for the decision-making.

The real-time dashboard, that monitors the pickers activity, makes possible to take measurements when a picker has been out of activity for greater time than normal. It also allows monitoring the fulfillment of the daily-defined objectives, since at the end of each shift; the supervisor knows who has and who has not fulfilled the defined objectives. It was possible to conclude that the implementation of the dashboard in real time has potential to raise productivity. With a possibility to reduce the time in analyzing information and to eliminate information that is being generated in excess, i.e., waste, employees have more time to carry out value-added activities.

Acknowledgments. The authors would like to express their acknowledgments to national funds by COMPETE: POCI-01-0145-FEDER-007043 and FCT–Fundação para a Ciência e Tecnologia within the Project Scope: UID/CEC/00319/2013, and to all company's stakeholders who accepted the challenge to participate in this study.

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Ethical Aspects of Dissemination and Archiving Qualitative Data in Poland

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Abstract. The aim of the article is a reflection on ethical dilemmas, methodological problems and technological threats as well as practical solutions for dissemination, archiving and sharing of empirical material collected by qualitative researchers, and then deposited in specially created archives. The issues concerning the protection of personal subjects in the terms of the right to authorize and secure data obtained at each stage of the research are discussed. The basis of these considerations is the authors' own experience and the subject literature. These issues are related to the realities of social research in Poland, situating them in the broader context of the debate on the proposals and possibilities but also fears and doubts related to the archiving qualitative data.

Keywords: Archiving · Qualitative data · Social studies in Poland · Ethical dilemmas

1 Introduction

Currently there is a discussion taking Place in Poland about the shape and future of qualitative data archiving. Special significance in this respect had the initiative of "Understanding research of a lifestyle: digitalization - archiving - methodological revisit. Pilot project of the Qualitative Data Archive", realized in the Institute of Philosophy and Sociology of the Polish Academy of Sciences, which is intended to support archiving and popularization of qualitative data. The resulting Data Archive operates at the Institute of Philosophy and Sociology of the Polish Academy of Sciences, within the scope of a grant project finances by the National Programme for the Development of Humanities.

First of all, it needs to be stressed that tradition of archiving of data that comes from qualitative research is relatively short in Poland [1]. However, the concept of developing a professional platform that would allow archiving of various qualitative data and then making them available for researchers, is gradually attracting its proponents. The concept is supported by numerous arguments, such as e.g.: didactic value of such materials in the education of new generations of researchers, the possibility to re-use them in other research projects or to threat them as a source of historical knowledge [2]. However, there is still a series of ethical notions that must be specified, clarified, and sometimes solved. Some steps have already been taken in this respect, what is proved

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_22

by the fact that the notion of data archiving has found its place in the Polish Code of Sociologist Ethics adopted by the Polish Sociological Association in 2012, which includes a provision that refers directly to it procedures. This is mentioned in point 38 of the Code, with the following wording: "Sociologists should popularize the results of their research as much as possible, and if there is such a needs, immediately upon completion of their analyses, to provide other researchers with their data through the applied archives and databases".

The above-mentioned provision from the Code, together with the mentioned initiative undertaken by the Institute of Philosophy and Sociology of the Polish Academy of Sciences incline to give some thoughts to the future shape of qualitative data archiving in Poland. First of all, it is worth taking a closer look at the notions related to ethical aspects of data gathering and collection, regarding the specificity of research methods and techniques. The notions related to the care about interests and well-being of the respondents and the issues related to data security also seem interesting.

2 Ethical Notions

Even though the topic of qualitative data archiving is relatively new in Poland, the discussion in that field has been carried out from numerous years internationally. The numerous group of researchers in the field of qualitative data archiving includes Libby Bishop [3], who represents the British Qualidata, as one of the first qualitative data archives that currently is a part of the national UK Data Archive. Bishop makes a short summary of her previous works, focusing mainly on the profile of users of those data collections. She also briefly presents the basic problems related to archiving, such as the difference in reviewing and understanding data held by the primary and secondary researcher, not knowing the whole context of research. A matter of dispute is whether an author of a given scientific paper finds the character of data access or argumentation strength more important, and whether the problem of misinterpretation regards equally the researchers using the primary and secondary data. Another problem brought by archiving is related to the notion of obtaining an informed consent from the respondents to dispose of the research results: to what extent it is possible to predict the use of data, and if they can be protected from misuse.

Another representative of Qualidata, Louise Corti [4] raises a discussion on the qualitative data archiving, trying to deal with the counter-arguments put forwards by opponents of this form of empirical material gathering method. First of all, as he himself emphasizes, the researchers sharing their empirical material with others is frustrating, because they are not used to showing their research "backstage" (collecting and processing the materials), they are also afraid of criticism over their research practices and showing gaps in their data. According to Corti, a reliable researcher should be afraid of criticism and analysis of their materials. At the same time, she adds that at least in Great Britain the quality of empirical studies tends to be different, and there is no control in this scope as there are no standards for evaluation of their quality, hence publication may be a form of verification. At the same time, among other advantages brought by data archiving, Corti lists the possibility to reuse the qualitative materials what serves

their fuller exploitation and thus has an economic aspect, as we do not duplicate the data unnecessarily, allocating the funds for other research projects. What is more, she adds, thanks to archiving we can carry out comparative research, and good documentation of material (field notes, memos, letters documenting the research) may ensure its contextuality in case of a repeated analysis.

In turn, Natasha Mauthner [5] gives a deeper thought to the belief that one's own "data" archiving and sharing is a significant component of a "good research practice", stressing on one hand the historical character of such an opinion, and on the other the difficulty of defining of what data is and how it can be separated from the research context. The duty to deposit "data" imposed, especially on the British researchers, by institutions that fund the research, changes the relationships between the researchers and respondents radically, bringing the risk of violating their trust and security, distort data and interpret it in a wrong manner, because of not knowing the context. What is more, the duty for archiving exposes the research work to criticism, not always reflected in the collected "data". It also puts a question mark after the notion of property: who the data belong to, who and how should manage them. Mauthner proposes some convincing argumentation that the "archiving fever" is not of an obvious or neutral nature: it is one of numerous possible ways to dispose the materials from research, and it somehow shapes and changes the research reality itself.

An interesting voice in the discussion is also the position held by Ruth Geraghty [6], a representative of the Irish Qualitative Data Archive - IQDA, who described the discussion on the archiving and re-analysis of qualitative data that is taking place in her country. This opinion seems important in the context of what is currently happening in Poland, because it somehow gives an insight into the intermediate stage of the ongoing discussion, between the advanced British and the completely initial Polish case. Ireland imposes no legal obligation to archive data compiled within the research process, however there has been the national archive of such data working and developing since 2008.

Similarly in Poland, it is not obligatory nor required legally to archive data. Moreover, the problem of archiving of data that come from social research in Poland is considerably related to lack of straight legal provisions that would govern this practice. It is especially significant in case of qualitative research that is based on the individual contact with particular persons, frequently difficult to be rendered anonymous [7]. These notions are raised especially often by Polish researchers who use biographic and narrative interviews in their work. According to them, a basic problem with qualitative data archiving results from the conflict of values: on one hand from the need to protect the anonymity of interviewees, not revealing, or even hiding their identity, and on the other - from the belief that such individualized and personal biographical stories get a status of a precious historical source, which is worth and should be protected from destruction or dispersion. Protected with all of its richness. Within the course of years, the latter value seems to become increasingly more significant [8]. At the same time, there might be cases of some researchers encountered in Poland (also those adopting the narrative and biographic interviews in their work), who decide to archive data, being fully aware of theoretical, methodological or ethical problems. An example may be posed here by interviews with Silesian workers, recorded by Adam Mrozowicki and his students in

several research projects, intended to recognize and describe the biographic experiences of this professional group's transformation [9].

In the paper we would like to present several, in our view important notions that match the framework of discussion on the data archiving and making them available to other researchers. We do it having in mind the broadly understood well-being of the respondents. The basis for our deliberations will be posed by own research carried out in social welfare homes for intellectually disabled individuals [10] and in the environment of women providing sex services in escort agencies [11].

2.1 Obtaining Consent from Respondents

The gathered data and the possibility to carry out the research result - to some extent - from trust that the interviewees put in a certain researcher. This trust is based on the belief that the researcher managed to develop and consolidate within them, that the data will not be disclosed in an uncontrollable manner, and the researcher himself will be taking care to keep them confidential [6]. Archiving poses a certain risk in this concept, related to the fact that not well-considered and reluctant utilization of materials by other archive users may cause that the researcher will be recognized by the interviewers as an unfaithful and dishonest person [12]. In turn, loosing trust in the relationship between the researcher and the respondent may bring wider consequences and hinder realization of research in a given environment in the future.

The first issue that we will focus on is obtaining of a respondent's consent to deposit the collected data. The data archiving supporters often mention the researchers' fear to negotiate the consent for data archiving with the respondents. They believe that the researchers (or some of them) adopt this paternalistic protective position towards the respondents unnecessarily. They claim that it is usually enough just to discuss the principles of using the data with the respondents to obtain their consent. [4] In many situations this is an adequate tactic for protection of personal goods of the respondents, but in case of researching certain - especially the tough [13] and sensitive phenomena, it may turn out to be troublesome or even impossible to implement. An example may be posed by research over prostitution, where it is hard to imagine a fruitful discussion with the respondent about the possibility to archive the data, since the fact of recording the talk on the voice recorder itself causes the respondents to oppose, and it is possible to fight this opposition only with a promise that the recording will not be made available to third parties, both in terms of the audio file and its transcription [11]. Leak of information or its publication on the Internet (and thus the risk that the family, relatives or friends will discover the job) is one of the main concerns that the researched women have [14]. In case of such respondents, only the request for a consent to archive the contents may influence not only the course of the interview but even the possibility to carry it out at all. It may lead to breakage of the relation between the researcher and the respondent may give rise to doubts on what will happen with the obtained information. In addition, signing any documentation (e.g. a formal consent to deposit the data in the archive) would be difficult as the necessity to provide personal details (which according to the respondents is similar to a relation with the police) makes them afraid that the data may fall into unauthorized hands and be used against them, now or in the future.

When it comes to research in the environment of intellectually disabled residents of social welfare homes, an additional difficulty is the notion of obtaining an informed consent if it not certain whether the respondents understood the research situation at all. Any attempts undertaken by the researcher to clarify the research process usually fail to bring an expected result [10]. Apart from an open and undisguised attitude, which the researcher attempts to maintain in the whole process of field work towards the representatives of the environment of intellectually disabled residents of a social welfare home, character of his participation in the group, similarly to the purpose of taken actions and the reason of presence, may often remain "unidentified" what results from the limited perception of possibilities and interpretation difficulties that the intellectually disabled must face [15]. This example may pose an illustration also for other research, where regarding similar circumstances it is impossible to obtain a fully informed consent of the respondents, even despite of great efforts undertaken by the researcher themselves. Hence, if it is hard to obtain the respondents' consent to carry out the interviews, it would be even harder to obtain a consent to deposit and then provide the data to other researchers [3].

Another issue that must be considered is to think through the moment, when the researcher should turn with a request for the consent to archive the data obtained from the respondent. Such a consent obtained before the interview may bring two consequences. The first one is related to self-censorship, leading to the respondent's avoiding certain topics or threads, while the other to self-presentation and highlighting some events or experiences from their biography so the researcher can see them as "deserving" to be entered into the archive. From this perspective it seems a better solution to raise the notion of archiving after the interview, as it will be easier to obtain such a consent thanks to the trust developed within its course. However, we cannot exclude that the respondent will refuse us the right to any use of obtained material, being afraid of the consequence that may be brought by disclosing too much information about themselves. In order to minimize the risk of such a behavior there is a need to consider another key matter related to data archiving, i.e. providing the respondents with confidentiality.

2.2 Data Protection

In case of spoken history archives, entering personal details of a witness is an integral part of the deposited material. However, the situation may look differently in case of field (ethnographic) research, where strong emphasis is put on the researcher's duty to remove any information allowing to identify the respondents and reveal their personality to unauthorized persons from the reports [4]. This problem becomes even more visible, when the respondents are persons, who are easy to identify, among others regarding a collection of unique and characteristic features. On the other hand, it cannot be excluded that some respondent will not expect anonymity, resulting from e.g. the feeling of pride that may be rooted in the belief that while participating in the research they contribute to development of science. As suggested by some researchers, in case of research projects deposited in a prestigious academic archive, such as that of the London School of Economics, the respondents even expected to have their name listed in the material, perceiving it as a honour [8]. Certain categories of respondents will have greater

acceptance or will even expect their personal details to be listed in the reports, perceiving participation in the research as an opportunity for self-promotion. These are e.g. artists, sportsmen, celebrities. The situation will look differently in case of individuals that belong to marginalized groups or stigmatized circles. An example here may be posed by persons providing sex services or criminal environment, where the goal is to hide facts and the priority that nobody discovers the identity of the respondents [16]. In such a situation the researcher, who decides to explore such a research area, must prove special care to ensure confidentiality of data. Therefore, we cannot completely agree with Piotr Filipkowski, who writes: "Absolute anonymity is often more of a research assumption than it is a real necessity during the phase of data archiving. If such an archive exists and fulfills its role, it means that it must have won - more or less - with and leave the methodological strictness that assumes absolute anonymity of the respondent" [2]. On the other hand, the cited author further claims "any universal standards cannot be directly implemented without previous arrangements of conditions stipulated in national regulations, what in case of Poland suggests that the riddle might be tough" [2]. Hence, the author points to the significant issue of legal regulations as the basis for actions undertaken by the researchers and the interconnected duties [7]. Although it is not simple in case of Polish legislation, a researcher must be absolutely subordinate to the regulations.

An attempt to deal with the challenges described above is posed by procedures of preparation and publication of qualitative data for their repeated use, introduced by the archives. One of them is anonymization, i.e. removal of all data allowing to disclose the respondents' personality from the deposited materials. However, such an action may give a rise to certain doubts in technical aspects, related to the difficulty as well as time- and work-consuming nature of such a procedure [17]. There is also a question emerging in this context: how to achieve such a level of anonymization of data so it is possible on one hand to protect the respondents from identification and on the other not to interfere too much, so they data do not loose integrity, and what is more their essence and meaning remain the same. If the modifications are too deep they may hinder correct interpretation, and thus reduce the possibility of their reuse, rendering them unclear and deprived of context that provided them with meaning [5].

Another procedure allowing to protect the respondents may be posed by actions consisting in determination of grace period between depositing and publishing data, and introduction of a system of limitations for those who are willing to use them [6]. While depositing the data a researcher should state the date of their publication. Extension of the grace period, e.g. until the sensitive issue raised in the interview become invalid or stop triggering emotions, may partially solve the data anonymization problem [4]. While there might be certain doubts on whether after sever or a dozen or so years the archived data are still interesting to the researchers (especially those that deal with current social problems). Therefore, an alternative path for protection of deposited archive data is to limit the access. Various solutions have been adopted in the existing archives in this scope, based on utilization of the restrictions system towards specific categories of potential users or barrier and direct access control for all users. A researcher who deposited the data may be only informed that their materials are used, or they might request their consent to be obtained before the data are used, cited or their respondents are

contacted again [12]. Therefore, they may maintain control over who and for what purposes may use the data, and restrict that e.g. journalists cannot use them [3].

2.3 Scientific Discourse and Its Consequences

The described discourse is related to a highly significant notion, which occurs in the context of realization of research and generation of scientific knowledge on their basis, because representatives of the academic world are burdened with special responsibility related to the influence on, or as claimed by Peter Berger and Thomas Luckmann, construction of the social reality [18]. Direct influence of the scientific discourse in case of scientific field that we present, is reflected in e.g. grasping the phenomenon of prostitution in an extreme manner, from pathology to a profession that must be legalized, and when it comes to the intellectual disability, creation of definitions and tools for measurement and well as scales that would specify in a discretionary manner, when we deal with an intellectual standard. Literature of the subject emphasizes influence of authoritative figures (scientists, specialists from a given field) on the manner that an intellectually disabled individual perceives their surroundings in [19]. Usually, categorization of such a person takes place, and it is based on "objective" indicators developed by science, which serve specialists [20] as a measuring gauge for evaluation of effectiveness or mental disability of an individual. As claimed by the author of research over identity of women with intellectual disability - Agnieszka Kumaniceka-Wiśniewska - a diagnosis made by specialists exerts enormous influence on almost all spheres of the person classified as intellectually disabled, including the fact that the system of social welfare takes control over the mentally handicapped, which results in copying of biographical schemes [21]. Elżebieta Zakrzewska Manterys also warns against it, and writes about a particular dictate of science, especially psychology and pedagogics, which leading to naming and cataloging the handicapped, support their stigmatization and exclusion [20].

We deal with a similar mechanism in case of women providing sex services. It is often the case that ideologically strong trends collide in the field of science, e.g. in the sphere of feminism, where prostitution is treated on one side as evil and a form of women exploitation by men, but on the other it is presented as an "ordinary" job that women choose voluntarily [11]. In this respect, it must be borne in mind that the deposited interview might be utilized by a researcher that the respondent would never agree to talk to (as they would probably fail to accept that researcher's approach and the manner they perceive a given phenomenon in). Moreover, in an extreme case, such data may be utilized for purposes that are contrary to the original research.

3 Conclusion

The described notions related to the researcher's responsibility for the respondents' (members of the researched environment) well-being suggest that ethical aspect of qualitative data archiving pose one of the key notions in discussions over future shape of the initiative.

On one hand we deal with a situation full of concerns about confidentiality of data and anonymity of respondents, or the possibility to reuse the data coming from projects based on different research methods. Such a system is also based on a belief that researchers are willing to share their data, what in practice may turn out to be hard to realize regarding divisions in the environment, growing competition triggered by the parametrization policy or the grant awarding system.

On the other hand, the archiving supporters stress that it provides access to data for a wider group of researchers, it is a reflection of scientific advancement and popularization of knowledge, and it contributes to transparency of qualitative data. It is also a possibility to develop strong basis of scientific knowledge. Thanks to archiving, future generations of researchers will have access to previously explored, and maybe currently unavailable (non-existent) spheres of social life. All of this causes that the need to create new and develop the existing qualitative data archives is absolutely justified. However, in order for the archives to achieve the expected result, there is a need to convince the researchers to archive their data, meaning to convince them that it is not a risk or harmful action, and it does not undermine the role of a responsible researcher. We need to show what the archives can offer the researchers and what benefits they may bring to the whole scientific environment. An important task of the archive is to shape the archiving culture and repeated analysis of qualitative data [2]. Therefore, it will be possible to confront different positions, what will help to develop a common model, which would include those differences, and at the same time minimize the researchers' doubts. It will also help to specify potential barriers not allowing to deposit data in archives, and develop standards that should be popularized [12].

4 Discussion

When it comes to the sociological or anthropological research in Poland, the word "archive" is associated first of all with the place of collecting and storing papers, documents, and works, used only by historicists [1]. Archives that collect source materials employed for re-analyses are still rare; generally they function in a local environment, at particular research institutions, depositing only their own materials, the access to which is difficult. An exception here may be the Archive of Social Data (Archiwum Danych Społecznych) established in 2003, which is actually of a central character; it collects data from qualitative research carried out by various scientific institutions in Poland. Since archiving of data that come from survey questionnaires do not bring so many epistemological, ethical or technical difficulties to archive workers, the archive collecting qualitative data must face all of that problem [1]. It might be the reason why a qualitative data archive is still absent in Poland, (a spoken history archive at the KARTA Center was a pioneer in this field, today operating as the Spoken History Archive (Archiwum Historii Mówionej), managed by the Warsaw History Meeting House (Dom Spotkań z Historią), with interinstitutional qualities, generally accessible, similar to e.g. the British Qualidata Archive at the UK Data Archive in Essex. Nobody imposes any official obligations on Polish researchers to deposit the research financed from public funds in generally accessible archives, such as e.g. the British Economic

and Social Research Council. On the level of Polish research projects, the expressed willingness to archive the materials actually is appreciated, but regarding no central qualitative data archives it is rather of a declarative than real character. However, bearing in mind the world trends (for example the directives issued by OECD http://www.oecd.org/dataoecd/9/61/38500813.pdf, which are binding also for the Polish party), this situation can change soon also in Poland. However, we need to remember that the archiving process and the interconnected thought to methodological and ethical consequences of such procedures is a relatively new matter in Polish social sciences, while in the West European countries, especially in Great Britain, this discussion covers the last two decades. This is the time for the increasingly more dynamically developing process of (any) qualitative data archiving [1]. Hence, it can be assumed that here in Poland, we are at the brisk of establishing certain solutions for qualitative data archiving that are soon to become an element of our research reality. All the more, the debate on new challenges and dilemmas related to qualitative data archiving and re-analysis seems to be highly necessary at the moment.

Such a discussion should take place in relation to two aspects of social reality: past and presence [8]. In the retrospective context, the stored documents, empirical materials in a form of e.g. diaries, letters, pictures and other qualitative data, pose a invaluable source of knowledge about the social reality in Poland. They may become a subject of comparative analyses or repeated reflexion in various analytical contexts. In the perspective of presence they might be some serious reservations appearing, related to the ethical, methodological or institutional issues. Moreover, bearing in mind the differences between the types of collected materials (e.g. life stories obtained in the mode of spoken history and autobiographic narrative interviews), we need to think on whether general assumptions and standards for their archiving can be introduces, especially when the Polish tradition of qualitative research is considered [8]. There is also a need to make a clear distinction between the archiving problem itself and the issue of access to the archived material. The advancing technology allows to archive and transfer the resources, basically at an unlimited scale. This causes the desire to share everything with everyone, often for the sake of democratization of knowledge. However, it is not an argument that would completely convince the Polish qualitative researchers environment, especially that the price for democratization might be subjectification of a respondent, who consents for use of e.g. their life story, to publish it on the Internet, etc., and a researcher, who may be deprived of the copyrights, and in some situations the moral right for own research actions and their results in a form of collected materials.

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A Mixed Methods Research of Pre-service Teachers' Perceptions about the Benefits of Wiki-Based Tasks and Discussion Boards

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Abstract. The aim of the research was to explore pre-service teachers' perspectives towards the use of wikis and discussion boards to improve writing skills and promote collaboration. A total of 358 pre-service teachers, enrolled in the subject English I, participated in it. They ranged in age from 20 to 58. We adopted a mixed methods research approach to integrate results and carry out a combined discussion that allowed making interferences to understand better and to have a broader vision of the phenomenon. The data analysis revealed the impact of the e-activities on the participants' confidence in English. They emphasized the opportunities afforded by the wikis to promote individual and cooperative learning, and by discussion boards to communicate. In our research, we demonstrated that the use of a mixed methods research enhanced the validity and reliability of the data, and added rigor to researches in technology and second language.

Keywords: English as L2 · Wiki-Based tasks · Discussion boards · Mixed methods research

1 Introduction

The purpose of teaching English as a second language (L2) is to provide learners with the necessary skills to carry out an adequate communication. Usó & Martínez [27] show the necessity of developing students' level of listening, speaking, reading & writing to produce and interpret any piece of written or spoken discourses, and to communicate perfectly. In this research we have concentrated on the written skills: reading and writing. There are different definitions of these skills, for example, Woolley [29] refers to reading as *the process of making meaning from text,* that is to say *to gain an overall understanding of what is described in the text rather than obtain meaning from isolated words or sentences.* Regarding his words, we can state that reading does not only refer to the process of decoding a text word by word, but it also implies to understand what a person is reading in a particular context and of a specific topic [23]. On the other hand, Nunan [20] defines writing as *the written products of thinking, drafting, and revising that require specialized skills on how to generate ideas,*

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_23

how to organize them coherently, how to use discourse markers and rhetorical conventions coherently into a written text, how to revise text for clearer meaning and how to edit text for appropriate grammar and how to produce a final product. In this definition the author clearly emphasizes how the learner of the L2 must master aspects such as grammar or vocabulary, and others more complex as cohesion and coherence that must always exist in a well-written text [15].

In the field of teaching a L2, technology has always occupied a relevant position. Nowadays Web 2.0 tools have increased the possibilities to teach, to learn and to be in contact with the L2 [22]. In our research we have specially focused on two asynchronous tools (wiki and discussion board) to explore pre-service teachers' perspectives towards their uses as learning strategies in a blended learning environment. We have tried to extend the existing research on the use of these tools in second language learning (SLL) and to give a new perspective of their uses. In 2007 Farabaugh [8] conducted a study at Cornell University in different literature courses. Two different versions of the wiki software (QwikiWiki and MediaWiki) were used. The researched concluded that this technology was a good tool to carry out reading and writing assignments that encouraged language awareness in the literary domain. The results also emphasized that this asynchronous tool was appropriate to improve writing skills, to extend group work outside the class, to promote collaborative writing, and to help students to create their own knowledge rather than just receiving it from teachers. The study of Fitze [9] also expressed the positive aspects of using forum to teach a foreign language. In this occasion it combines traditional and online instruction through an e-learning platform. The study concluded that there was a broader range in the vocabulary used, as well as a greater interaction and participation of students in written expression. The study conducted by Kol & Schcolnik [13] also focused on the use of forum in the teaching-learning process of English. The main goal of this research was to establish valid criteria to assess students' contributions. It emphasized students' positive perceptions towards the use of this tool to improve written skills. The research of Twu [26] pointed out learners' positive attitude towards language learning in Wiki environments, and towards interaction developed in a second language throughout wiki environments. The results identified some effective strategies to involve students in the activity, to maximize the learning environment of a L2, using wiki as a tool of communication, and to build a learning community. The study of Mak & Coniam [16] was conducted in a high school in Hong Kong. The level of English of the students that participated in the study was intermediate. Regarding the results, the use of wiki allowed students to develop their writing skills, and promoted collaborative writing between students with a minimal input and supported from teachers. The research of Kovacic, Bubas & Zlatovic [14] was carried out in November 2006 at the University of Zagreb, Croatia, and was developed during the 2006/2007 and 2007/2008 academic years. They wanted to assess the applicability of wiki in teaching English for special purposes to engage students in different individual and collaborative online learning activities, to evaluate these activities, and to allow them to choose the most appropriate activities to learn a L2. The main results emphasized how the use of this tool allowed students to participate more actively in the course, to contribute to the development of activities, and to demonstrate what they had learned. The teachers also had different elements to evaluate students' participation more precisely and objectively.

The students concluded that they had improved both their writing skills and vocabulary. In the research carried out by Franco [10] the use of wiki was also emphasized. The study was developed in Brazil and the aim was to analyse the use of wiki to promote peer correction in a virtual group environment. The results confirmed, once again, the participants' positive attitudes towards the use of this technological tool to learn English. Finally, we highlight the research carried out by Miyazoe & Anderson [18]. They discussed the positive effects of the simultaneous implementation of three written activities through technological tools such as forum, blog, and wiki in a blended learning environment for teaching and learning English at Tokyo University. The results of the study emphasized the positive students' perception of these three tools, highlighting wiki as the most favourable one, followed by blog and forum. The study established the usefulness of each one of the online writing tools, and observed a general improvement in participants' writing abilities.

2 Method

We employed a mixed methods research to explore pre-service teachers' perspectives towards the use of wiki-based tasks, and discussion boards as learning strategies to improve writing skills in English and to promote collaborative autonomy in a blended learning environment. As Anguera [1] states the combined use of qualitative and quantitative methodology, since it is interested in the process and the result, enhances the mutual invigoration of the two types of methods, and facilitates the triangulation through operations. Delgado [7] emphasizes this idea and points out that it is not juxtaposition but a flexible combination of the components of both methods. She reinforces this idea and states that it is a combination of the formal rigour of the quantitative method and the creativity and plasticity of the qualitative one. Qualitative and quantitative data collection and analysis aim at integrating results and carrying out a combined discussion that allows making interferences to understand better and to have a broader vision of the phenomenon.

Analysing the works done by different authors [5, 7, 11, 24] we can emphasize that mixed methods research has the following characteristics:

1. Triangulation (quantitative and qualitative corroboration)
2. Complementation (clarification of the results of one method on the basis of the other)
3. Holistic vision (complete and integral approach)
4. Development (the results of one method as a support of the processes of the other: sampling, collection, data analysis, new hypotheses, etc.)
5. Initiation (to discover contradictions, new frames of reference, to modify original approaches with the results of the other method)
6. Expansion (one method can expand the knowledge obtained by the other)
7. Compensation (the weaknesses of one method can be made up for the other)
8. Diversity (different views of the problem)
9. Clarity (to display elements which were not detected by a single method)
10. Credibility and improvement (reinforcing arguments, results and procedures)

2.1 Participants

The population of our study was composed of 451 pre-service teachers of the Faculty of Education of the Pontifical University of Salamanca. They were studying the last year of the Degree in Primary Education: English, and were enrolled in the subject English I. The quantitative sample was a probability sample since everybody had the same probability of being chosen and included in the study. The kind of sampling was cluster sampling since all the members formed natural groupings. It was composed of a total of 358, 83 men (23.2%) and 275 women (76.8%), with an average age of 29.49 (SD = 5.99). They were divided into four different age groups: 20–24 (24.6%), 25–29 (25.7%), 30–34 (34.4%), and 35 or older (15.4%). All of them had already finished a previous university Degree and the majority of them had completed a Degree in Primary Education (70,70%). Regarding their professional status, 82.1% were already working, and 70.7% had a job related to education, holding the position of teachers in infant (22.1%), primary (28.2%) and secondary education (7.3%). Regarding their level of English, and according to the Common European Framework of Reference for Languages (CEFR), they had an intermediate level (B1). The quantitative sample was sufficiently representative (relative error = 2.5%) to reach conclusions that could be generalized to a larger population. On the other hand, the qualitative sample of the research was non-probabilistic, cumulative and sequential since we had the sample needed to get enough information, reaching the data saturation to meet the goals of the research. The sample was composed of 91 pre-service teachers, 46 were men and 45 women.

2.2 Variables and Instruments

We used two instruments to collect data: pre-test and post-test, and semi-structured interviews. The pre-test and post-test were hosted on the virtual learning environment (VLE). Pre-service teachers were provided with a username and password to get access to them. Both questionnaires were designed in three phases. Firstly, the researchers designed the initial draft based on the literature reviewed. Secondly, a panel of experts in educational research, English and technology reviewed and evaluated the items of the initial draft and elaborated a report in which they stated the adequacy or not of the items, the appropriate scales of measurement, the readability and the comprehension of the tests for the purpose of the research. Finally, the researchers took into account the experts' report to carry out the changes proposed and to select the items of the final questionnaires. The participation of the experts in the design of the tests provided the external validity. Regarding their internal consistency, we calculated the Cronbach's alpha. The coefficients obtained ($\alpha = 0.853$, $\alpha = 0.845$) suggested that their measures were consistent and stable. The pre-test was composed of 19 items, and the post-test contained 36. They were divided into three parts: participants' personal details, English as L2, and technology. They contained several types of questions: open, close, yes/no, short answer, multiple choice, and five-point Likert scales. Regarding the individual interviews, they were conducted to go more deeply into participants' personal usage perspectives and experiences towards wiki-based tasks and discussion boards to improve their level in English and to promote collaborative autonomy. A total of 91

individual interviews were conducted during three months at times convenient to each participant. Researchers did the individual interviews until theoretical saturation occurs. The researchers decided to use an interview guide approach so before starting the different sessions, the researchers prepared a set of open-ended questions that referred to the specific phenomenon of the research. Although the researchers had that list of questions, they were free to change their order or even to reword them. At the beginning of each session the researchers introduced themselves and presented the goal of the study. At the end of this presentation, they projected a video about technology and education [21]. Each interview lasted between thirty-five and fifty-one minutes. They were recorded to facilitate the transcription and later analysis. The participants were asked for the permission to record them. Internal validity was achieved because the criteria established by Coleman & Unrau [6], and Hernández et al. [11] were met. Referring to the reliability of the coding, we had the collaboration of 16 experts in these matters. They had a tree of categories and the transcription of different interviews to code them. We compared their encodings with ours to identify the agreements that existed between them, with an agreement of 81%. That level of reliability meant that the encodings were valid and determined which category was part of the final tree.

2.3 Data Collection and Analysis

We collected the quantitative data in the subject English I at the beginning and at the end of the academic year. Once the fieldwork was finished we ordered and coded the data to enter them in the software SPPS24. We took into account the nature of the variables to carry the statistical analyses: descriptive statistics (frequencies and percentages) and inferential (paired sample t-tests, and analysis of variance: ANOVA). Regarding the qualitative data collection and analysis, we collected the data from May to July. We followed the scheme proposed by Miles & Huberman [17] about the processes of qualitative data analysis: (a) data reduction, (b) data display, and (c) drawing and verifying conclusions.

3 Results

In the next subsections, we present the results obtained in the analyses carried out with the quantitative and quality data.

3.1 Quantitative Results

The participants were asked to self-assess their level of writing (item8 - I6); reading (item9 - I7); vocabulary (item10 - I8); grammar competence (item11 - I9); discourse competence (item12 - I10); culture (item13 - I11); and confidence (item14 - I12) at the beginning and at the end of the academic year (see Table 1). Regarding the results, we state that the majority of them considered that they improved their level in all these aspects with the e-tasks developed through wikis and discussion boards.

Table 1. Statistics of the dependent variables of L2

	$\bar{x}$	Sx	Excellent	Very good	Good	Fair	Poor
Item8	2.83	.814	2.2%	16.2%	46.9%	31.6%	3.1%
Item9	3.12	.831	5.3%	24.6%	48.0%	21.2%	0.8%
Item10	2.94	.860	2.2%	23.2%	45.3%	25.1%	4.2%
Item11	2.77	.829	2.5%	13.4%	47.2%	32.4%	4.5%
Item12	2.15	.884	2.0%	6.1%	17.3%	53.9%	20.7%
Item13	2.55	.890	2.8%	12.6%	27.7%	50.8%	6.1%
Item14	3.41	.845	5.6%	47.2%	31.0%	15.4%	0.8%
I6	3.98	.735	24.9%	49.4%	24.6%	1.1%	–
I7	4.09	.622	24.0%	61.5%	14.2%	0.3%	–
I8	4.10	.754	33.5%	43.9%	22.1%	0.6%	–
I9	3.89	.760	20.9%	50.6%	25.4%	3.1%	
I10	3.54	.739	–	8.9%	42.5%	42.7%	5.9%
I11	4.28	.787	46.6%	37.7%	13.1%	2.5%	–
I12	3.99	.794	27.9%	46.1%	23.5%	2.2%	0.3%

We analysed the previous results to know if there were statistically significant differences (CI 95%) between the results of these items of the pre-test and post-test. According to them, we appreciated that there were differences (see Table 2) and rejected the null hypothesis, affirming that there was a clear relationship between the improvement of pre-service teachers' self-assessment of all these aspects, and their perspectives towards the effectiveness of all the e-tasks developed.

Table 2. Paired samples correlations of the dependent variables of L2

		Mean	t	Correlation	Sig.	Sig. (2-tailed)
Pair 1	Writing & Writing	−1.151	−21.278	.130	.014	.000
Pair 2	Reading & Reading	−.969	−18.942	.135	.010	.000
Pair 3	Vocabulary & Vocabulary	−1.162	−18.207	−.116	.028	.000
Pair 4	Grammar Competence & Grammar Competence	−1.123	−20.057	.113	.033	.000
Pair 5	Discourse Competence & Discourse competence	−1.397	−24.257	.108	.042	.000
Pair 6	Culture & Culture	−1.735	−26.117	−.121	.023	.000
Pair 7	Confidence in L2 & Confidence in L2	−.578	−10.000	.110	.038	.000

* 95% Confidence Interval of the Difference. n = 358.

Pre-service teachers were also asked to self-assess their level of English (I13) and to assess peers' level (I14). The results were quite positive as we show in Table 3.

Table 3. Statistics of the dependent variables of self-assessment and peers' assessment

	$\bar{x}$	Sx	Excellent	Very good	Good	Fair	Poor
I13	3.91	0.546	19%	55.9%	22.3%	2.2%	0.6%
I14	3.91	0.561	21.2%	51.4%	25.1%	2%	0.3%

Pre-service teachers were also asked about the effectiveness of wiki-based activities to improve their knowledge of the L2 (I15); to carry out collective authorship (I33); to support autonomous (I34) and cooperative learning (I35). As we show in Table 4, the majority of participants assessed them as very effective or absolutely effective.

Table 4. Statistics of the dependent variables of the effectiveness of wiki-based activities

	$\bar{x}$	Sx	Absolutely effective	Very effective	Neither effective nor ineffective	Very ineffective	Absolutely ineffective
I15	4.14	.807	37.2%	42.2%	18.2%	2.2%	0.3%
I33	4.08	.652	24.9%	58.7%	15.9%	0.6%	–
I34	4.03	.646	21.2%	60.9%	17.0%	0.8%	–
I35	4.01	.674	21.5%	58.9%	18.2%	1.4%	–

We analysed the previous results to know if there were statistically significant differences (CI 95%) between the age groups. Regarding the results, we appreciated differences in the variables: collective authorship ($p = .000$); autonomous learning ($p = .000$) and collaborative learning ($p = .000$) (see Table 5). The results of the Tukey HSD test showed that the differences existed between the mean of the youngest (20–24 & 25–29) and the oldest participants (30–34 & 35 or more than 35) (see Figs. 1, 2, and 3).

Table 5. Mean of the dependent variables of the effectiveness of wiki-based activities

	20–24	25–29	30–34	35 or more than 35
I33	4.28	4.25	3.91	3.85
I34	4.25	4.26	3.82	3.73
I35	4.22	4.28	3.78	3.71

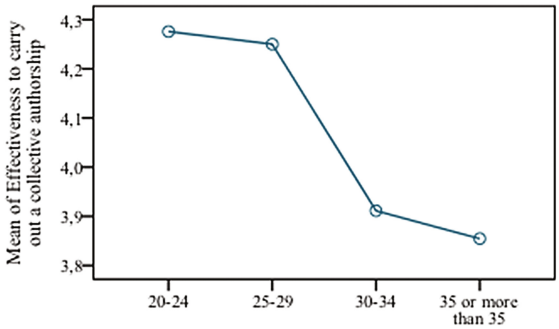

Fig. 1. Results of the Tukey HSD test of the dependent variables of the effectiveness of wiki-based activities to carry out collective authorship.

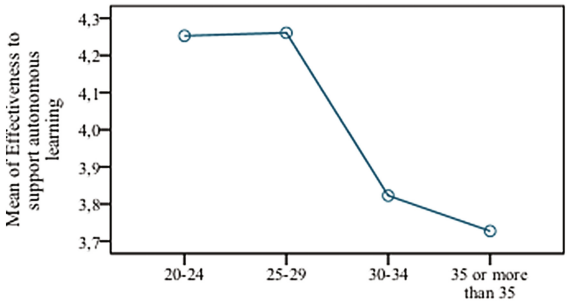

Fig. 2. Results of the Tukey HSD test of the dependent variables of the effectiveness of wiki-based activities to support autonomous learning.

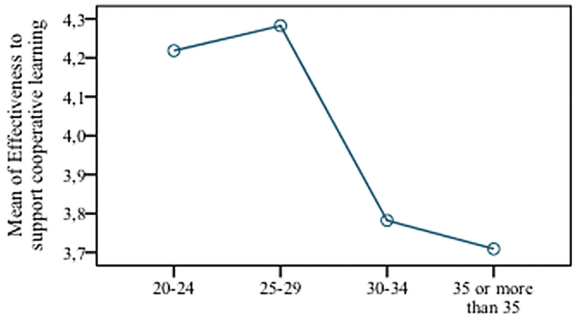

Fig. 3. Results of the Tukey HSD test of the dependent variables of the effectiveness of wiki-based activities to support cooperative learning.

Participants were also asked about the effectiveness of discussion boards (see Table 6) to communicate (I24); to get consensus (I25); to resolve conflicts (I26); to provide a constructive feedback (I27); and to support a dynamic process (I28). As we show in Table 6, the majority of them assessed them as very effective or absolutely effective.

Table 6. Statistics of the dependent variables of the effectiveness of discussion boards.

	$\bar{x}$	Sx	Absolutely effective	Very effective	Neither effective nor ineffective	Very ineffective	Absolutely ineffective
I24	3.94	.776	23.7%	50.6%	22.1%	3.6%	–
I25	3.94	.863	26.3%	48.9%	18.4%	5.6%	0.8%
I26	4.01	.657	20.7%	60.3%	17.9%	1.1%	–
I27	4.02	.686	23.2%	57.3%	18.2%	1.4%	–
I28	4.07	.674	25.7%	56.7%	16.8%	0.8%	–

We analysed the results obtained to know if there were statistically significant differences (CI 95%) between the age groups in these dependent variables. Regarding the results we appreciated differences in all of them (p = .000, p = .000, p = .000, p = .000 & p = .000) (see Table 7). The results of the Tukey HSD test showed that the differences existed between the mean of the youngest (20–24 & 25–29) and the oldest participants (30–34 & 35 or more than 35) (see Figs. 4, 5, 6, 7, and 8).

Table 7. Mean of the dependent variables of the effectiveness of discussion boards.

	20–24	25–29	30–34	35 or more than 35
I24	4.29	4.17	3.66	3.65
I25	4.39	4.17	3.60	3.62
I26	4.25	4.24	3.74	3.82
I27	4.34	4.23	3.77	3.73
I28	4.37	4.34	3.79	3.80

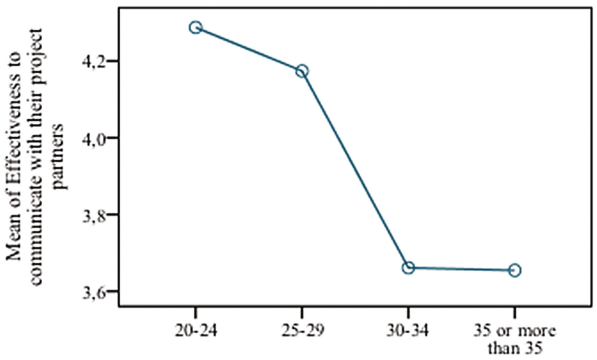

Fig. 4. Results of the Tukey HSD test of the dependent variables of the effectiveness of discussion boards to communicate with their project partners.

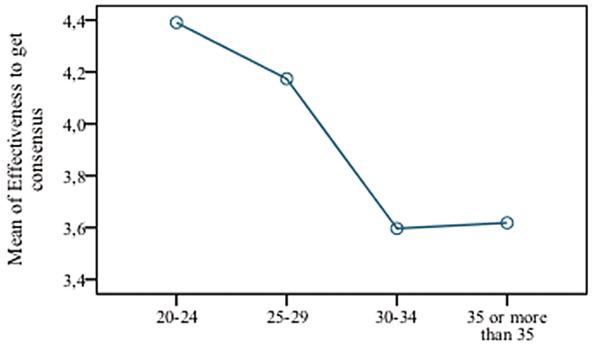

Fig. 5. Results of the Tukey HSD test of the dependent variables of the effectiveness of discussion boards to get consensus.

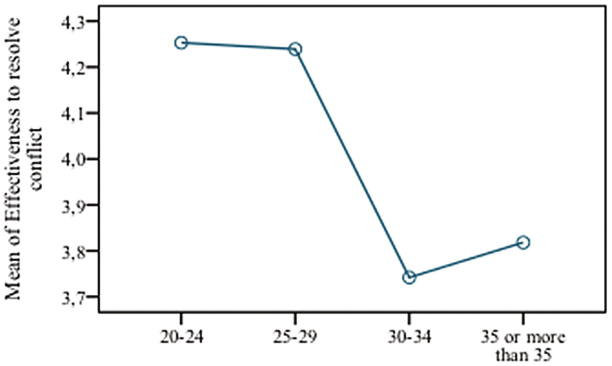

Fig. 6. Results of the Tukey HSD test of the dependent variables of the effectiveness of discussion boards to resolve conflicts.

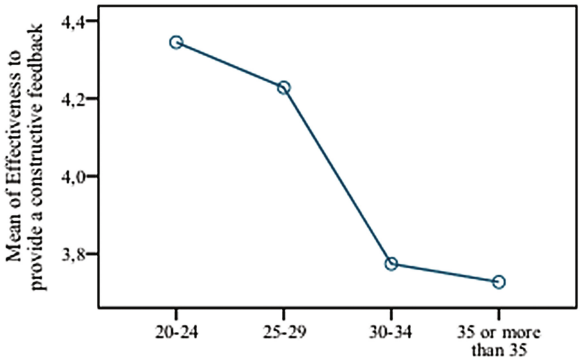

Fig. 7. Results of the Tukey HSD test of the dependent variables of the effectiveness of discussion boards to provide a constructive feedback.

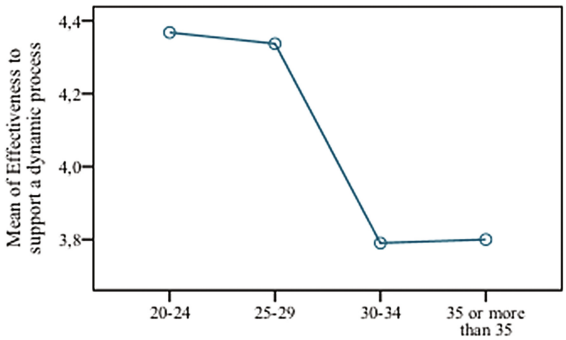

Fig. 8. Results of the Tukey HSD test of the dependent variables of the effectiveness of discussion boards to support a dynamic process.

3.2 Qualitative Results

In this subsection, we present the results obtained in the analyses carried out with the qualitative data. First of all, we describe the discursive positions expressed by the pre-service teachers in the semi-structured individual interviews. They are ordered according to frequency in a word cloud obtained through NVivo11 Fig. 9.

Fig. 9. Word cloud

The relevant categories and subcategories of the analysis carried out of the pre-service teachers' discourse are represented in the following conceptual map (see Fig. 10). The same ideas were described in the quantitative analysis.

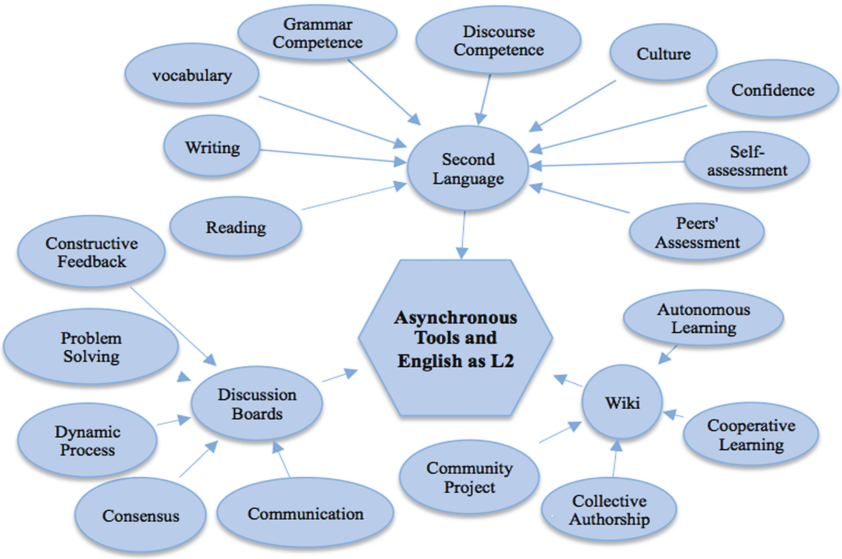

Fig. 10. Conceptual map

We apply thematic networks to organize the thematic analysis of the data. As Attride-Stirling [3] points out thematic networks arrange the coding text that is presented at the end of the data gathering stage in three classes of themes, three levels and their relationships: Global Theme: *Asynchronous Tools and English as L2*, Organizing Theme: *Second language; Wiki; and Discussion Boards* and Basic Theme: Second language: *Reading, Writing, Vocabulary, Grammar Competence, Discourse competence, Culture, Confidence, Self-assessment, Peers' Assessment*. Wiki: *Autonomous learning, Cooperative learning, Collective Authorship, Community Project*. Discussion Boards: *Communication, Consensus, Dynamic Process, Problem-Solving, Constructive Feedback*.

Table 8 shows the results of each theme in which:

A = total number of text units retrieved of each subcategory
B = number of interviews in which participants refer to each subcategory
C = percentage of the number of interviews in which participants refer to each subcategories in relation to the total number of interviews
D = number of text units of B
E = percentage of A in relation to the total text units of the interviews in which participants refer to each subcategory
F = percentage of A in relation to the total text units (19,443) of all interviews (91)

Table 8. Thematic networks results

Asynchronous tools and english as L2	A	B	C	D	E	F
Second Language	2753	91	100%	19443	14%	14%
1. Reading	975	66	73%	14242	6.8%	5%
2. Writing	897	60	66%	13014	6.9%	4.6%
3. Vocabulary	220	20	22%	4411	5%	1.1%
4. Grammar Competence	441	40	44%	8747	4.7%	2.1%
5. Discourse Competence	1182	71	78%	15326	7.7%	6.1%
6. Culture	688	52	57%	11160	6.2%	3.5%
7. Confidence	954	62	68%	13324	7.2%	4.9%
8. Self-assessment	894	62	68%	13214	6.8%	4.6%
9. Peers' Assessment	1011	65	71%	13891	7.3%	5.2%
Wiki	6211	91	100%	19443	32%	32%
10. Autonomous Learning	2329	90	99%	19234	12%	12%
11. Cooperative Learning	2673	90	99%	19228	14%	14%
12. Collective Authorship	3126	79	87%	17022	18%	16%
13. Community Project	2245	90	99%	19212	12%	12%
Discussion Boards	6722	91	100%	19443	35%	35%
14. Communication	5545	91	100%	19443	29%	29%
15. Consensus	1021	57	62%	12756	8%	5.3%
16. Dynamic Process	3244	82	90%	17602	18%	17%
17. Problem-Solving	1219	59	64%	12443	10%	6.3%
18. Constructive Feedback	4153	90	99%	19123	21%	21%

The verbatim quotes are labelled in terms of participants' gender and age.

3.3 Organizing Theme: Second Language

Based on the overall evaluation of the data, the majority of pre-service teachers considered that the e-activities provided adequate practices to improve writing skills and the vocabulary related to the topics developed. They also emphasized the opportunity that they had to work about some specific aspects of culture. They believed that these activities helped them to be familiar with some traditions and the history of some countries what it had an influence in their level of the L2, since they considered that culture is part of the learning of a L2. The data analysis also revealed that there was a significant impact of the activities developed on their level of grammar competence, discourse competence and confidence in L2. The model created a favourable environment for self-assessment and peers' assessment. Participants pointed out that they could reflect about their contributions and could analyse their improvement. They stated that they had the opportunity to assess their partners' contributions and that everything was done in an environment of respect.

I had some doubts about the possibilities that we had to improve our skills in the L2. However, after the experience I can really say that we have had many opportunities to improve, especially our writing skills (27-year-old woman, participant 69).
The fact of developing wikis around culture has been a good practice to learn different aspects of the culture of the USA and UK (32-year-old man, participant 80).

The way in which the activities were designed has allowed us to reflect about our learning and self-assess our improvement and also to assess our classmates contributions (31-year-old woman, participant 4).

3.4 Organizing Theme: Wiki

The analysis also provided evidences on the opportunity afforded by wikis activities to promote individual and cooperative learning. Participants stated that they had the opportunity to develop some activities by themselves and to reflect about what they were doing. They considered that this reflection helped them to acquire the skill of learning to learn which is essential to learn and improve in the acquisition of a L2 since the learning of any L2 implies a lifelong learning. A high number of participants stated that they undertook a learning experience in which they had opportunities to work together. They emphasized that the e-activities developed promoted the creation of a community project since these activities involved them in decisions about their contents, style, planning and management. It was created a supportive environment that helped them to develop the e-activities, and reinforced interpersonal skills such as respecting opinions, remaining flexible and appreciating teammates' contributions.

Pre-service teachers emphasized that the use of this tool managed to carry out collective authorship activities in which connected groups of them participated. They reported that all their contributions merged into a collective single work.

We have participated in an experience in which we could work individually acquiring the responsibility in a task in which we collaborated. It was a more effective learning process (43-year-old man, participant 71).
The contributions of all of us led to collective texts developed with the consensus of our opinions (33-year-old woman, participant 57).
We were actively involved in the development of the activities; we took decisions and assumed individual and group responsibilities (24-year-old woman, participant 39).

3.5 Organizing Theme: Discussion Boards

The highest percentage was obtained in the category that referred to communication. Participants believed that it was essential to have this tool to interact with classmates during the development of the e-activities or when they had some doubts that wanted to share with the rest of the learning community. They especially emphasized that they could communicate accurately and effectively even though they did not share the same place and did not connect at the same time, eliminating all the spatial and temporal barriers. The data also showed that this technological tool afforded them the opportunities to share an environment in which they could get consensus for the development of the e-activities and could solve the problems that appeared in the development of group e-tasks. They also pointed out that the fact of using this tool made the process more dynamic with many interactions and a flow of ideas or proposals, creating knowledge. Finally, data revealed the benefits of feedback. It was described as an

essential aspect to help them to reflect about what they were doing and were learning, and to move forward in their level of English.

> *Discussion boards have allowed us to communicate with our project partners as well as to get consensus about the development of the activities and to solve the conflicts that took place (49-year-old woman, participant 79).*
> *One of things that I would like to emphasize is the feedback received during the development of the activities on the part of the teachers. I consider that it is essential when we are learning new skills, since we need to know if what we are doing is correct or incorrect (43-year-old woman, participant 35).*

4 Discussion and Conclusions

In this study, we revealed how pre-service teachers perceive the use or opportunities afforded by the two asynchronous tools used in a hypermedia modular model in blended learning education. We also showed how the development of the e-activities had influence in their improvement and the quality of their level in English, especially pre-service teachers emphasized the benefits of the e-tasks to practice and improve writing skills, culture, vocabulary, grammar competence and discourse competence [28]. The group e-activities developed allowed them, on one hand, to work effectively to create longer collective texts based on their agreements and individual contributions, and, on the other hand, to develop better quality texts because these contributions were constantly assessed by the community. Our findings also highlighted how important was to reflect and self-assess their level in English since they must persist in learning and must have the ability to organise their own learning, being aware of their strengths and weaknesses [21, 25]. Although the activities were designed to develop in groups, they also allowed pre-service teachers to work individually, fostering the learner's autonomy [12, 22].

The results emphasized how important was to have the necessary technological tools in blended learning education to communicate whenever they wanted and wherever they were. Learning implies communication so it is not possible to have success in any kind of education in which this is not taken into account. The results showed the benefits of having adequate interactions in which participants could reach consensus on the ideas they wanted to transmit, and which could help them to solve the conflicts that normally appear in the development of group activities [18, 19].

Our study proved the benefits and effectiveness of the constructive feedback to help participants to get the objectives of the subject. It was demonstrated that when participants received a positive and constructive feedback, performance was improved and they were more motivated since they felt part of the teaching-learning process.

We have demonstrated that the use of a mixed methods research enhances the validity and reliability of the data obtained, and adds rigor to researches in technology and L2. Qualitative and quantitative triangulation is a necessary and a useful resource to carry out quality studies.

The findings of our study shed light on the effectiveness of wiki-based activities and discussion boards in the development of pre-service teachers' writing skills [28], and their impact on the collaborative autonomy [2, 4] in a blended learning course.

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Perspective of Clients and Healthcare Professionals About Occupational Therapy Intervention in Vocational Rehabilitation: A Descriptive-Exploratory Study at a Professional Rehabilitation Centre in Portugal

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Abstract. Vocational rehabilitation (VR) allows individuals to enter, return and/or maintain employment. After literature review, no evidence of VR in individuals with acquired injuries, in Portugal was found. This paper aims to explore and describe the Occupational Therapy (OT) approach in VR and the client's and the healthcare professionals' perspectives, at Centro de Reabilitação Profissional de Gaia. A case study research was carried out with individuals aged 18 to 65 years old, with physical and neurological injuries, and receiving OT intervention; Occupational Therapists and other healthcare professionals working with those clients. To collect and analyse the data, a semi structured interview, focus group and subsequent content analysis by Bardin method were done. Participants' perspectives were that OT promotes autonomy in occupations, assesses and recommends assistive products and performs functional assessments. Comparing results with literature, the clients and health professionals' perspective of the OT intervention was consistent with the Occupational Therapist skills and intervention in VR.

Keywords: Vocational rehabilitation · Occupational Therapy · Employment · Acquired injury · Occupation

1 Introduction

Work as an area of occupation consists of paid employment, work interests, job and employment search, job performance, retirement preparation, and volunteering exploration and participation [1]. A job gives independence, because people can care for themselves and their dependents [2]. It is associated with better quality of life and

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_24

allows the development of meaningful social activities [3]. On the other hand, unemployment or inability to return to work is associated with isolation and depression, due to income loss and stress increase [4]. Therefore, in populations with disability that cannot work, returning to work is essential [5–7] but difficult, due to the lack of information about adaptations and alternatives that may allow them to perform tasks that would be difficult or impossible otherwise [8].

Disability is a complex and broad concept, that includes different levels of functional limitations related to the person and their environment [5, 9, 10]. People with disabilities are capable of working in any context if their skills, limitations and adjusted strategies to workplaces are taken into account [11]. In many cases disability is acquired in adulthood, when the person is already working. Disability prevention, reintegration and job adjustment are matters that concern any organisation that does not have disabled workers [8].

Occupational Therapy (OT) and its field of action are still relatively unknown to the majority of the Portuguese population. A physiotherapist or a nurse are easily characterised, however with the Occupational Therapist there are still uncertainties, not knowing where the occupational in the name comes from. It is observed that many still do not take advantage of the services of these professionals either by the general lack of knowledge or by the unfamiliarity of other professionals and therapeutic decision makers.

When it comes to Vocational Rehabilitation (VR), this situation worsens, since many (including professionals) are also unaware of the existence of these services and specialised professionals in occupational science, as are the Occupational Therapists. It is in the public interest to educate people in general and health professionals for this possibility.

An essential element of the VR process is helping the person to become aware of their injury, disability or health condition in order to understand the balance between functionality and disability to manage their influence on occupational participation in work [2]. Thus, the first step in the OT process is to assess the capabilities and significant occupations of the individual, towards adapting the environment and activities to the person.

OT allows individuals to participate and be involved in occupations, through task analysis and identifying, removing or adjusting mobility and/or access to information barriers [12, 13]. This can be achieved through specifically aimed intervention to regain function or using bespoke assistive products to compensate a reduced or inexistent function.

An assistive product consists in any product, instrument, equipment, or technical system, used by a person with a deficit, specially produced to prevent, compensate or neutralise the functional or participation limitation [14], prescribed by the multidisciplinary team [15]. Using assistive products in the workplace requires specific personalised adaptations to each person. Therefore, a careful assessment is made, that connects individual and their work conditions [8].

There are health facilities and other institutions that provide vocational rehabilitation services to restore people's abilities, allowing them to become as independent as possible [16]. Vocational rehabilitation consists in services that help to enter, return and/or maintain a job [12, 17], through interventions such as needs assessment, coaching, workplace adjustment and disability awareness [2, 13]. Anyone who has a

problem in occupational performance, due to illness or injury, and wants to return or increase work quality may benefit from a vocational rehabilitation programme [18].

Occupational Therapists are distinctive in vocational rehabilitation, since they have a broad knowledge and a holistic perspective of physical and psychosocial sciences, activity analysis and organisational behaviour [12, 13, 17].

In a broad way, Occupational Therapists can assume a pivot role regarding the assessment, occupational performance improvement, career exploration, work adaptations, work conditioning, return to work planning, counselling, employers' training [12, 19, 20]; and act like a bridge between employers, physicians, clients and others involved in the rehabilitation process [2, 21].

After a critical revision, no literature was found regarding vocational rehabilitation of individuals with physical and neurological conditions in Portugal. Thus, we aimed on answering the research question "What are the clients and the healthcare professionals' perspectives about OT in vocational rehabilitation in physical and neurological conditions?". A qualitative approach through a case study with exploratory and descriptive goals was used to answer the question above.

The Centro de Reabilitação Profissional de Gaia (CRPG) is a public entity, resulting from the cooperation between the Instituto de Emprego e Formação Profissional (IEFP), Associação de Deficientes das Forças Armadas and the Cooperativa para a Educação e Reabilitação de Cidadãos Inadaptados de Gaia [22]. CRPG clients are people with disability, their families, employers and public work services, promoting active citizenship and quality of life [22]. The institution has social and professional rehabilitation services, qualification/education support, workplace endorsement (awareness, assessment and guidance for qualification and work; promoting recruitment; after-recruitment follow-up; assessment of workplace adaptations needs), finding solutions within public responses that promote work and self-care products (advisement and assessing; production and commercialisation) [22].

It is of interest to say that this study also aims to advance understanding about the role of the Occupational Therapist in this type of services in order to review, develop, and deliver services that provide outstanding health benefits for the people they work with. Furthermore, it seeks to appraise Occupational Therapists' perceptions of their participation in different modalities, in order adjust interventions and interactions with clients and team members to deliver the best service possible. Thus, it acquires great relevance as the occupation and the experience of their clients in all settings must be a concern of the Occupational Therapist.

We must always keep in mind that the practice of OT is based on a dynamic interaction with clients, so it is important to understand their feedback on the benefit of the intervention they receive. Investment in a qualitative study appears to have a good return to the extent that the "findings from qualitative descriptive studies are also readily conveyed by Occupational Therapists to clients or other team members without them requiring an understanding of a theoretical orientation in order to comprehend the findings" [23, p. 34].

2 Ethic Procedures

CRPG authorised the study and all participants read and signed an informed consent to participate in the study and for recording the interview (video and audio).

3 Methods

Qualitative research is used to obtain in-depth participants meanings, representations, symbolisations, perspectives and opinions. Therefore, the conceptual bases of this approach are a lot different from the ones used in quantitative research [23]. When there is not enough theoretical knowledge or precise hypothesis, qualitative research is used to build and comprehend the study object, so hypothesis can be formulated and proved [24]. Since there was not enough literature regarding vocational rehabilitation with individuals with physical and neurological disabilities in Portugal, there was a need for an exploratory research that exposed what is being done and how this is being done. As it is an unexplored territory and only a few niches have been detected in the national context, it is considered that a qualitative approach could be the best option to break ground. Therefore, a qualitative approach was used to build up the foundations for the knowledge on the subject, through the views of those who come closest to the process, particularly the individuals who receive the services and the professionals who deliver them.

The present study has a descriptive-exploratory goal as it tries to describe and comprehend a problem through critical literature review, interviews with participants and an exploration of their insights [25, 26]. To achieve this, case study research was conducted as it is a qualitative research method that explores, describes [27] and observes an environment or an individual [28] in its real context [27]. Several authors, among them Yin [27] and Stake [29] emphasise that the purpose of a case study is to deepen the understanding of the "how" and the "why" of the case, showing its identity and its own characteristics, specially in the aspects that interest the researcher.

Stanley invokes Patton to refer that a qualitative descriptive approach is appropriate for programmes research. Corresponding research questions might be: "What do the clients think of this service?" "What are the clients' perspectives?" This author also states that qualitative descriptive studies bring great potential to OT research, they are especially appropriate for appraising clients and stakeholders' perspectives on a program, service or topic, and the findings can be used to inform quality improvements, more client-focused services and better targeted services [30].

In qualitative research, participants are included if they are linked to the problem studied and/or if they have knowledge about it [31]. For this study the unit of analysis, the case, was OT's intervention in vocational rehabilitation of individuals with physical and neurological disability. In order for case study research to have a solid foundation it requires data acquired from different sources and through different methods. Thus, it was considered to inquire clients and professionals equally, to gather their singular perspectives as they play different roles in the process. Therefore, participants were clients receiving a vocational rehabilitation programme at CRPG, their Occupational Therapists and other healthcare professionals involved in the rehabilitation process.

It is the use of these different instruments that, according to Coutinho [32], allow cross-referencing, assure different perspectives of participants and several measures of the same phenomenon, and create the necessary conditions for triangulation and confirmation of validity of the process. The inclusion criteria for clients were: being aged between 18 and 65 years old; having a physical and/or neurological disability; being included in a vocational rehabilitation programme, with OT intervention. The inclusion criteria for Occupational Therapists consisted in providing vocational rehabilitation to these same participants. In the same way, the healthcare professionals were included if they also provided vocational rehabilitation services to the same client(s) and worked with the Occupational Therapists.

Interview and focal group (with audiovisual support) were used to collect data. With the clients, due to more sensitive issues, the option was to resort to single interview to directly access their thoughts in a most unconstrained environment. Accordingly, semi structured interview was selected to assess the participants' perception, thoughts and ideas about OT interventions and relevance in the rehabilitation process. Audiovisual recording allowed to gather information through observation of the individuals' behaviours [25, 33].

To elicit information from the team members about the shared, specific and focused issue, in this case working with an OT focus group emerged as the best technique to use. During the focus group, a moderator and an observer were present, to capture and register insights on OT work, on its contributions to team and clients' effort towards vocational rehabilitation, and possibly other contributions that could enrich the data obtained.

In order to achieve the objectives foreseen in the research and to improve the reliability and fluidity of the interviews and focus groups, scripts were created and validated by experts in OT and in research tools development.

The meetings were initiated with the exposure of the study purpose, the guarantee of the confidentiality of the contributions and the request of the permission of each one of the participants, so that the conversations could be recorded.

After data was obtained, qualitative content analysis by Bardin method, was conducted. This method consists in communication analysis techniques that use objective and systematic procedures to analyse data content, based on methodological rigorousness that give scientific validity to the study and overcomes subjectivity in data interpretation [34–36].

WebQDA was the software used for content analysis, where data from each participant was verbatim transcribed and codified simultaneously by three members of the research group (in order to achieve intercoder reliability) in semantic categories and subcategories and according to the rules of exclusivity, homogeneity and pertinence. Categorisation is the process by which raw data is transformed and aggregated into units that allow an accurate description of the relevant characteristics of the content (Holsti, 1969 cited by Bardin [37]). Accordingly, the categories were predetermined when the scripts of data collection instruments were created and also emerged from the data. These were mainly related with perceptions about the knowledge of the OT practice and client's satisfaction. The categories are substantiated with quotations.

The sample included six clients, two Occupational Therapists and three healthcare professionals. Participants main characteristics are presented in the following table (see Table 1).

Table 1. Corpus

Participant	Information	
C1 client	Biodemographic	Female, 52 years, Unemployed
	Diagnosis	Ischemic Cerebral Vascular Accident (CVA)/Stroke
	Rehabilitation service	Assessment and advisement of self-care products; Assessment of Activities of Daily Living (ADL) and 3rd person assistance
C2 client	Biodemographic	Female, 39 years, Unemployed
	Diagnosis	Epilepsy and non-identified neurodegenerative disease
	Rehabilitation service	Individual intervention for active life
C3 client	Biodemographic	Female, 59 years, (saleswoman)
	Diagnosis	Ischemic CVA
	Rehabilitation service	Individual intervention for active life; Rehabilitation after acquired brain injury
C4 client	Biodemographic	Female, 38 years, Unemployed
	Diagnosis	Bilateral transtibial amputation
	Rehabilitation service	Assessment and advisement of self-care products
C5 client	Biodemographic	Male, 20 years, Unemployed
	Diagnosis	Cerebral tumor (in remission)
	Rehabilitation service	Individual intervention for active life; Rehabilitation after acquired brain injury
C6 client	Biodemographic	Female, 47 years, Unemployed
	Diagnosis	Cerebral Aneurysm
	Rehabilitation service	Individual intervention for active life; Rehabilitation after acquired brain injury
P1 team professional	Gender	Female
	Job	Neuropsychologist
P2 team professional	Gender	Male
	Job	Speech therapist
P3 team professional	Gender	Male
	Job	Psychologist
OT1 occupational therapist	Gender	Female
	Qualifications	Bachelor's degree in 2001; Working at CRPG since 1997
OT2 occupational therapist	Gender	Male
	Qualifications	Bachelor's degree in 2006; Master's degree in OT in gerontology; Worked in physical rehabilitation and at CRPG since April 2016

4 Results Analysis and Discussion

Data used to address the research question was devised into content analytical units and codified in the categories demonstrated in Table 2.

Table 2. Codified data in categories

Categories	Subcategories	Coding rules
Knowledge of OT	Previous knowledge	References to previous OT contact or knowledge
	Present knowledge	References to present OT knowledge
	Benefits of OT	References to benefits of OT in promoting autonomy, return to occupation (employment), assessment and advisement of self-care products, comparing to team professionals
Client's satisfaction	Assessment and Advisement of Self-Care Products Satisfaction	References to client's satisfaction with occupational therapy role in assessment and advisement of self-care products
	Intervention Satisfaction	References to client's satisfaction with occupational therapy role in overall rehabilitation
OT Process	Meeting Client Needs and Priorities	References to OT intervention responding client needs and priorities
	Promoting Autonomy	References to OT intervention in promoting ADL independence
	Occupation Recovery	References to OT intervention in occupation recovery (employment)

Initially it was compared the previous and the current knowledge that clients had about OT. This data was then compared with the knowledge of other healthcare professionals and confronted with the Occupational Therapists' perspective of what they think the other participants know about their profession.

All CRPG clients had previous contact with OT, in other institutions (C1, C2, C3 and C5) or through friends and/or relatives that previously received OT intervention (C4 and C6). Occupational Therapists referred that clients who had contact with OT before, had difficulties in differentiate Physiotherapy and OT. For example, OT1 mentioned "confusion with OT and Physiotherapy" and OT2 justified this confusion by mentioning that "(…) most of clients' previous intervention was based in rehabilitation services, like in physical medicine rehabilitation centres". The overlap between Physiotherapy and OT had been a point of discussion since the 70's; for example, CVA rehabilitation is one of the main areas where this overlap is verified [38], therefore it was expectable that clients' perception was similar in these two areas.

Occupational Therapists referred differences between OT and the other team members' interventions, mostly because "the goals are completely different. For example, neuropsychological and OT work is similar in this context but the goals are

completely different. Just because we use same techniques doesn´t mean the final goal will be the same." (OT2). Although this may seem counterintuitive in a rehabilitation process, we believe that the interviewee intended to refer that OT provides expertise in functional assessment and observation and the neuropsychologist uses formal assessments to identify changes in cognitive function or identify preserved functions that can be used in the rehabilitation process. Ultimately, the goals are established accordingly to the client's needs and the team should work together to achieve the same final goal that is employment reintegration.

With regards to current knowledge, clients referred that OT intervenes in ADL and Instrumental Activities of Daily Living (IADL), occupation areas well defined in OT Practice Framework [1]. C2 referenced that OT "helps me walking". Walking matches to occupational area "functional mobility", an ADL, target of OT approach with activities that promote muscle strength and/or tools to help mobility [39, 40].

IADL are domestic activities, such as house management and maintenance (C1 whishes "to be capable of ironing"); cleaning and preparing meals (C6 refer "sometimes we have to do the lunches"); computer use for communication, work or leisure management (C1 says "OT teaches to write in computer") and social participation, or, in other words, community activities (C6 mentions "sometimes we go out"). IADL also require social and environmental related skills - the Occupational Therapist intervenes directly in these activities when occupational performance is affected, being one of principal and exclusive OT intervention area [41].

About praxis and motor skills improvement, most of inquired referred to the OT role in upper limb re-education. C1 refers that "OT works (…) with upper limbs", C2 mentions that she stopped trembling so much since OT helped in "hands shaking", C3 says "OT is a help to my arm" and "help to hold and pull" and C5 refers his spasticity in upper limb and the Occupational Therapist worked "to open the hand and things like that". The respondents also affirmed that OT intervention area includes body (according to C1 "OT works the body") and coordination (C1 affirms "OT improves coordination"). As the participants referred, OT intervention improves muscle strength, coordination and dexterity [42]. Work market tendencies and some of population demands, took Occupational Therapists (mainly the ones who work in physical rehabilitation area), to specialise and directing their therapeutic efforts to promote functionality in the upper limb [42–44].

There were also references to OT intervention in cognitive rehabilitation (C6 refers "it is for brain stimulation"). Occupational Therapists have an important role in promoting cognitive function because when deficits are identified, the therapist promotes or maintains a significant and productive life, within client's social and cultural context [45].

Team members mentioned that OT is important in "client's ADL" (P2), allows to have "autonomy in ADL" (P3) and "intervenes in (…) daily life" (P1). There was also mentions to OT approach in skills improvement, like P1 that referred "OT works postures", "gives functionality to the limbs", "gives self-confidence" and "stimulates physical part through motor exercises". P1 added that "working the skills already mentioned is crucial to [vocational] reintegration, once they are connected".

P1 and P2 referred OT broadness of interventions. Also, P3 affirmed "OT potentiates functionality after injury; (…) in functionality assessment or in the design of rehabilitation plans, the Occupational Therapist summarises functional skills profile

and enhances rehabilitation potential". In fact, OT corresponds to a health field related to client's autonomy, allowing the Occupational Therapist to be the best healthcare professional to assess and summarise functional competence in any area [39, 40].

When asked about their perception concerning what others think about their work, OT1 refers "clients know my job", and added "that makes me feel fulfilled". Clients and healthcare professionals referred OT intervention advantages, identifying the use of assistive products, as described by literature [46]. Thus, C1 referred "Occupational Therapist knew products I need". Also, P3 stated "the Occupational Therapist is essential to give functionality, because we need to know what the client stopped doing, what activities can be recovered and what cannot. Thereafter, we can understand what assistive products can be useful for each client". P3 continued saying that "Occupational Therapists give clients assistive products, and they always know a lot of possible devices that we never heard of. This helps clients understanding that they can become functional again".

CRPG clients interviewed about assessment and advisement for assistive products were satisfied - C1 revealed "the electric wheelchair will allow me to be more independent, specially outside, because I do not have to put so much effort like I do with the manual one"; C4 stated "the therapist was really thoughtful and recommended the most suitable wheelchair". Assistive products are important for clients' functionality [42] and to improve occupational performance in work activities, because they can promote job opportunities and provide employment for people with disabilities [10]. When needed, Occupational Therapists use assistive products and/or materials and tools adaptations, that allow clients to perform their activities and create an accessible environment [42, 47, 48].

P1 referred "the Occupational Therapist has a relevant and complementary role (…) with several strategies that are transferred to the other team members". Complementary role with multidisciplinary team was also confirmed by some clients, like C4 that affirmed "the Occupational Therapist has a broad vision that can suppress needs we might have".

Team members referred the importance of including an Occupational Therapist in the team:

- P2, the Speech and Language Therapist, said "OT intervention is more comprehensive, unlike speech therapists, for example, that know specifically about speech";
- P1, the Neuropsychologist, referred "the assessment of the Occupational Therapist is key, because it provides essential information to the team";
- P3, the Psychologist, affirmed "nowadays, the Occupational Therapists' opinions and suggestions about adaptations are supported by scientific statements".

Regarding OT intervention satisfaction, clients' opinion was good and positive (C1, C2, C3 and C4). Some clients recommended it because it was beneficial for them (C2, C3, C4 and C6). One client mentioned improvements with OT intervention - C2 stated "since I have OT, I can see improvements [on upper limb] and so can the therapist".

Some clients also referred work integration through internship programmes, like C5 "I applied to an internship within my rehabilitation process". C5 wanted to be in hotel business, but could only do tasks related to greeting customers, recognising the needs

of tasks adaptations to integrate workplace. Adjusting tasks in order to make them more attuned to the client's capabilities is one of the OT competencies that is easily transferred into the workplace [49].

From the team members' perspective, OT can promote work integration by recommending assistive products, teaching strategies to employers, "can give a job to someone that wasn't functional before" (according to P3) or by direct intervention "in work context" (according to P2). The OT goal, in vocational rehabilitation, is promoting work inclusion for people with disability by, for example, adjusting clients to the task or vice-versa [49].

It was also mentioned that non-working related skills improvement could "increase productivity and allow an individual to engage in a job" (according to P3). According to evidence, young adults who were part of a vocational rehabilitation, with a multidisciplinary team, had improved occupational performance in work, leisure and self-care [3].

OT is crucial to allow improvement on client's autonomy on a number of different activities - C2 refers "I love knitting and OT helps a lot"; C5 states "I can tie my shoes now". Clients also observe results on skills improvement, like C1 "OT helped me control my hands" and C2 "now I have balance (…) so I feel more active". There were also references regarding global autonomy - C6 affirmed "I became more independent".

The healthcare professionals said that clients who had OT intervention "had better upper limb skills", were more independent in "ADL, like lunch" and had "better quality of life" (P3) These are well described OT interventions [50, 51].

According to Occupational Therapists' perspective, there are autonomy improvements - OT2 confirmed "they leave here doing a lot more and we can see results".

CRPG intervention responds to clients' priorities and needs, according to OT1 that affirmed "when Occupational Therapists do not know, they search for the answer". Some clients also mentioned OT answers their personal goals and respects their interests, like C6 that affirmed "helps me (…) give strategies to achieve what I want" and "my interests are being respected".

Occupational Therapists search for client's life experience, expectations and goals. Afterwards, they use their knowledge about how occupational engagement affects health, wellbeing and participation. Therefore, they observe, analyse, describe and interpret occupational performance and identify, both with clients and caregivers, the intervention process [1].

5 Conclusion

Comparing the research results with international literature, it was verified that clients and team members' perspectives correspond to Occupational Therapist skills and intervention, in a vocational rehabilitation programme. Most of the clients associated OT with autonomy, functionality and satisfactory occupational performance in ADL, IADL and work, which are recognised areas of OT intervention in vocational rehabilitation.

Clients and other healthcare professionals recognize the work tools of the Occupational Therapists and their competencies. Their wide range of knowledge contribute

to a unique professional profile in the vocational rehabilitation field either through their particular experience in the use and study of activities, or by the way in which they perceive the complexity and uniqueness of individuals and how they relate to work in its biopsychosocial dimensions.

Study results allowed to describe and explore clients and other team members' perspectives about OT intervention in vocational rehabilitation, as well as to understand how OT intervention contributes to the clients' occupational performance.

It was observed that, in Portugal, a very a small number of institutions are intended to provide vocational rehabilitation services, however only one, CRPG, is currently providing this type of programmes in this area. It was also found the need for greater disclosure of the OT intervention in vocational rehabilitation, according to the other team members' perspective. Considering the favourable results of OT intervention with clients' occupational performance, it would be beneficial to increase the number vocational rehabilitation centres with specialized Occupational Therapists. It was also pertinent to verify that the link between the Occupational Therapist and the employer influences clients' productivity in the work context.

Finally, it can be seen that the different participants, clients and team members, in the study agree that the existence of a professional with an Occupational Therapist competence profile is an asset and enhances the rehabilitation potential of those seeking rehabilitation and vocational training services with the aim of reintegrating in the labour market.

It would be beneficial for collective knowledge to explore more contexts in vocational therapy, in Portugal, with OT intervention, to gather a more comprehensive information about this topic.

Acknowledgments. This paper is the result of a research work that involved students and professors of the Bachelor's Degree in Occupational Therapy of the School of Health Sciences of the Polytechnic of Leiria – Portugal - academic year 2015-2016. The authors acknowledge the collaboration of the Centro de Reabilitação Profissional de Gaia, in particular it's Occupational Therapists.

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Insights and Perspectives About Textual with Visual Data Analysis: The Use of Photos as an Example

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Abstract. Visual data analysis have become a noteworthy approach in qualitative research in the years. This paper presents a content analysis based on a study carried out in tourism field that used visual elements specifically photos, combined with verbal data. The goal is to demonstrate that, always considering the research goals, a more integrated approach to data production and analysis might be a suitable option. The results intend to provide evidence that visual data, in this case photos about lakes, might add value to the findings extracted from textual analysis (description of lakes) and reveal, in some cases, new insights about the object of research. In addition, the procedure of using webQDA, a Computer-Aided Text Analysis (and pictorial) is exposed and explained.

Keywords: Tourism · Visual data · Textual data · Content-analysis · **w**ebQDA

1 Introduction

This paper aims to share the rationale behind a Ph.D study in Tourism and its methodology design based on a mixed-method research (MMR). The main focus of this paper lies on the qualitative stage of a more integrated research. The goal is to provide evidence that, always considering the problem and research objectives, the visual analysis might add value to textual analysis in terms of analytics strategy. For that, an example of the analysis rationale and software tactics from the 1st stage of the study (website content analysis of text and pictures), using WebQDA software is here highlighted. Specifically, this study is about exploring the main image attributes that might potentially influence lake tourism destination, and simultaneously, contribute to conceptualizing and defining lake tourism as recent sub-field of tourism studies [1].

Lake tourism is a growing academic research area with an emerging body of literature. However, little research attention has been given to lake-destinations' projected or perceived tourism images [2]. Due to the goal of this study, a mixed-method design was adopted [3], particularly a *complementarity* approach [4]. The data were first collected in the qualitative stage, then analyzed, and the information was used to develop a follow-up quantitative phase of data collection, which is not covered by his paper. With this in mind, this paper attempts to examined and discuss that a more integrated approach to data production and analysis might, in some cases, be the most applicable option. In this case, a based content analysis of textual and pictorial elements was adopted.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_25

2 Literature Review and Conceptual Frame of Reference

With the advance and growth of the tourism and hospitality industry, more places have been emerging as travel destinations and, therefore, the scope of image studies has expanded [5]. Thus, in this investigation the destination image (DI) concept and nature is applied to lake tourism and LDAs as a non-traditional destination, which has been completely absent from DI studies since the starting point in the 1970s. More precisely, there has been a scarcity of literature investigating the attributes involved in the formation of a lake-destination image. In this sense, apart from assessing the image of a lake-destination, this study also aims to identify characteristics and dimensions of lake tourism as a study field, attempting to enrich tourism theory. It is important to note that lakes are open water bodies, dams or reservoirs which might represent a valuable resource for a variety of human activities. In addition, lakes might also become an important resource for tourism development, based on their landscape features, flora, fauna and cultural attractions [6].

Based on this aim and mainly because this is an exploratory study about DI structure or nature [7], a combination of two DI theories and scales were used [8, 9]. The former because it helped to understand that LDAs can also be assessed through more tangible or intangible attributes (a cognitive component which includes functional and psychological attributes), common *vs.* unique attributes that really can differentiate the destination and a more holistic or *gestalt* image *vs.* an image more focused on particular attributes; the latter because Beerli and Martín [9] propose a framework that includes every aspect of the destination of DI based on nine image categories or dimensions (natural resources; general infrastructure; tourist infrastructure; tourist leisure and recreation; culture, history and art; political and economic factors; natural environment; social environment; and atmosphere of places).

Considering the previous literature review discussion, the conceptual frame of reference of this study is presented in Fig. 1.

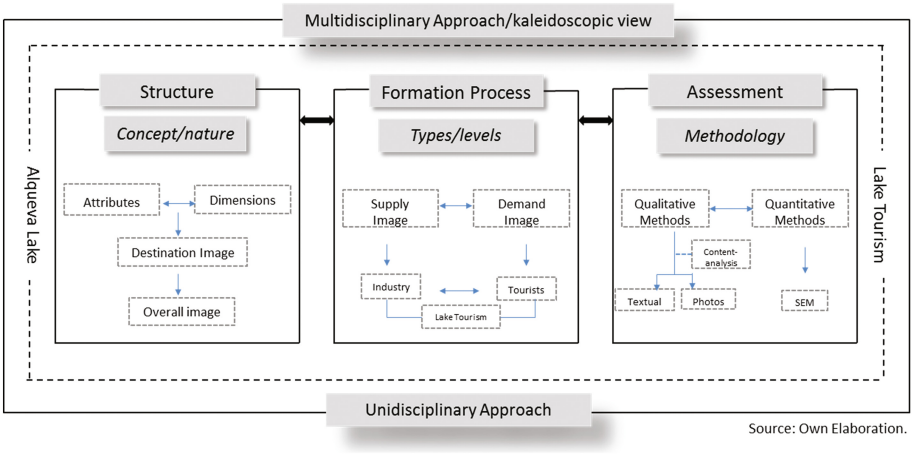

Fig. 1. Conceptual framework of the study

This conceptual frame of reference is grounded on a mindset with two angles that are related to one another as a part of a whole [11]. The 'multidisciplinary approach' (MA) is considered here as a precondition, a prerequisite to undertake a DI assessment as a result of theoretical complexity and limitations of this construct continuously pointed out by several authors [8, 12–14]. This corresponds to Gallarza *et al.* [13] named as a 'kaleidoscopic view' of the construct. The idea is that DI is a multidimensional construct that constantly requires an open way of thinking of the researcher, in exactly as the same way as tourism as an academic field. DI is a construct that intersects with perspectives, standpoints and theoretical predilections from several other disciplines.

Alongside the 'unidisciplinary approach' (UA) with regard to the scope of this study, there is a marketing viewpoint of destination image. This study is embraced by marketing theory in general, destination marketing in particular and even more precisely, destination image as a research topic. Considering this approach, the frame of reference illustrates three lines of inquiry in DI research [13, 15] (structure, formation process and assessment) from which the main theoretical and empirical contributions for this study arise. From here, the study site was located at the Alqueva Lake as an emerging destination in the Alentejo region in the south of Portugal. This new resource, the lake itself, has offered a naturally defined unit for tourism development since the reservoir started to fill up in 2002.

3 Aims of the Study and Research Design

Framed by the previous discussion, this study soon posed the following question [10]: *Since the Alqueva Lake is at the very beginning as an lake-destination area, how can image as a marketing tool contribute to this process?* Having this as a starting point, a line of reasoning emerges based on depicting potential image attributes that might contribute to the development of lake tourism, particularly LDAs, with the Alqueva Lake as the study site. In other words, this study posits that an image assessment study of a recent type of tourism, such as lake tourism, presupposes a deeper understanding of the characteristics and dimensions of this particular typology. Further, since there is an absence of information concerning the characteristics of lake tourism in general and the dimensions and attributes involved in the formation of a lake-destination image in particular, four general goals were primarily defined:

1. To define the theoretical bases of this thesis and the conceptual frame of reference, particularly by investigating the two main domains of this study: DI and lake tourism;
2. To investigate the nature of lake-destination image and identify a set of image variables that might form the image of LDAs;
3. To test a model of image formation in order to assess image dimensions and propose a set of image variables that create the image of this type of destinations;
4. To discuss and propose courses of action that might be implemented to improve the image, positioning, and competitive advantages of LDAs, particularly applied to the Alqueva Lake as the biggest man-made Lake in Europe.

Considering the goals of this study, not only to extract and identify a set of image variables that might form the image of lake-destination areas, but also to investigate the

nature and the concept of lake tourism, in order to contribute to a theory building process, this study advocates that a MMR approach, first qualitative and then quantitative should be the most suitable way to more freely extract a complete image of a place. In the last decade multimethod studies have been increasing in this field of research [7, 16, 17], even more so when the object under study is a very recent field of research, such as lake tourism. The central argument of MMR is that a combined use of qualitative and quantitative approaches provides a better understanding of research problems than either approach alone [4].

The methodological approach is then comprised of a three-phase model (Fig. 2) with an initial or preliminary phase to specify the domain of the constructs and identify the main DI attributes in existing literature.

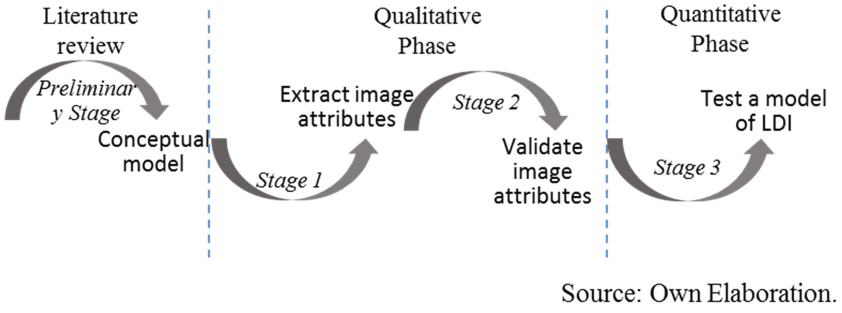

Fig. 2. Methodological approach: three-phase model. Source: [10]

Firstly, 1st stage to extract image attributes more related to LDA and explore lake tourism concept; secondly, 2nd stage to assess the applicability of items/attributes in an existing LDA, and 3rd stage to test a lake a model of lake-destination image. The research design, analytics strategy and software tactics of 1st stage, website content-analysis of texts and pictures in order to extract image attributes, is here highlighted in this paper.

4 Analytic Method

As previously mentioned this section intends to share the analysis strategy and software tactics from the 1st stage of the study. A website containing texts and visual stimuli was used as the *corpus* for content analysis procedure. Despite the fact that tourism researchers have been reluctant to place confidence in the use on computer-aided text analysis (CATA) as concluded by Stepchenkova and Mills [5] in their meta-analysis paper, the analysis process was done with the help of WebQDA (Web Qualitative Data Analysis). This is qualitative software which carries out qualitative data analysis individually or collaboratively, synchronously or asynchronously [18].

Regarding the literature review and the conceptual framework of the study, this stage is supported by the following research questions:

1. What are attributes are involved in the image formation of lake-destinations areas?
2. What are the main characteristics of lake-destinations areas that might contribute to conceptualizing lake tourism as a new form of tourism?

In order to respond to these questions, an exploratory study was conducted using an online environment by analyzing contents of a lake-related website as a source of information (cf. http://www.lakelubbers.com). The destination identity projected in online environments in the context of marketing has been investigated over the last decades. For instance Govers and Go [19] examined the destination how Dubai is being projected through the use of photographic imagery and narratives in an online environment. There are some studies that validate the use the multimedia interactive nature of the Web can add a whole new dimension to destination marketing [20].

Lakelubbers is an online directory for lake enthusiasts containing a worldwide database of about 1695 lakes and reservoirs spread throughout the world. Each lake contains a description by people who love lakes, true connoisseurs of inland bodies of water, named as 'lakelubbers', according to the website. It seems appropriate to deem that this is a suitable data base since the aim is to generate a sample of image attributes specifically related to the lake tourism context. Table 1 displays the result of the unitizing and sampling procedure of content analysis. A total of 40 lake descriptions (textual data) and 124 photos (pictorial data) from the sampled website were collected and grouped by country to constitute the sample of this study.

The analysis is presented next divided by textual and pictorial data.

Table 1. Unitizing and sampling procedure of content analysis

Country	Lake	Code	Nº of photos	Country	Lake	Code	Nº of photos
Austria	Attersee Hallstätter See	AU01 AU02	5 5	Macedonia	Lake Ohrid Lake Prespa	MA21 MA22	5 1
Bulgaria	Smolyan	BU03	0	Netherlands	Lake IJssel Lake Markermeer	NE23 NE24	2 3
Croatia	Plitvice	CR04	5	Norway	Hornindalsvatnet Lake	NO25	3
Finland	Saimaa Päijänne	FI05 FI06	5 5	Poland	Śniardwy Lake Ilawa Lakeland	PO26 PO27	0 0
France	Lac d'Hourtins-Carcan Bourget	FR07 FR08	0 3	Portugal	Alqueva Lake	POR28	5
Germany	Constance Muritz	GE09 GE10	5 2	Russia	Lake Ladoga Rybinsk Reservoir	RU29 RU30	0 0
Greece	Kerkini Volvi	GR11 GR12	O O	Slovenia	Lake Bohinj Lake Bled	SL31 SL32	5 6
Hungary	Balaton Heviz	HU13 HU14	5 1	Spain	Las Salinas de Torrevieja Lake Sanabria	SP33 SP34	5 4
Iceland	Thingvallavat Skorradalsvatn	IC15 IC16	4 2	Sweden	Vanern Vättern	SW35 SW36	4 3
Ireland	Lough Foyle Lough Corrib	IR17 IR18	2 5	Switzerland	Lake Geneva Lake Neuchatel	SWT37 SWT38	4 4
Italy	Garda Maggiori	IR19 IR20	5 5	United Kingdom	Lough Neagh Lough Foyle	UK39 UK40	4 2

Source: [10]

4.1 Analysis of Textual Data

A sample of the 40 texts (units of analysis) was used for content analysis from the *Lakelubbers* website regarding the two research questions previously presented. In terms of coding procedure, firstly a holistic method of coding was used "as a preparatory approach to a unit of data before a more detailed coding or categorization process" [21]. Based on the coding procedure of webQDA through free nodes it was possible to identify the following two main themes directly linked with the lake tourism concept with the corresponding segments: (i) the lake itself and lakeshore (178 coded segments) and (ii) the destination/surrounding region (157 coded segments). This coding method broke the text into broad topics, which contribute to explore and identify in a more organized way basic elements of lake tourism. This step allowed having a first glance at the relevant attributes of lake-destination areas. It´s important to remind that the goal of this stage was not only to identity image attributes, but also to explore lake-destination areas and lake tourism concept. The 'holistic method' of coding allowed digging into lake-destination areas and starting to understand the concept of lake tourism.

From here, a more deductive approach was undertaken and an external analytical framework based on a theoretical schema was used to code [9]. In fact, the goal here was to conceptually validate or extend a theoretical framework of DI by Beerli and Martín [9], but applied to the lake-destination context. The results of a direct coding procedure are shown in Table 2, where "Tourist Infrastructures" and "Natural Resources" are the most coded categories (with 231 and 223 segments, correspondently), based on tree nodes of webQDA. Figure 3 exhibit the procedure in webQDA.

Table 2. Results of the coding procedure from webQDA software

Category	Nº of segments	Category	Nº of segments
Natural resources	222	Political and economic factors	37
General infrastructure	37	Natural environment	108
Tourist infrastructures	231	Social environment	7
Tourist leisure and recreation	219	Atmosphere of the place	114
Culture, history and art	134	**Total of segments**	**1110**

Source: [10]

After having 1110 segments of text coded in the corresponding category, a more 'inductive procedure' was used in order to generate sub-categories. This procedure gave rise to 23 sub-categories freely generated, through a process of defining categories and sub-categories and development of the corresponding survey items as the first task in content-analysis. Each reference, sentence or a block of sentences was allocated to the corresponding sub-category. After this, a descriptive method that summarizes in a word or short phrase – most often as a noun – was adopted [21].

Based on this, a final composite list of image attributes mostly related to LDAs was extract with a set of over 100 potential variables (see Table 3).

Table 3. Defining dimensions and attributes of lake-destination areas from content-analysis procedure

Categories (deductive approach)	Sub-categories (inductive approach)	Attributes/Properties (some examples)
A. Natural Resources	A.1. Physical features of the lake A.2. Richness of nature A.3. Weather	A.1. Origin, type, surface, depth, elevation, length, topography (…) A.2. Protected Areas, flora and fauna (birds, fish); sky, beaches, islands (…) A.3. Temperature, snow, frozen or unfrozen lake (…)
B. General Infrastructure	B.1. Development and quality of roads B.2. Transport facilities B.3. Nautical facilities and other infrastructures	B.1. Access roads to the lake; circular drives. B.2. Existence of nearby airport; between villages around the lake; between lakes; between islands on the lake; B.3. Marinas, ports, public ramps, boat slips, public piers, berths, swimming areas; boardwalks (…)
C. Tourist Infrastructure	C.1. Accommodation and catering facilities C.2. Available packages C.3. Signed trails and paths C.4. Tourist services and information	C.1. Caravan parks, cottages, real estate, camping, hotels, chalets, vacation rentals (…) C.2. Sightseeing tours, excursions, cruises (half-day, whole-day, evening, lunch), fishing trips (…) C.3. Bicycle trails, climbing trails, hiking trails, nature/scenic trails, walking trails (…) C.4. Maps, tourist offices, visitor/information centres, nature centres, picnic areas, rental services), charter services (…)
D. Tourist Leisure and Recreation	D.1. Water activities, sports and recreation D.2. Land-based activities, sports and recreation D.3. Winter activities, sports and recreation D.4. Entertainment and Events	D.1. Boating, boardwalk, canoeing, fishing, houseboating, lake sightseeing, kayaking, kite-surfing, sailing, swimming D.2. Biking, birdwatching, climbing, hiking, paragliding, picnicking, sightseeing, rock climbing trekking, walking. D.3. Alpine and Nordic skiing, dog sledding, ice fishing, ice skating, ice climbing, snowboard, snowshoeing, toboggan, D.4. Sport competitions (regattas, tournaments, parades), themed events (wine festivals, evening parties), local attractions (swimming pools, casinos), nightlife

(*continued*)

Table 3. (*continued*)

Categories (deductive approach)	Sub-categories (inductive approach)	Attributes/Properties (some examples)
E. Culture, History and Art	E.1. History of the lake and surrounding region E.2. Museums and historic buildings E.3. Cultural Attractions and Events E.4. Gastronomy	E.1. historic ruins, archaeological ruins and artefacts, local architecture, legends/stories, caves, UNESCO E.2. Museums, castles, fortresses, fortifications, churches, monasteries, abbeys, chapels, cathedrals, monasteries, (…) E.3. Music festivals and demonstrations, concerts, recitals, exhibitions, theatre, dance performances. E.4. Local dishes, wine, (…)
F. Political and Economic Factors	F.1. Geographical location and territorial division F.2. Lake purposes (past and present)	F.1. Location, countries and region boundaries, geo-political significance of the lake F.2. Salt extraction, fishery, energy production, supply of drinking water, agriculture, transportation
G. Natural Environment	G.1. Attractiveness of the communities G.2. Beauty of the landscape/scenery	G.1. Historic villages, mountain villages, cities, hamlets, lakeside towns, small towns, (…) G.2. Rural, natural, alpine, mountain, vineyards, orchards, vegetable farms, deep valleys, foothills, alpine
H. Social Environment	H.1. Host Community	H.1. Presence of local people, way of life, hospitality and friendliness.
I. Atmosphere	No sub-category	Active, amazing scenery, breathtaking views, challenging, dramatic scenery, friendly and family-oriented lake, inspired, simplicity, tranquillity, beauty, memorable, outdoor destination, picturesque, quiet, rejuvenation, relaxing, unspoiled, romantic

Source: [10]

4.2 Analysis of Pictorial Data

Figure 3 illustrates the procedure adopted for pictorial content analysis, where 124 photos were content analyzed first in terms of *motifs* and then in terms of *theme* [22]. The goal here was to complement, with visual data, the textual analysis previously explained.

In the first instance all the *motifs* (objects or appearances) shown in every image were identified using WebQDA software. The *motifs* were then isolated, registered, and freely described without any constraints through the use of colorful boxes which encircle them, each one with a spontaneous commented. The method was based on using some principles of iconography. Other studies follow this procedure [19, 22–24].

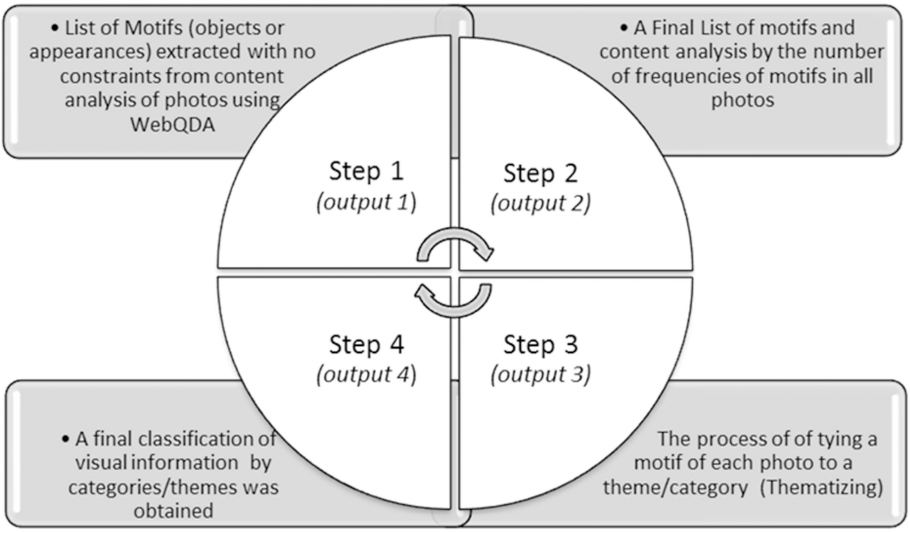

Fig. 3. Procedure of the pictorial data content analysis. Source: [10]

Figure 4 displays an example of an output from the procedure of pictorial data content analysis.

In the first instance all the *motifs* (objects or appearances) shown in every image were identified using webQDA software. The *motifs* were then isolated, registered, and freely described without any constraints through the use of colorful boxes which encircle them, each one with a spontaneous commented. The method was based on using some principles of iconography. Other studies follow this procedure [19, 22–24]. Figure 4 displays an example of an output from the procedure of pictorial data content analysis.

Based on this methodology, all the *motifs* were first listed, and only after this were they submitted to a process of filtering, clustering or cut-off. An organized list of motifs was obtained (42 in total) in order to measure the frequency of each motif/object present (or not) in all photos (Step 2). Next, with each photo being a case, for each object a count was done to indicate if the specific object appeared in the picture or not. The process of tying each motif to a theme (thematizing) was conducted (Step 3). In sum, this visual method obtained 42 motifs related to LDAs, organized into five categories. Finally, a final classification of the visual information was obtained (Step 4). Table 4 shows the final result of the categorization procedure of photos (for more information see [6].

Among the total of 124 photos, 47 were classified as category 1 “Natural Elements”, only based on the presence of natural pictorial such as sky, flora, fauna, lake water, landscape, islands, etc. This is undoubtedly the most important category associated with lakes. Secondly, in order to confirm the relevance of nature, but also the surrounding environment of lakes, category 5 “Natural Environment” appears next, containing 23 photos. The photos classified in this category associated motifs based on the natural elements previously described with the presence of villages on the lakeshore, houses, etc. This is also an important category, as textual analysis revealed.

Fig. 4. An example of an output from the procedure of pictorial data content analysis (Source: webQDA web-based computer application. Photo from Lakelubbers website available at www.lakelubbers.com/ (accessed on 12.12. 2013)

Table 4. Visual information on the five sub-categories/themes

Category	Nº of images	% of images
1. Natural elements	47	38
2. Infrastructures	22	18
3. Activities and recreation	20	16
4. Culture and heritage	12	10
5. Natural environment	23	19

Source: [6]

Category 1 "Natural Elements": physical characteristics directly related to the lake.

Category 2 "Infrastructures": Facilities and infrastructures which allow access to and navigating on the lake.

Category 3 "Activities and Recreation": different types of sporting and recreational activities that take place on the lake and surrounding region.

Category 4 "Culture and Heritage": Cultural and historical attractions that provide insights into the history of the territory.

Category 5 "Natural Environment": Includes communities with visible natural elements creating an atmosphere on and around the lake.

Fig. 5. Photos used in pictorial content analysis representing the five categories [10]. Photos from Lakelubbers website available at www.lakelubbers.com/ (accessed on 12.12. 2013)

Thirdly, and following immediately, was category 2 "Infrastructures" containing 22 photos with this classification, mainly based on motifs related to nautical infrastructures (marinas, slips, harbours, etc.). Fourthly, 20 photos were classified in category 3 "Activities and Recreation" containing the presence of motifs such as sailing, boating, fishing, etc. This is the category that surely contributes to transforming lakes into a meaningful experience, an important dimension in the lake tourism concept as textual analysis revealed. Finally, the least representative, category 4 "Culture and Heritage" with only 12 photos, which apparently indicates that this is not the central resource of lakes.

In order to conclude the analysis procedure of visual data, Fig. 5 shows an example of the 124 photos used in content analysis representing the five categories/themes.

5 Findings

The content analysis of text and pictures was conducted separately. For that reason the findings are also presented separately. The textual analysis is crucial to respond to both research questions, and the results from visuals are considered to be supportive.

5.1 Findings from Textual Analysis

Research Question 1: What are attributes are involved in the image formation of lake-destinations areas?

The initial set of image attributes extracted from the literature review reveals that they are too generic (e.g. landscape, sport facilities, culture attractions, accommodation). The list was considered inadequate and did not incorporate all salient attributes for lake-destination areas. Through a deductive approach nine image categories were determined based on Beerli and Martín [9], namely "natural resources", "general infrastructure", "touristic infrastructures", "tourist leisure and recreation", "culture, history and art", "political and economic factors", "natural environment", "social environment", and "atmosphere". Simultaneously, through a more inductive approach, 23 subcategories in total were identified for these nine categories (see again Table 3). For each sub-categories items/attributes that characterize the image formation of LDA were defined.

Research Question 2: What are the main characteristics of lake-destinations areas that might contribute to conceptualizing lake tourism as a new form of tourism?

The initial coding, using the holistic method, promptly identified two main themes in each lake's description: (i) the lake itself and lakeshore, and (ii) the destination/surrounding region. The former consists of all the elements that take place on the lake and lakeshore which are directly related to it (natural characteristics, activities, infrastructures); the latter incorporated the same elements but now located in the surrounding region. With this in mind, three spatial levels in terms of tourism development came out: (i) development on the lake itself as the main resource of this type of tourism; (ii) development on the lakeshore, intertwined with the (iii) development of the surrounding region. Therefore, it was possible to identify the following five main dimensions of lake tourism as field of tourism studies: (i) Resource Dimension;

(ii) Supply Dimension; (iii) Logistical Dimension; (iv) Organizational Dimension; (v) Image Dimension.

5.2 Findings from Pictorial Analysis

The results were similar to those of the text content analysis.

Research Question 1: What are attributes are involved in the image formation of lake-destinations areas?

The applied visual method obtained 42 motifs or attributes. The motifs range from water, sky, landscape, vegetation on the lakeshore, flora and fauna to nautical infrastructures, villages, culture, monuments, activities (swimming, fishing), among others, very similar to the textual analysis results. As explained in the methods section, after listing and analyzed all the motifs of the photos, it was necessary to add meaning to the photos by a classification into five categories as depicted in Fig. 6, which are: (i) Natural Elements; (ii) Infrastructures; (iii) Activities and Recreation; (iv) Cultural and Heritage; (v) Natural Environment.

Research Question 2: What are the main characteristics of lake-destinations areas that might contribute to conceptualizing lake tourism as a new form of tourism?

Regarding the 2nd research question, the pictorial analysis did not add any new information to textual findings. However it validated the textual findings with pictorial elements, which is gives insights and perspectives about the study that should be taken into consideration. It corroborates the conclusion from textual analysis that "natural environment" is a very important dimension for lake tourism, since there are many motifs/attributes related to the atmosphere, environment, etc. (images of the lake, landscape, vegetation, etc.).

6 Conclusions

With regard to the nature of lake-destination image, the results indicate that attributes related to lakes can be classified and incorporated into nine dimensions/categories and subcategories [9]. These categories and sub-categories extract from the content analysis identify important image attributes that could be used explored a tourism promotion campaign. Simultaneously, it was evident that in this case lake-destinations are mainly formed on the basis of cognitive image according to Martín and Rodríguez del Bosque [7], with functional (more tangible) and psychological (more abstract) image attributes, which might be more attribute-based or a more holistic impression.

Regarding the nature of lake tourism concept, this research empirically identifies the existence of a lake tourism definition and specific characteristics of this form of tourism. It is clear that the lake itself is the core resource for the development of lake-destinations enhanced by other resources and infrastructures located in the surrounding region. In fact, natural features of lakes such as its surface, length, origin, etc., are important elements that should be considered when promoting the lake. It was also interesting to observe that communities located on the lakeshore or near the lake add an important value to lake-destinations, since in many cases they are considered a

base-camp, a starting point for visiting the lake, the idea of 'gateways' as described by Gartner [14]. Simultaneously, the existence of some services and infrastructures such as accommodation on the lakeshore, available packages, marinas, ramps or slips, rental services (e.g. fishing or boating), or signed trails around the lake surely contribute to transform a neutral landscape like a lake into a meaningful experience [2].

There were some inherent limitations to this study. Content analysis is exploratory and is based on subjective judgments to some extent. Furthermore, an exhaustive examination of 42 units of analysis about lake description was made to collect image attributes related to this object. However, the findings may still not fully represent the image of LDA. At some point the units of analysis were too repetitive, containing a very similar text structure. Additionally, lake lovers' viewpoints may not be fully representative of the travelling public. Nevertheless, by analysing the contents of information provided by a lake lovers' online directory ('lakelubbers'), this preliminary qualitative study confirms that several dimensions and attributes exist specifically related to LDA. One should recall that the goal here was mainly to extract image attributes and not to analyse how lake-destinations are represented on the web, since this is a very recent form of tourism and has not yet been explored in online environments.

Lastly, this paper demonstrates that are advantages in using a more integrated approach in data analysis, by combining textual with visual elements. In this case, the visual results allowed us to corroborate the textual results and also give some new insights about lakes and their main image attributes. Further research will continue on this line of though, demonstrating that mixing visual data and visual methodologies might add value to qualitative studies.

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Use of Software in Qualitative Health Research in Brazil: A Scoping Review

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Abstract. The objective of this study is to identify the use of software in qualitative studies produced within the framework of Brazilian postgraduate programs in the health area. This scoping review was carried out from the Thesis Bank and Dissertations of the Coordination for the Improvement of Higher Education Personnel (CAPES). Dissertations and theses produced in the scope of Brazilian postgraduate programs in the health area configured as qualitative studies using software were analyzed. Data were analyzed by simple descriptive statistics. The final sample consisted of 306 studies. Seventeen software programs were used, some in combination. Emphasis was placed on the central role of the researcher in qualitative research. We conclude that the use of software in qualitative Brazilian studies in the health area, although still incipient, have increased, indicating a concern for innovation in research methods due to current demands for the methodological rigor of qualitative investigations and the creativity of the researcher.

Keywords: Qualitative research · Software · Health personnel · Health postgraduate programs

1 Introduction

Qualitative research is understood as capable of incorporating meaning and intentionality being inherent to acts, relationships and social structures. In this way, the search for qualitative methodologies is related to subjective study questions, characterized by dynamism and the interaction of the subjects [1].

In the scope of a discussion regarding the methodological deepening necessary to guarantee the quality and rigor of research, are elements related to methods and techniques for analysis of qualitative data, which are often presented as a labyrinth of possibilities and paradigms [2]. In this context, the data analysis phase is seen as a reason for anxiety and insecurity for a large number of postgraduate students [3].

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_26

In addition, technological advances in the current scenario have provided new approaches to data collection and analysis methods which are no longer limited to paper and pencil. With these innovations, researchers are not overloaded with manually handling data, and data analysis is optimized by the use of software programs [4].

In this perspective, several software programs have already been developed to facilitate managing qualitative data. Since the introduction of the first Computer-Assisted Qualitative Data Analysis Software (CAQDAS), developed in the 1960s and later popularized in the 1980s and 1990s, software packages have become more specialized for the specific method of qualitative research. Some CAQDAS use only text, while others can import images, audio and video data, newspaper clippings, and books [4].

Among the benefits already highlighted in literature, we can emphasize that the use of qualitative data analysis software has not only increased the perceived legitimacy of qualitative research, but also concerns about its impact and rigor [5, 6].

Thus, we can affirm that the use of software in textual analysis is a path from which one cannot deviate, and that it has elucidated new challenges for researchers who need to learn how to effectively use these software programs in their research [3]. It is in this context that the research question of the study in question is presented: How have Brazilian researchers used software in qualitative research in the health area?

Therefore, our objective is to identify the use of software in qualitative studies produced within the scope of Brazilian postgraduate programs in the health area.

2 Methodology

This is a scoping review guided by the recommendations of the JBI Institute Reviewer's Manual [7], following the theoretical framework proposed by Arksey and O'Malley [8].

The study population consisted of dissertations and theses produced in the scope of postgraduate programs in the Brazilian health area, which were configured as qualitative studies that used software. PCC strategy was used to formulate the research question, as described: P (Population) – Qualitative research; C (Concept) – Software; C (Context) – Brazilian postgraduate programs in health. Thus, the following question guided the scoping review: How have Brazilian researchers used software in qualitative research in the health area?

A preliminary search was initially carried out in the JBI COnNECT+, DARE, The Cochrane Library and PROSPERO databases, and no protocols or reviews with similar themes were identified. Thus, the research was carried out using the Theses and Dissertations Bank of the Coordination for the Improvement of Higher Education Personnel (CAPES), a database that gathers the dissertations and theses defended in the Brazilian context. Monographic works were chosen as the field for data collection, as they are studies that present more in-depth information regarding the methodology implemented in the studies.

The search was performed through a combination of two descriptors extracted from the Descriptors in Health Sciences (DeCS), which corresponded to the two initial elements of the PCC mnemonic of this research - (P) Qualitative research AND (C) Software. In addition, a Concentration Area filter available on the database was

used to select the areas corresponding to the graduate health programs, which set up the other (C) of the implemented mnemonic.

Dissertations and theses produced in the scope of graduate programs in the Brazilian health area, published in full online, and that were configured as qualitative studies using software were included.

No time limit was stipulated. However, since the used database had undergone recent updates, some limitations were found in the search and selection of studies: (1) only abstracts from studies published between 2013 and 2016 were available; and (2) abstract availability was limited to the first 10,000 studies available. As a first step of the analysis, titles and abstracts of all identified studies were evaluated based on the established inclusion and exclusion criteria. However, this was only possible for the first 10,000 studies due to the limitation established by the database itself.

Publications selected for complete reading were subsequently recovered in full and the data were extracted. Forty-two (42) studies were excluded in this last stage: 40 because the full version was not available online, and 2 for not using qualitative software (Fig. 1).

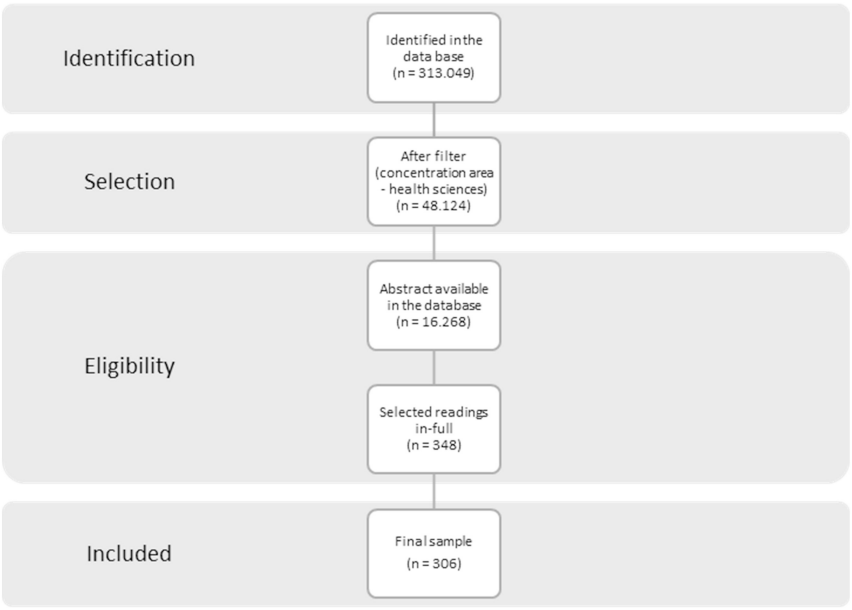

Fig. 1. Flowchart of data collection (in absolute numbers).

The following data were extracted from the selected studies to compose the final sample, based on a spreadsheet built in Microsoft Excel 2010: Academic level; year of publication; institution of Higher Education; author's graduation; research type and approach; qualitative software used; stage of the software was used; benefits of using the software; and difficulties encountered in using the software.

Data were analyzed from simple descriptive statistics. No ethical appreciation was necessary, as this is a survey using public studies.

3 Results

The final sample consisted of 306 studies: 189 (61.8%) academic master's studies; 91 (29.7%) doctorate studies; and 26 (8.5%) professional masters. Due to the limitation established by the database used, the temporal dimension of the selected studies ranged from 2013 to 2016, with the highest number of studies published in 2015 (95; 30.9%).

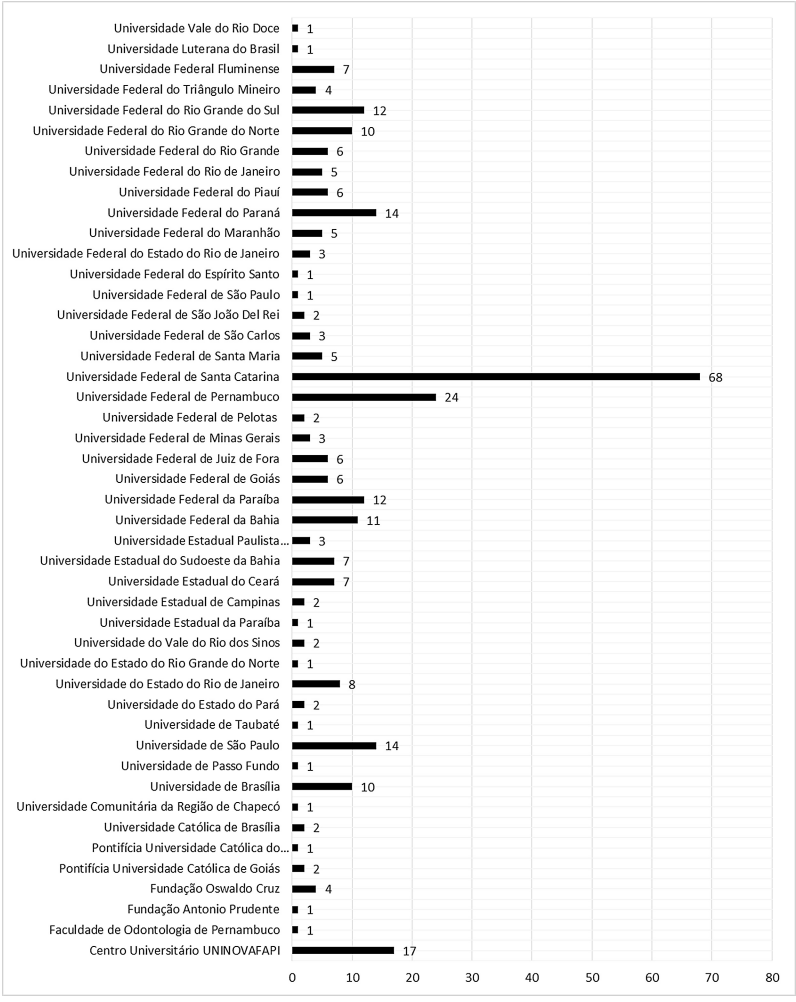

Fig. 2. Higher Education Institutions in which the studies were developed (in absolute numbers).

The authors of the analyzed papers came from 13 different graduate programs. The Nursing field was predominant with authors of 239 (78.4%) studies. The other graduation areas were: Physical Education (19, 6.2%); Psychology (10; 3.3%); Physical therapy (9; 2.9%); Medicine (9 2.9%); Nutrition (5; 1.6%); Dentistry (4; 1.3%); Pharmacy (4; 1.3%); Speech-Language Pathology (2; 0.6%); Biological Sciences (2; 0.6%); Law (1; 0.3%); Philosophy (1; 0.3%); and Pedagogy (1; 0.3%).

The analyzed studies were developed within the framework of 46 different Higher Education Institutions, with special attention to: the Federal University of Santa Catarina (68; 22.2%); the Federal University of Pernambuco (24, 7.8%); the UNINOVAFAPI University Center (17; 5.6%); the Federal University of Paraná (14, 4.6%); and the University of São Paulo (14, 4.6%) (Fig. 2).

By grouping the federal units of the Institutions of Higher Education where the studies were developed by Brazilian geographic regions, we can emphasize the South (113; 37.1%) and the Northeast (102; 33.3%), followed by the Southeast (69; 22.5%), Central West (20; 6.5%) and North (2; 0.6%).

Regarding the type of research according to information elucidated by the authors of the analyzed dissertations and theses, descriptive research predominated (132, 43.2%), followed by exploratory-descriptive studies (98; 32.0%), exploratory studies (27; 8.8%), evaluative studies (4; 1.3%), experimental (3; 1.0%) and methodological studies (2; 0.6%). We emphasize that 40 (13.1%) studies did not include this information.

Table 1. Software programs used in the analyzed studies (N = 306).

Software	n	%*
Atlas.ti	69	22.5
Nvivo	58	19.0
Alceste	54	17.6
IRAMUTEQ	54	17.6
EVOC	33	10.8
Qualiquantisoft	18	5.9
WebQDA	8	2.6
Etnograph	7	2.3
Tri-deux-mots	6	2.0
MaxQDA	3	1.0
OpenLogos	3	1.0
oTranscribe	1	0.3
ELAN	1	0.3
AnCo-Redes	1	0.3
f4 Plus	1	0.3
Express Scribe	1	0.3

*The sum is greater than 100.0% as some studies used more than one software

With regard to the research approach, 241 (78.8%) studies used only the qualitative approach, while 65 (21.2%) used a mixed approach, combining quantitative and qualitative analyzes.

Seventeen qualitative software programs were used in the analyzed dissertations and theses; their use was combined in 14 (4.6%) studies (two software programs in the same research). The five most used programs were: Atlas.ti (69; 22.5%); NVivo (58; 19.0%); Alceste (54; 17.6%); IRAMUTEQ (54, 17.6%); and EVOC (33; 10.8%) (Table 1).

As to the research stage where the software was used, 232 (75.8%) authors reported using it for data analysis, 117 (38.2%) for data treatment and 4 (1.3%) for data transcription.

Table 2 presents the benefits and difficulties faced in using qualitative software as highlighted by the authors. We emphasize that 214 (70.0%) studies did not indicate the benefits, and 294 (96.1%) did not highlight the difficulties.

Table 2. Benefits and difficulties faced in using qualitative software (N = 306).

Benefits	n	%*
It optimizes data organization, reducing time and increasing security	62	20.3
It enables different types of data analyses	52	17.0
It offers greater methodological rigor to research	15	4.9
It enables high-volume analyses of texts	10	3.3
It allows analysis and management of different types of documents	7	2.3
It allows researchers more time to dedicate to the analytical stage	4	1.3
It offers innovation to qualitative research	3	1.0
It is flexible for different types of research	2	0.6
It is free *software*	2	0.6
It stimulates researcher creativity	1	0.3
It enables analysis by a group of researchers	1	0.3
Difficulties	n	%*
It demands researcher's time to learn how to use it	6	2.0
It does not exclude the role of the aware and critical researcher	4	1.3
Complexity of the analysis	2	0.6
Risks of misinterpretation due to misuse	2	0.6
Software language	1	0.3
Costs for program acquisition	1	0.3
Possibility of software overload due to textual volume	1	0.3

*The sum is greater than 100.0% as some studies used more than one software

4 Discussion

A predominance of academic masters courses and higher education institutions located in the Southeast region is in line with the quantitative distribution of postgraduate programs in Brazil [9].

Regarding the ascending number of qualitative research using software, a similar study conducted a search in the Capes Portal to verify the use of software in qualitative studies in Brazil from 2010 to 2014, and also identified that although the use of software in qualitative research is still modest in the Brazilian context, it has grown considerably in recent years [3].

This research was not restricted to health studies, however, it only included 33 dissertations and theses in its final sample, despite including a five-year time dimension (2010 to 2014), compared to the four-year dimension (2013 to 2016) of the present study. Nonetheless, the criteria used to select the papers are not clear in the article [3]. In addition, recent instability and database updates may also have influenced the difference found between the referred survey (33 studies) and the present study (306 studies).

Despite the mentioned methodological differences, this study also revealed a higher frequency of studies developed in the scope of postgraduate Nursing courses [3]. A greater number of qualitative studies carried out by Nursing researchers has already been highlighted in the literature, noting that this may be due to the possibility of qualitative studies reaching answers to particular concerns involving nursing care and nursing assistance; in other words, by the adequacy of the Nursing research objects [10, 11].

In this context, using software to support qualitative studies in Nursing, as well as in other areas of health, demonstrates a search for innovative research methods in response to current demands for methodological rigor and researcher creativity.

Emphasis on the use of the Atlas.ti and NVivo software was also pointed out by a study with a similar objective [3]. However, a variety of software programs have been used in qualitative Brazilian health studies, including combinations of more than one software. It is important to emphasize, however, researcher's necessary knowledge for the conscious and adequate choice of the software to be used, considering the study object, objectives and the consequent methodological path chosen. Each software has specific indications for use which must be well-understood by the researcher.

Thus, before choosing the software, the researcher must be aware and clear of the research method that will be used. The technique itself should not be determinant, but determined by the qualitative aspects that guide the study. In this way, the software should be understood as an auxiliary tool to the researcher and never as a substitute for this [3, 12].

It is possible to use software in the different stages of qualitative studies; for transcription, as well as data treatment and analysis, as has been elucidated in this research. However, it is important to be careful when stating that the software analyzes data. Such programs aid in codification and in the elucidating the units of meaning, however, nothing replaces the critical and analytical role of the researcher, who must interpret the codifications generated by the software [4].

As highlighted in this research, conscious and theory-grounded software use in qualitative studies can provide numerous benefits to researchers. The main benefits highlighted by the authors of the analyzed studies were: optimization of data organization with less time for codification, especially of large textual volume, as well as the possibility of performing different types of analysis which enables a contextual approach, and the use of graphic elements, as well as multivariate analyzes.

Researchers also point out that one of the main advantages of qualitative software is that using qualitative analysis programs enables researchers to focus on analytical

techniques and intellectual thinking in identifying emerging meanings and themes rather than manual tasks. Moreover, by using multiple codes, researchers are able to study relationships and gain in-depth analysis [3, 4, 13, 14].

In this way, we consider that the use of software in the aid of textual analysis gives the research greater objectivity, since it combines agility and clarity to all stages of the process [3].

Another benefit that was highlighted in the dissertations and analyzed theses was the possibility of greater methodological rigor for qualitative research that makes use of software programs throughout its steps, as the software allows for recording data analysis, and it also facilitates use by various researchers and research assistants in sharing data and ideas. Thus, the ability of several researchers to examine the same dataset assists in systematic analysis. In this way, scientific rigor is reinforced and an audit trail is created [2, 4, 13].

An additional benefit described in the literature is that qualitative software also provide an environmentally friendly approach, reducing the waste of paper, pens, storage and filing space [4].

In contrast to the many outstanding benefits, the authors of the evaluated dissertations and theses also elucidated some challenges and concerns with the use of software in the scope of qualitative studies. We should point out the fact that only 3.9% of the studies analyzed pointed out experiencing difficulties in using software programs. We emphasize that recognizing limitations experienced in a research process is fundamental, since it can translate into learning for future researchers, in addition to demonstrating fundamental points of context in which the results must be understood.

The main difficulties described were: researcher's time required for studying/understanding it; the complexity of the analyzes; the software language; it does not replace the attention and criticism of the researcher; beyond the possible risks of misinterpretation. All these aspects are summarized into one, namely that the central role of the researcher cannot be neglected in qualitative research, with or without the use of software.

In this context, disengaging data is a potential concern in using software. Researchers can focus on the technique process rather than the meaning of the data. In contrast, transcribing interviews gives the researcher the opportunity to become immersed in the richness of the data, while using software can make this process incipient from the volume of codes and categories created [4].

However, other researchers disagree with this statement by claiming that immersions are inevitable in discursive textual analyzes, so the use of software does not inhibit this from happening. There is no distancing from the texts offered in the answers, because the researcher is closer to the researched subject at each reading [3, 12].

What stands out once again is that the researcher becomes a crucial element for adequately using software in qualitative research and with a theoretical basis. In this sense, it is important to ensure that researchers are conscious consumers of these programs. They should understand how to properly use the software and how to appropriately apply it to the chosen methods. The inappropriate use of these software programs, however, can lead to misinterpretation of qualitative data [13].

Thus, despite the potential that software has to increase the methodological rigor of qualitative investigations, it is possible that unprepared researchers associate numbers

to the coding process in an inadequate way, which may encourage inadequate replication of quantitative techniques or create distance from the data, producing an oversimplification of the meanings [13].

Thus, before deeply knowing the software, it is necessary that the researcher understands the procedures of the chosen textual analysis. In this way, software use in qualitative research will be adequate when not considered as a central element [3].

In this context it is imperative that teaching software use in qualitative research is appropriately incorporated into graduate programs, in order to have an effective/positive impact on the adequate and reasoned consumption of these programs [13, 15].

The high cost of software was also highlighted as a limiting factor. However, there are currently free software tools for textual analysis, which were produced and made available according to the contemporary perception of open science.

In summary, we emphasize that the use of software in qualitative research can be translated as an effective and practical technique for qualitative data analysis. Therefore, the recommendations to be considered before the use of qualitative software include: (1) examining qualitative data analysis software packages to ensure a good fit between the research question and the chosen methods; (2) allocating sufficient time to learn and become familiar with using the selected software; (3) avoiding concerns regarding coding and other software management procedures which can result in data distractions; and (4) maintaining the perspective and vision of the essence of qualitative research [4].

From such perspectives, understanding software as a facilitator and supporter in data management rather than an alternative for immersion and data analysis will provide effective and theory-grounded use to the qualitative researcher [4].

5 Conclusions

We conclude that the use of software in qualitative research in the Brazilian health area has increased, although it is still incipient when compared to the total amount of studies produced. This reveals a concern for innovation in research methods in response to current demands for methodological rigor of qualitative investigations and for researcher creativity.

Seventeen different software programs were used in the analyzed dissertations and theses, some in combination, and were applied in the steps of data transcription, treatment and analysis. Benefits of use were highlighted, namely: optimization of data organization, with reduced time for coding, especially of large textual volume, as well as the possibility of performing different types of analysis.

The main difficulties described were: the researcher's time required for studying/understanding it; the complexity of the analyzes; the software language; it does not replace the attention and criticism of the researcher; as well as possible risks of misinterpretation. All these aspects are summarized into one, being that the central role of the researcher cannot be neglected in qualitative research, with or without the use of software.

Among limitations of this study we can highlight difficulties encountered in handling the database we used, including: instability; temporal limitation of study availability (2013 to 2016); and limiting access to the first 10,000 available studies.

Thus, it is possible that the sample analyzed in this study is underestimated, and therefore it should be analyzed from this perspective.

Thus, we suggest replicating this study in order to integrate all the studies, regardless of the time dimension. Moreover, we point out the importance of including dissertations and theses from other countries, denoting a comparison of software used in qualitative studies in the health area in different continents.

We hope to contribute to the reflection of qualitative researchers on the conscious and theory-grounded use of software, as well as to encourage teaching of qualitative software in graduate programs.

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Photovoice as a Method of Data Collection in the Study of Motherhood Over the Age of 35: The Power of Images

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Abstract. Objective: explore the use of Photovoice data collection method in qualitative research. Method: Data collection performed through interviews and photographs using Photovoice and analysis performed with the Grounded Theory methodology. Results: from the analysis of the photographs captured by the participants and their elicitation during the interviews, one category emerged: Needing Time For Yourself. Conclusions: Photovoice proved to be an important method of data collection by allowing access to the perspective of the participants and better understand the meaning of the phenomenon of late motherhood. Using Photovoice at the same time as Grounded Theory has been shown to bring reciprocal benefits.

Keywords: Photovoice · Grounded theory · Advanced maternal age · Transition

1 Introduction

Maternity after the age of 35 is a trend that has become widespread in developed countries for social, educational and economic reasons [1]. If the increase in women starting motherhood after the age of 35 continues, in the future they will be the main recipients of maternity nursing care during pregnancy, childbirth and puerperium. In motherhood after the age of 35 there is an increased risk of the woman developing diseases that may affect the pregnancy, aggravate chronic diseases or even give birth to a baby with a genetic defect. The later the pregnancy, the greater the associated risks. The increased risks and maternal-fetal complications in the pre, peri and postnatal periods that may compromise the transition to motherhood are well documented in literature [1, 2]. The transition to motherhood is the greatest developmental transition for a woman over the course of her life cycle [3]. Before a pregnancy or decision to become pregnant, the woman begins a process of transition in which she has to restructure her goals, behaviors and responsibilities to reach a new concept of herself and reach the maternal identity [4].

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_27

2 Photovoice

The concept of Photovoice was developed by Caroline Wang and Mary Ann Burris in 1997. They initially called it the *photo novella* technique (1994), a term they abandoned because it is generally used to describe the process of using photographs or images to tell a story or teach a language or literature. Caroline Wang and Mary Ann Burris defined Photovoice as a process in which people could identify, represent and improve their community through a specific photography technique where the participants capture their everyday lives by taking photographs. As an participatory action research strategy, Photovoice allows it's users to create and discuss photographs in a way to inspire personal and community change [5]. The same authors defined three main goals for using *Photovoice*: "(1) enable people to record and reflect on their community's strengths and concerns; (2) promote critical dialogue and knowledge of important issues through large and small photo discussion groups; (3) reach policy makers" [5]. The concept of Photovoice was developed from Paulo Freire's critical awareness theoretical foundations of education (1974) [6], the feminist theory and the non-traditional approaches to documentary photography [5]. The underlying concepts of feminist methodology are a valuation of the subjective experiences of women as researchers, advocates or participants, based on the understanding that feminist theory and practice will implement programs and policies carried out by and with women, rather than about women, in such a way to value the knowledge and intelligence of women based on their experience, the recognition of the importance of their experiences and their involvement and political commitment in the communities to which they belong [7]. A literature review on this method [8], reveals that initially most of the projects carried out with the Photovoice method were carried out with women, perhaps reflecting their feminist roots. The Photovoice method, designed initially to be used in community health, can be a tool to reach, inform and organize community members enabling them to prioritize their concerns, discuss problems and solutions, and making its users defenders of their own well-being and community. According to its producers [5], the Photovoice method offers advantages over others that intend to equally evaluate a community's needs, be it in terms of context, diagnosis or evaluation process, in particular: it enables researchers and caregivers to see the world from the people's point of view; uses an exceptionally powerful means of communication - the visual image; you can access the most vulnerable groups of the population's perspectives by being able to access all those who are able to take a photograph, regardless of whether they can read or write; facilitates the sampling of different social and behavioral contexts, such as places, moments or ideas, that might otherwise not be available to health professionals or researchers; keeps participants from the initial needs assessment phase to the implementation phase because the use of a camera can be a source of pride and sense of ownership; to reaffirm or redefine the initially drawn up programme aims; allows participants to bring explanations, ideas or stories from other community members to the evaluation process, provides real (tangible, clear) benefits to the people in your social network because by sharing the photos with neighbors and friends, it allows participants to express their opinions, establish links and convey something of value they have made; allows to portray not only the needs of the community, but also

their skills, strengths and resources; The images produced and the subjects discussed can stimulate social action [5]. Since the first studies conducted in the 1990s, the use of Photovoice has been increasing with participants of both sexes, from various age groups ranging from adolescents to the elderly, of various races/ethnicities and addressing a wide range of themes in the of health and social justice sector, such as epidemic infections, chronic diseases, discrimination or violence [8]. Photovoice is an increasingly used method in qualitative research by increasing the possibility of capturing participants' perceptions and experiences. The photographs stimulate new thinking and triggered memories, but not necessarily contained in the image present in the photograph, making the invisible visible and thus make it possible to access the understanding of phenomena or experiences, and, because they increase the sense of hearing or vision, they expand the sensory awareness and increase the reflective process [9]. The term Photovoice encapsulates the central idea of this method - give voice to an individual or collective experience through photos.

3 Methodology

Qualitative research as a method seeks to understand phenomena from the participants' perspective, while the methodology or paradigm approach to study is determined by the research question. This study had the following research question as its starting point: "What does 'the process of transition to motherhood after the age of 35' mean and how is it carried out?". Bearing in mind that the research question was defined as the purpose of the study "*To improve the specific intervention models of nursing care for over 35-year-old pregnant women" and as a general objective: "Understanding the transition process in the maternity experience of women over the age of 35*". This present study is part of a wider study. To gain access to the motherhood experience of the participants, we performed a qualitative analysis using the Grounded Theory according to Charmaz [10], along with the Photovoice method. Some changes and adaptations were introduced to the Photovoice method detailed by Wang & Burris [5], due to the specificity of the study and the participants, which are described below. In the beginning the participants were informed about the topic and purpose of the study and the use of Photovoice. Participants were asked to choose moments they would consider to have contributed in some way to their adaptation to motherhood, to take photos of them and to describe them orally or in writing. No restrictions were imposed in terms of the number or material to be photographed. It was only suggested that they preferably photograph objects or places related to the motive that led them to take that photograph, rather than faces, in order to preserve the identity and maintain the participants' anonymity. It was not necessary to distribute cameras or instruct the participants on how to use them because they all had mobile phones with inbuilt cameras that they knew how to use. In a second phase, an in-depth interview was conducted in which the photos that had been taken and the identified themes were discussed, analysed and validated with the researcher. For this phase which some authors call *photo elicitation* [11, 12], the SHOWeD technique [13] was modified in order to fit our aims. The acronym SHOWeD refers to questions to be asked to the participants to help them talk about the photographs they take, to critically describe and analyse them.

It's made up of five questions which are detailed below [7, 9, 14]: *What do you **S**ee here? What is really **H**appening here? How does this relate to **O**ur lives? **W**hy does this situation, concern or strength exist? What can we **D**o about it?*

In our study the questions were simplified and adjusted to the specificity of the study and to the reality of the participants, the SHOWeD technique being used only as guideline. The questions asked were as follows: What led you to taking this photograph? Tell me a bit about this photograph. What is this photograph of? What is the most important part of this photo? What does it try to express/convey? If you had to explain this photo over the phone (to someone that couldn't see it), what would you say? How would you describe it?

The interviews were audio recorded, the data collected transcribed to a verbatim that was later introduced and analysed alongside the photographs collected with the QSR NVivo 11 software. The data underwent a qualitative analysis using the procedures according to the Grounded Theory according to Charmaz [10], in which the verbatim of the interviews about the photographs was analysed as follows: reading and coding line by line, using the grammatical form of the gerund for the verbs and keeping, whenever possible, the words or expressions used by the participants (initial coding); interacting and systematically comparing the data between each of them - data with data, data with codes and subsequently data and codes with possible categories and subcategories (focused coding). During the data analysis process, memos were also made in order to answer questions clarifying the properties and robustness of the categories, such as: To who? How? When? What do they do? What are the consequences?

3.1 Participants

The selection and integration of the study's participants was done through theoretical sampling, using a convenience sample at first and later using the snowball technique [10]. The convenience sample was used to deliberately choose mothers capable of providing rich descriptions of the phenomenon being explored. The inclusion criteria were: mothers over 35 years of age in the postpartum period, with no pathology during pregnancy, eclampsic birth or cesarean section, who have a newborn/baby with no known pathology/malformation. In the wider study of which this is part, 26 interviews were carried out with 21 participants and 36 photographs were collected, the number varied due to their individual availability. The photographs were taken by 6 of the participants aged between 36–47, it being the second experience of pregnancy for five of them and one's first. The number of interviews conducted with participants who submitted photographs ranged from one to four interviews, the variation being due to the individual availability of the participants. The majority of the interviews were carried out at the participants' homes, with the exceptions of one that was carried out in the hospital waiting room, before a birth preparation/post-partum recovery course, two in the participants' workplaces, one in an interviewer's workplace and another participant sent the photos by email with the respective description.

3.2 Ethical Considerations

Ethical views and consent were obtained from the nursing school, which, in partnership with the university, runs the doctoral course to which this investigation belongs, the hospital where the first interviews took place, and the National Commission for Data Protection (case nº 6055/2014; authorisation nº 64/2015), because the second and subsequent interviews are carried out outside the hospital context, in a place chosen by the participants, mainly in their homes. In the first interview participants were informed about the study, it's aims and they were asked for their collaboration, and an informed consent form was signed stating that the participant could withdraw at any time without having to give any justification and that the researcher would keep copies of the photographs and their notes until the thesis is written and presented, after which they would be destroyed. As previously mentioned, the participants were asked to take pictures without faces in them, in order to maintain their anonymity, but if they presented some with faces and they were to be published, their features would have been obscured prior to publication so that they couldn't be identified. Also with the aim of preserving the participants' anonymity, a code number was assigned to each one of the interviewees and their names were changed when they were referred to throughout the discourse.

4 Findings

The data obtained from the 26 interviews with the 21 participants allowed us to construct the wider study's categories. As an example, we will only present one of the categories "Needing Time For Yourself", built using the Photovoice method and using some of the photographs taken by the participants, although the other photographs have contributed equally to the construction of other categories that helped to learn about the transition to motherhood process after the age of 35. In addition to the photographs, the narrative of the interviews of the other participants in the wider study contributed to the construction and saturation of this category, as well as to the others. In Table 1 you can see the participants' narratives about the photographs and the way in which they were analysed.

Table 1. Participants' narratives about the photographs and their respective analysis process

Data Excerpts	Initial Coding	Focused Coding	
		Subcategories	Categories
"one (photo) that I took of my nail polish; it was the first time that *I painted my nails after becoming a mother (…) This photograph was going to say that it was the first time I had a little time to look after myself" E7-3*	Making time for yourself	Having time for yourself	Needing Time For Yourself
"*In this photo I'm coming out of the tub. I managed to take a bath without any interruptions" E18* (Fig. 1)	Managing to take a bath without any interruptions		

(*continued*)

Table 1. (*continued*)

Data Excerpts	Initial Coding	Focused Coding	
		Subcategories	Categories
"*and in this case I got to buy shirts that are also suitable for breastfeeding, they have a button-opening, they are comfortable and lifted my morale a lot that day (…) I didn't really feel like… what I mean is I didn't feel right in shirts, the shirts that I had were no use to me anymore, I was not feeling good in them and that wasn't helping my self-esteem" (…) yes, I also invested in my image, not that one…it does not have to be that one… Okay, so I'm at home playing the "mum" role, but I don't need to be in my pyjamas and have rollers in my hair (…) so that I feel a bit more… I don't know how to put it…but feel better about myself…more womanly E7-3*	Dressing appropriately	Looking after your body and personal appearance	
	Buying new clothes		
"This was when I went to the salon down there to get a pedicure (…) I was like "oh my God I have to go, I have to go, I can't walk around in flipflops with unpedicured toenails, heaven forbid! I'll go today, I'll go tomorrow, but I always had so much to do…I'm not going today…" and then I eventually took these while getting my pedicure" E6-3 (Fig. 2)	Getting a pedicure again		
"*One of the biggest changes was being at home, right?, exclusively dedicated to being a mother" (…) I don't like being at home because I was also used to being out of the house and it does me good (…) That was a big change: spending a lot of time at home…and that day I felt sorry for myself, it was spectacular because I got out of the house and went on a trip with my parents and M. and in this case I was able to buy shirts that are suitable for breastfeeding, that have a button-opening, they are comfortable and they really raised my morale that day (laughs)! E7-3*	Exclusive dedication to motherhood	Going out/being at home	
	Staying at home		
	Feeling isolated		
	Leaving the house to go shopping		

(*continued*)

Table 1. (*continued*)

Data Excerpts	Initial Coding	Focused Coding	
		Subcategories	Categories
"I left the maternity ward and went to a friend of mine's birthday party! Right! (…) and I "Look, I feel like I need to see people. I didn't take pictures of anything there, but I could have taken them, because it was a very important event, to have left the hospital (…). There were a lot of laughs, it was really cool (…) It was, hanging out yes. Hanging out yes. It even seems to be a normal thing, us being together (…) it was really nice; it felt really good" E6-2	Leaving the hospital for a party	Resuming social and leisure activities	Needing Time For Yourself
	Needing to see people and hang out		
"*Oh, that was when I went to the Japanese restaurant (…) this was the first lunch that my husband and I went to after we left the maternity ward (…) and I really like Japanese food and I went 9 months without eating it, so we went to a cool place (…) and that was really good.*" *E6-2* (Fig. 3)	Going back to the Japanese restaurant	Resuming daily habits and activities	
	Resuming daily conjugal life		
	Ending food restrictions		
"This one was the hob. When I cooked (…) because it's something that I really like to do and lately I haven't been able to do it much. Yes, I love it, on my day off I love cooking when no one's here." E6-2 (Fig. 4)	Cooking again		
"*when I went to the hairdressing salon (…) I took a photo here too of my brushes, and I thought to myself "let me take a photo of my little brushes (…) My job, something that I love to do (…) it was good to have gone to the hairdressers and even just do a blow-dry; I was eager, when I get the opportunity (…) It's an important part of my life too, right, my job*" *E6-2* (Fig. 5).	Longing for your job	Going back to work	

Fig. 1. Managing to take a bath without any interruptions

Fig. 2. Looking after your body and personal appearance

Fig. 3. Going back to the Japanese restaurant

Fig. 5. Going back to work

Fig. 4. Cooking again

5 Discussion

Photovoice uses one of the most powerful means of communication - the visual image. As a participatory action-research method, Photovoice allows its participants to take and discuss photographs, empowering them in decision-making, as they choose when and what they photograph. On the other hand it gives the researcher access the participants' perspective, even if they are vulnerable or illiterate, since all they need to know is how to take a photograph [5]. Motherhood in terms of a social object is made up of the meaning that women attribute to themselves and express through a system of symbols - language. The symbols, language in particular, allow them to name, classify and remember the objects and thereby enabling people to relate to the social and material world, increase people's ability to perceive their environment and increase thinking capacity [15]. The association of language with pictorial images, the interviews and the photographs in our case, substantially increase the participants' capacity of thinking, to perceive the meaning that they attribute to the phenomenon of motherhood. Based on these assumptions about the symbolic interactionism of the Grounded Theory, one of the challenges facing the researcher is accessing and understanding the meanings that the participants attribute to the phenomena. In Grounded Theory, the flexibility of data collection methods is intended to reach the participants' perspective,

although the interpretative role is the researcher's responsibility. The Photovoice method deepens the learning experience [16], in our case, to gain access to the meaning that the phenomenon of motherhood has for these mothers over the age of 35 and their interpretation of the situation, because the choice and description of the situations or moments that define motherhood to them are their choice, which allows us to access their perspective of the situation/phenomenon. By using Photovoice and Photo elicitation in the interviews about the photos we are allowing participants to verbalize difficult or painful experiences not captured by the photographs but triggered during the interview. In addition they promote the empowerment, creativity and critical awareness of their participants [8]. In the present study, the photographs taken by the participants and subsequent analysis led to the identification of a category: "Needing Time For Yourself". For these participants, the Need to Have Time was one of the highly-valued aspects in this transition period and adaptation to motherhood. For the participants, the Have time for yourself, represented in Fig. 1 for being able to take a bath without any interruptions was one of the aspects mentioned; Another was the *Looking After your Body and Personal Appearance*, getting a pedicure illustrated by Fig. 2 or taking care of your face and wearing make up again. *Leaving The House* was a strategy to get out of their confinement and *Resume their Social and Leisure Activities,* by simply going shopping or meeting friends. *Resume everyday Habits and Activities* like going back to a Japanese restaurant (Fig. 3) or cooking again (Fig. 4), they are activities that contribute to their well-being, as well as the *Returning to Work*, even just occasionally, since they recognise their job as an important part of their lives and therefore they take pleasure in returning to their workplace (Fig. 5).

The Need (to Have) Time to buy new clothes or look after your body and appearance, agrees with Janet Currie [17], who although not referring to looking after your body and personal appearance, refers to the need to find time for yourself and to get out of the house, adding that often taking time for yourself leaves mothers feeling guilty. The same author, in addition to *getting out of the house,* identifies two other strategies for maintaining a sense of well-being: *getting help* and *the need for a plan or schedule* to keep on top of domestic activities [17]. The need to have a plan and schedule satisfies the participants' needs to resume daily activities. Staying at home with the consequent changes in family and friend relationships is perceived as a loss and requires a great deal of adjustment to achieve a new concept of self and achieve maternal identity. The development of motherhood implies loss and the consequent mourning process for the incompatibility of other previously carried out roles [4], in our participants' cases, loss of freedom, not leaving the house, not hanging out, not looking after their body and appearance, are negative aspects of motherhood stress mentioned by Emmanuel & St. John [18], that they do not feel the motherhood experience was as positive, or as positive as they hoped it would be, or that others expected them to feel. For these participants, returning to the workplace is a strategy to adapt to the maternal role, being perceived as a way to get out of the house, to break social isolation, to resume or maintain contact and socializing with co-workers and customers. We have not found any allusion in literature to this important aspect of work as a strategy in the transition to motherhood, as a source of well-being and harmony while undertaking the motherhood role. We only found one article on the readjustment of mother and worker roles after maternity leave [19]. Although the woman sometimes

has to choose between being a responsible worker or a responsible mother, dealing with feelings of uncertainty and guilt for not feeling good enough as a mother, returning to work can be crucial to the woman's identity and well-being. For the participants in the study to achieve well-being in interpersonal relationships, it means having time to resume the social and leisure activities they did before they were mothers, such as having time for themselves, looking after their bodies and appearance, getting out of the house, resuming social and leisure activities, resuming daily habits and activities, or having contact with their work.

6 Conclusions

Photovoice has proved to be an important method of data collection, in order to access the participants' perspectives and to better understand the meaning that the phenomenon of motherhood has for mothers over the age of 35, while at the same time promoting their involvement and empowerment. From the analysis of the photos taken by the participants and their elicitation during the interviews, we presented one of the categories that emerged: *"Needing To Have Time"*. Photovoice as a method of data collection enabled a deeper understanding of the meaning of the motherhood experience after age 35, enriching the Grounded Theory analysis by promoting thought and critical analysis in interviews and photo elicitation. The use of Photovoice in conjunction with Grounded Theory has been shown to bring reciprocal benefits because the Photovoice method helps elicit data that enrich Grounded Theory's data collection, but also Grounded Theory strengthens Photovoice as a research method.

Acknowledgements. A very special thanks to the participants who collaborated with us in the study.

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The Schools' Ranking in the Opinion of Directors of Secondary Education Schools in Portugal

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Abstract. In order to study the schools' ranking we have to perceive in a micro towards a meso structure, in Secondary Education, what the factors that can influence the performance of schools are. In this study, we will focus on the opinion of school directors. We conducted three interviews, with two directors from two grouped schools and one from a non-grouped school, in the Northern of Portugal. The semi-structured interviews were audio recorded and later transcribed. The content was analyzed and treated with the support of the webQDA qualitative analysis software. This external evaluation affects teachers and directors, when scores are used to determine the "social" position of the school, granting them recognition or additional funds, or threatening with loss of "social register", when the score is low and, consequently, affects students, in what concerns their promotion, monitoring and graduation.

Keywords: Rankings · Secondary education · External evaluation · Content analysis · webQDA

1 Introduction

The publication in Portugal, for the first time in 2001, of the ordered list of secondary education schools, having as basis the results of the 12th grade national exams marks, has initiated a controversy known as "schools' rankings". Regardless of the appropriateness of the designation, it is important to know the contours that it assumes and the contexts in which it arises.

Referring to a chronological period that does not go beyond the mid-1990s, [1], suggests that there was a "late connection" to the neoliberal ideology in Portugal. However, in a later study, the author addresses the controversial issue of schools' rankings [2]. Considering our argument, the question arises: what do policy makers intend with the introduction of schools' rankings?

In addition to the obvious attraction that any ranking exercises with the entities that are better classified, it is verified that few are indifferent to the presentation of a clear

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_28

order, supposedly based on facts (the classifications of exams) and apparently bare of subjectivity and ambiguity. In addition, the history of the process includes refusals to make the raw data available (the classifications of exams) on the part of successive Ministries of Education, which have increased the affective adhesion to the first concrete exercise of the use of this data and, later, the following data.

[3, p. 76] is one of those who advise careful handling of information: if it is not valid, it leads to erroneous conclusions, with the potential risk of personal and institutional losses. The simplistic and reductive processes of interpretation can never be a good way of perceiving complex institutions such as educational institutions. Without intending to exhaust the subject, many of the rankings do not allow, namely, to know [4, p. 4]:

> "Which factors make some schools achieve their goals better than others?; What to do to make a school improve?; What "school effect" will be directly related to the success of the teaching-learning process?; Can the school enhance the "school effect" in the sense of real improvement of effectiveness, taking into account that each student is a reflection of innumerable interactions, throughout their school career?; Naturally, all this is a long way from the mere ordering of schools by global averages of exam scores, an exercise that is not intended to address any of these questions."

Our purpose here is quite different from what we have seen in discussions related to this topic. Benefitting from the availability of 15 years of data, and the possibility of comparing the respective rankings, our exercise of data analysis sought to ascertain, afterwards, to what extent the implicit hypothesis in the enthusiastic use of rankings is reasonable. In other words, are *rankings* a reliable indicator of the quality, or effectiveness, of schools?

1.1 On a Meso Scale – the Ranking

At the moment, the school is being attacked by many: parents, guardians, researchers, journalists, students, Ministry of Education and Science, which question whether the school is fair, effective and question accusingly both its function and its mission, through the compared results, that is, the rankings.

In general, in Portugal, the Ranking of public or private education institutions is calculated only by the average obtained in some examinations of secondary education.

The newspaper, "Público", orders the Catholic University, annually, the Ranking of the institutions of public or private education, which is based on the Mathieu effect [5], which is calculated as follows: on the one of the secondary education, the eight exams with the highest number of enrolled students are counted, three of the twelfth year (Portuguese, Mathematics A and History A), and five of the eleventh year (Biology and Geology, Physics and Chemistry A, Geography A, Philosophy and Mathematics Applied to the Social Sciences). Only the exams taken on the first phase by students who attended school all year round are counted. In the "Tests" indicator, we know how many exams were taken in each school. The average indicates the average result obtained by the school and it is even possible to know the result of the previous year. The Ranking shows us in what position the school was. In the 2016 school year, ordination is done only with the schools where 50 or more exams were held. Since

2012, the rankings of the newspaper, "Público", which are conducted by the Catholic University, include socio-economic data that avoids the downsizing effect that many criticize in these tables. In 2016, the Catholic University, partner of the newspaper, "Público", selected the following factors for the organization of these rankings: the percentage of students without School Social Welfare, that is, less underprivileged, and the average of the qualifications of the parents (average number of years of schooling of the mother and father of the student). With this data, a variable was created that allows to characterize the context of each grouping or isolated school. On the website of the newspaper, "Público", this classification is done using numbers, from the least privileged context (marked as 1), to the most privileged (marked as 3), for example in Picture 1 [6]:

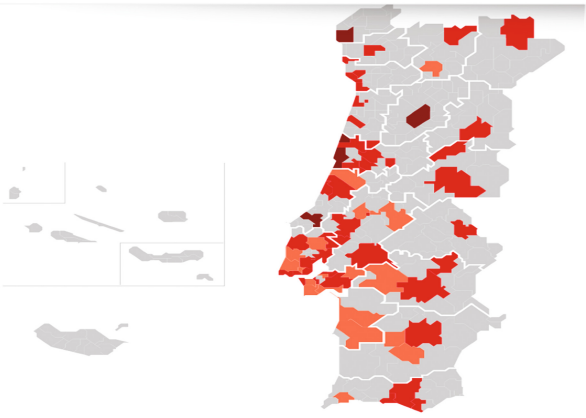

Fig. 1. Example of the rankings results for the country in a more underprivileged context

It should be noted, first, that there is a time lag: the results of the exams are from the 2015/2016 school year and the socioeconomic data is from the previous school year (2014/2015). And, secondly, the data is provided by a school grouping rather than by a school. Because a grouping typically includes multiple schools, these figures may not represent the exact universe of each school.

Due to the pressure of the ranking, schools place their educational projects as central and strategic objectives: to improve the students' achievement, reflected on the transition rates and the conclusion of the year or cycle; to compare, in the analysis of the evaluation results, the performance in the final exams and national exams with the results of the elements of internal summative evaluation (cognitive domain); to hold students responsible for their formative options, committing them to the results achieved (consulted the Educational Projects of the three grouped or non-grouped schools).

1.2 On a Micro Scale – Accountability

We know that teachers and institutions, first and foremost, try to avoid enhancing the inequalities of natural or social origin that are, infallibly, observed among the students, demanding supplements of attention/care in favour of those who experienced greater learning difficulties. Obviously, it is not in question that the delay in the pace of the progression of some students is a consequence of the implementation of curricular equity.

We are aware that no teaching-learning method can guarantee strict equality among students. Certainly, substantial learning can be generated in most students, and thus obtain quality performance from all students, but it can never be prevented that some transform the remaining differences into a hierarchy of values.

On a meso-scale analysis, external evaluation presupposes the concept of a common quality standard for all, which assumes that all students benefit from the same teaching or, more precisely, that they are exposed to the same curriculum. For national examinations, everyone must have had opportunities to build the competences defined by the program, even when it is argued that it is unrealistic to expect everyone to have reached the same level. Are the students offered the same opportunities to learn what will be evaluated, regardless of the school they attend?

Here a pertinent dilemma also arises. Should we privilege the autonomy of teachers or, on the contrary, reduce teachers' freedom to ensure equivalence of curricula and promote educational equity?

If we turn to the external evaluation devices for regulatory purposes [7] this dilemma is decontextualized and unfounded.

In this context, the spirit that presides over formative evaluation proceeds from the "right" to make mistakes and, therefore, assumes that the results in the tests that punctuate the course of learning do not intervene in the grades or in the final classification.

In a system where automatic promotion is adopted, the calculation of the general average or the percentage and, more generally, the attribution of a grade, make no sense.

Some authors [8, 9, 10, 11], argue that any attempt to standardize learning and teaching should be primarily used to give information about curricular changes that will strengthen the teaching-learning bonds and, consequently, schools. They understand that if there are problems, they will be an opportunity for the teacher, the school and the learning system, as it forces them to reflect on the most effective practice combined with more equal and better targeted distribution of resources. Others [12, 13], argue that the results of the external evaluations can motivate change only if they are used to apply sanctions to those who cannot find them.

Some of the decisions justified by the external evaluation affect students, such as promotion, monitoring and graduation based on test results. Others affect teachers and directors when scores are used to determine the "social" position of the school, granting them recognition or additional funds, when they are placed on intervention regime, or threatening with loss of "social register", when the score is low.

Many questions arise from this political strategy. Will investments in better education, curriculum and schooling evolve to new standards? Or is it that standards and tests built on a foundation of inequality continued simply to certify more clearly school failure and reduce access to higher education and future employment? What is the most correct way of reading the rankings? Should it be from the inside towards the external

environment of the school or from the external environment of the school into the curricular practices of the educational institution? Here is the challenge.

2 Methodological Options

Having as research object three different school contexts, we opted for a methodology of analysis that revealed the specificities, both of the communities themselves and of the opinions of the respective directors of the different grouped or non-grouped schools under study. Therefore, we opted for qualitative research.

A substantial part of the time of the qualitative researcher is invested in the natural environment of the study, in contact, as close as possible, with the participants [14, p. 78], and assuming that "the subjectivity of the researcher and the subjects studied is part of the research process" [15, p. 104], tends to analyze the data "in an inductive way" [16, p. 104].

Considering the objectives that we propose to study, to understand to what extent the exams condition the teaching-learning practices and evaluation in Secondary Education, as well as to know which factors of the exams most influence the teaching-learning process, we intend to realize how the directors of the educational community read the rankings.

The problem of our investigation is reflected in the following questions: What does it mean, in the opinion of school directors, that their school is very well positioned in the rankings? And, consequently, another question arises that causes us restlessness as professionals of education: Can a school be fair and effective if it wants to have a prominent place in the national rankings?

Considering the specificities of the objectives and the questions to be investigated, it seemed to us that the qualitative nature was the most adequate, as "qualitative methods cannot be regarded as independent from the research process and from the question to be studied" [15, p. 19] and [17, p. 36] argues that "there are the instruments that derive from the nature of the questioning and problematization that in each study are equated."

Whether it is "simple or complex" [18, p. 236], the case study can be characterized, according to [19, p. 18], "as an empirical investigation that: - investigates, in depth, a contemporary phenomenon within its context of real life; especially when - the boundaries between the phenomenon and its context are not clearly evident; and in which - many data sources are used".

Considering that the case study [20], (a) works with technically distinct situations, in which there may be more variables of interest than information items, and with only one final result; (b) depends on multiple sources of evidence, requiring the information to converge in a triangulated way; (c) benefits from previous theoretical propositions that guide the collection and analysis of data, this method of study would be the best methodological option to adopt.

As for the analysis unit, Yin, [19, p. 30], argues that "which is the same as the definition of the "case" ", being alterable, during the investigation, due to discoveries arising from the data collection.

Our research has a *design* unified in three contexts in Secondary Education, two of them with only one analysis unit in each - grouped school – and the other - non-grouped school.

Finally, it is also important to highlight the procedures followed in order to respect ethical issues. Our interview with each of the three directors began after the written consent of each one; the first contact was made by e-mail, explaining our purpose and study objectives. With regard to the semi-structured interviews with the directors, we previously contacted each one, requesting the interview, informing about our objectives and requesting authorization for audio recording.

In order to maintain the confidentiality of the contexts studied, the anonymity of all its participants, as well as the confidentiality of the declarations of the directors, we codified them. The respective instruments of collection and processing of data will now be subjected to detailed analysis.

3 Collection and Processing of Data

Considering the objectives of the study, we sought a detailed and rigorous description, in order to guarantee validation or credibility in a qualitative study [21]. Some authors [22, p. 9] refer to "the need to establish some strategies". Among them we highlight, for example, the triangulation of the various sources collected, that is, look at the same phenomenon from different perspectives; we have also chosen to focus on triangulation of data - a mode that proves whether the information collected is confirmed by another (theoretical) source, and we turned to the transparency of the whole process that guarantees the reader the merit, credibility and reliability of the research [23, p. 151].

As a methodology we carried out, in an initial phase, the analysis of the results of each community separately. Subsequently, and whenever possible, in order to compare and triangulate the data, we carried out the comparative analysis between the results of the different communities. As data collection techniques, we preferred the observation, survey by interview and by questionnaire, complemented by the technique of social network analysis.

3.1 The Interview

Based on the observation data, we interviewed three directors from three schools in the north of the country, two grouped schools and one non-grouped.

To achieve our objectives, a semi-structured interview script was created, especially for the study. The script was intended to ensure adequate levels of consistency between the information collected. It is also important to mention that the script was elaborated having as main reference the Matrix of the investigation and the Questions and Objectives mentioned above. In this way, it was also sought to ensure the necessary consistency with regard to the formulation of issues considered critical and/or fundamental, so as not to compromise the central objectives of the study.

With these interviews with the directors, we sought to obtain a number of clarifications, namely to understand the extent to which the exams condition the teaching-learning practices and evaluation in Secondary Education, as well as to know what factors of the exams influence the teaching-learning process the most.

It is intended to understand how the directors of the educational community read the rankings and, on the other hand, to understand, since the rankings do not take this into account, what characteristics (meso and micro) of the schools put them in the relative positions in the Rankings; to what extent are management bodies committed (in collusion) with this responsibility for achieving good results; what means they provide to the teaching community for the achievement of an improvement in these results.

In the same line of different authors [24, 25, 26] and [27], the content analysis seemed the most appropriate way to proceed with the treatment of the testimonies and information collected.

Having started with a "fluctuating reading" [28], in order to establish a first contact with the documents, subsequent readings were followed - given the richness and extent of the analyzed *corpus*. After this phase, the big categories began to emerge, in an inductive way, according to the pre-established objectives, the theoretical framework and the result of our interview. Since it was possible to replicate it by the three interviews, we found eighteen categories: students' IQ; the time of support that the students obtain; teachers expectation; the previous academic record of the students; the level of demand of the educational institution and its teachers; the socio-cultural characteristics of the students; the degree of selectivity of the educational establishment; the consistency of success or failure results of the students; anomalous situations justified by exogenous factors; the environmental characteristics of the educational establishment; management body.

With the help of webQDA software, we included the data (interviews and rankings) in the sources, followed by the encodings, where we built the tree with the dimensions and subcategories, and, finally, the questioning, where we questioned the data to answer the question(s) of the research.

4 The Analysis Matrix

We were aware of the specific characteristics of each community and of the great differences in relation to the theoretical framework. Thus, it was important to create a homogeneous analysis matrix that aimed at three objectives: (a) not miss the research questions in sight; (b) allow a triangulation and comparison between the various data corpus; (c) allow the comparison between contexts (Table 1).

The matrix then created was a facilitator of these objectives and is presented as follows:

Table 1. Internal coherence of research for the dimension "Student Learning"

Research question	Research objective	Data *Corpus*	Types of analysis	Observations and expectations
What does it mean, in the opinion of school directors, that their school is very well positioned in the rankings? Can a school be fair and effective if it wants to have a prominent place in the national rankings?	Understand the extent to which exams condition teaching-learning practices and evaluation in Secondary Education; Know which factors of the exams most influence the teaching-learning process; Realize how the directors of the educational community read the rankings	Interviews with directors Rankings Data published	Content Analysis Documentary Analysis	We hope to be able to compare the data from the interviews with the directors and correlate them with the data of the published rankings

5 Presentation and Discussion of Results

The data obtained from the triangulation between the content of the three interviews and the theoretical data of the published Rankings are presented and discussed. With the help of the webQDA software, we included the data (interviews and Rankings) in the sources, followed by the encodings, where we built the tree with the dimensions and categories and, finally, questioned the data to answer the question(s) of the research, elaborating the respective matrices.

The homogeneity of the categorization results from the homogeneity of the document source, since the interviews are oral testimonies, resulting from the personal interpretation of the interviewees about the object in question, so the categorization resulted mainly from data emerging from the interview transcription, while the Rankings are published empirical data. The analysis of this variety of data sources was organized and systematized through a category tree, allowing the researcher to record the entire research context, question the data and classify relationships [29]. Thus, in order to organize and clarify the presentation of the results and demonstrate the internal coherence of the research, we analyze the interviews and the Rankings by research objectives, followed by discussion and a synthesis to gather ideas and highlight the results essential to this investigation, attempting to answer the questions of the research, as shown in Table 2.

Table 2. Categories e indicators of the micro e meso dimensions

Dimensions	Categories	Indicators
MICRO	Students' IQ	A modest grading given to some students may represent an extraordinary effort rate and progress on their part and/or successful commitment on the part of their teachers
	The time of support the students obtain	The school's concern to provide its students with hours of support for the examination subjects, included in the workload of students and teachers
	Teachers expectation	If teachers have a high expectation of the goals to achieve with their students, they will probably reach the level of excellence more easily
	The previous academic record of the students	Exam scores reflect a consistent trend in students' academic achievement or are no more than exceptions justified by factors that have little to do with true success in teaching and learning
	The level of demand of the educational institution and its teachers	There are cases where students considered less able are dissuaded from taking the exam so as not to harm the image of success of the educational establishment. Naturally, such manipulative practice can significantly affect equity among educational institutions
MESO	The socio-cultural characteristics of the students	The socio-cultural level of students may influence how they are predisposed to learning
	The degree of selectivity of the educational establishment	Filtering the admissions will be reflected both in performance and in the results. It should not be neglected that, in an educational market scenario, the parents' freedom of choice of school is correlated with the same freedom of choice of the school regarding the admission of students
	The consistency of success or failure results of the students	The results of a year may reveal a trend of success, failure or stagnation. Naturally, the change in the assumptions and the methodologies of elaboration of the rankings, from one year to the next, does not allow analysis
	Anomalous situations justified by exogenous factors to the school	Intrinsic factors (student nervousness, stress, etc.) or extrinsic (degree of

(*continued*)

Table 2. (*continued*)

Dimensions	Categories	Indicators
		difficulty of the external evaluation, noise, etc.), influence the results of the exams
	The environmental characteristics of the educational establishment	The management body and the teachers have high expectations and encourage their students to achieve them
	Management body	The Leadership of a democratic school that supports its teachers provides, from the outset, greater freedom, well-being and a good environment among the teachers to achieve fruitful work in the teaching-learning process
	The differences between the population of each city	Regarding purchasing power or academic qualifications. It is evident that the fact that two or more schools are located in the same municipality does not mean that the respective student populations are characterized by similar socio-economic indicators
	The numbers of students of the educational establishment	Statistical significance is naturally affected by this factor. The more students are tested, the greater the significance and reliability of the results
	The relative percentage of internal, external and self-proposed students	The degree of "responsibility", "characteristics" or "goals" regarding the success/failure of these different types of students is not the same
	The existence and the relative percentage of students in technological courses	Students who attend technological courses (predominantly oriented to the labor market) in each educational establishment and that are proposed for examination
	The quality of operation of the management body	It depends on the scientific and pedagogical organization of the school teachers (the teachers have to feel involved in the process)
	Scientific and pedagogical organization of schools	In order to have work between peers with the common goal of success and improvement of the quality of learning of students
	The mobility rate of the teaching staff	If the teaching staff is stable, it translates into a greater sequential balance in the monitoring of their students, from the different school years to the year of examination

Throughout the discussion of results, we will use the term *reference unit* as registration units, which can be the phrase or set of words that make sense and have meaning.

In order to accomplish what we proposed, we present, in Table 3, the matrix resulting from the reference units of the various indicators in the triangulation of the interviews and the rankings concerning the dimensions, meso and micro.

Table 3. Matrix resulting from the questioning between the dimensions and the categories

Dimensions	Categories	Reference units
MESO	The socio-cultural characteristics of the students	7
MICRO	————————	0

We obtained 7 reference units only for the category "The socio-cultural characteristics of the students", that is to say, only this category was the one mentioned both in the dialogue with the directors, example "… we have students from very different socio-economic backgrounds", and in the rankings documents. This makes us think about the validity of rankings for the social projection that is given to schools. This external evaluation affects teachers and directors, when scores are used to determine the "social" position of the school, granting them recognition or additional funds, or threatening with loss of "social register", when the score is low and, consequently, affects students in the sense of their promotion, monitoring and graduation.

In contrast, directors, without distinction of a grouped or non-grouped school, value other dimensions at both meso and micro scale, as we can see in Table 4, which presents a questioning matrix between the interviews with the three teachers.

On the other hand, if directors account for so many other factors, it means that simplistic and reductive processes of interpretation can never be a good way of perceiving the value of complex institutions such as educational establishments. There are several factors that can influence the performance of schools, some of which may be subject to control at an organizational level, while others completely escape from the action or influence of schools.

As mentioned, this means that the school is questioned by everyone: parents, guardians, researchers, journalists, students, Ministry of Education and Science. They have the audacity to question whether the school is fair, whether it is effective, and accusingly question both their function and their mission, through comparative results, that is, rankings.

As we can see in the results of Table 4, directors are unanimous in referring to questions that go beyond the show-off of the final results of the external evaluation, such as the Micro dimension categories and even the Macro dimension.

In a more careful reading, we know that teachers and institutions, in the first instance, try to avoid the natural or social inequalities that are inevitably observed among students, demanding attention/care supplements for those who experience greater learning difficulties (for example, the existence of time quotas for support classes). It is not in question that the delay in the pace of student's progression is a consequence of the implementation of curricular equity.

Table 4. Matrix resulting from the questioning between the dimensions and the categories of the interviews

Dimensions	Categories	Reference units
MICRO	Students' IQ	4
	The time of support the students obtain	6
	Teachers expectation	7
	The previous academic record of the students	7
	The level of demand of the educational institution and its teachers	3
MESO	The socio-cultural characteristics of the students	5
	The degree of selectivity of the educational establishment	5
	The consistency of success or failure results of the students	6
	Anomalous situations justified by exogenous factors to the school	5
	The environmental characteristics of the educational establishment	4
	The Management body	5
	The differences between the population of each city	6
	The numbers of students of the educational establishment	6
	The relative percentage of internal, external and self-proposed students	7
	The existence and the relative percentage of students in technological courses	6
	The quality of operation of the management body	5
	Scientific and pedagogical organization of schools	5
	The mobility rate of the teaching staff	5

Directors are worried about the pressure of the ranking, since in their schools it is mirrored in their educational projects as central and strategic objectives: to improve students' school success, reflected on the transition and completion rates of the year or cycle; to compare, in the analysis of the evaluation results, the performance in the final exams and national exams with the results of the elements of internal summative evaluation (cognitive domain); to hold students responsible for their formative options, committing them to the results achieved. But this is redundant with respect to the educational process and, particularly, to the teaching-learning process.

Directors also expressed apprehension in the question: if the guardians can choose the school where to entrust the education/teaching of their students, why can't the school have the right to choose its students based on the same principle? Indeed, according to one Director, "… it is not possible to make omolettes without breaking eggs", but, according to another: "… we want our eggs to go from *M* class to *2XL*, in here, not caring if our size 2XL is equal to the 2XL of the school next door," concluding another, "we are not calibrating individuals, we are teaching and educating, that is our true function."

6 Conclusions

In the opinion of directors, the positioning of their school in the rankings only translates an external evaluation that unfairly affects both institution and teachers, either positively or negatively, in the sense that the scores are used to determine the "social" position of the school, granting them recognition or additional funds, if the score is high, or threatening with loss of "social register", when the score is low and, as a consequence, affects the students in their promotion, monitoring and graduation.

They consider that this translates an extremely reductive social vision for the totality of an honest, cohesive work, in which management bodies and teachers work together for a result: to raise the level of in-school success of their students to the level of demand, working hard and fruitfully in pairs, regardless of the level and type of education.

As to the second question, which has worried us so, whether a school can be fair and effective if it wants to have a prominent place in the national rankings, with these results, we have not been able to give a concise and reliable answer.

Therefore, on a micro-scale, is the purpose of the school system to develop skills, by creating opportunities, offered to students, in the fields of knowledge, of skills to use knowledge and to collaborate with peers in problem solving, as well as the experiences of personal formation structured around the individual freedom and the capacity to ethically self-determine their action, can be carried out in the professional field or be extended to the whole of citizenship, organized and applied with equal opportunities?

According to most studies in the field, the organization of schools' rankings is not enough to clarify this, because, constituting an ordering of results according to certain criteria, it does not allow to infer validly about elements of the school responsibility processes [7, 4, 12] and [13].

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Convergence Between Quantitative and Qualitative Methodological Orientations: Mixed Models

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Abstract. This chapter deals with the process of convergence that has developed between quantitative and qualitative methodological orientations over recent decades in the context of the social sciences. It brings together some of the arguments that sum up the opposing positions in this debate, from the stance of discrepancy and its attitude of subordinate methodological difference, to the stance of harmony, which emphasizes the value of each methodology and respects their respective contributions, and then on to a current position based on duality and the potential of convergence, compatibility and integration with regard to so-called mixed models or designs.

Keywords: Qualitative research · Quantitative research · Research mixed methods

1 Introduction: The Methodological Debate: A Brief Historical Note

In research, "methodology" refers to the way in which we approach problems and seek answers. It involves reflection on how to obtain knowledge, what needs to be done, and how to do it. Purposes, assumptions and interests determine the methodology to be followed in a research project. However, the necessary consensus on how to make the methodological approach a reality does not always exist. Debate on this issue is as old as the history of thought itself. A look into the distant past might place it in classical Greece, where it would be represented by the contrast between the formalism of Plato, in his eagerness for abstraction, idealism and mathematics—an outlook that could be regarded as prequantitative—and the substantivism of Aristotle, who was more qualitative in nature owing to his defence of the senses and the empirical, in the original sense of the empireia, understood as sensible experience or direct contact with things [1]. Subsequent social and cultural changes that occurred between the twelfth and fourteenth centuries also had a historical impact on methodological clashes. Conde [1] recounts two events related to the matter from that era. The acceptance for the first time by the Church of zero, which was tantamount to admitting the possibility of considering nothingness, acknowledged the widespread use of Arabic numerals, which revolutionized accounting. Moreover, acceptance of nothingness would also allow, albeit in the longer term, the development of unrestricted formal logic. And the presence of

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_29

nothingness and zero would put the contest between the qualitative and the quantitative in a new epistemological framework.

All of this implied a progressive mathematization of the world—that is, the consideration of everything unquantifiable as noise. A new conceptualization of the quantitative as something coming before the qualitative appeared, and the qualitative was discarded from scientific procedures. The quantitative's rise to prominence over the qualitative would find in Galileo's and Newton's theories some of its paradigmatic examples, with Newton's contributions representing the climax of that process. During the current epoch, this duality in viewing the world and nature would progress even further as the quantitative was perfected through the establishment of experiments as the ideal research condition. Within the space of a few centuries, quantitative methodology would be fully developed and, little by little, the transfer of methods from the natural and experimental sciences to the field of social research took place.

The social sciences were the domain in which this methodological debate truly became most pertinent, especially during the twentieth century. On the one hand, quantitative methodology has become associated with the underlying positivism of Durkheim's conception of the social sciences, according to which (a) facts are considered to be things and should be studied in the same way that they are in the natural sciences; (b) results must be formulated in the form of laws or generalizations similar to those produced in the natural sciences; and finally, (c) normative or evaluative neutrality is required. On the other, the Weberian comprehensive orientation of the social sciences offers a vision that is substantially different in some respects. The Weberian proposition that the object of social science should be social activity and that to for it to be social an activity must contain a sense or meaning underlines the importance of the comprehensive moment of the actor's subjectivity. Weber did not abandon an explanatory orientation, but he did present an analytical framework that varied substantially from Durkheim's proposition. For Weber, it is an error to think that it is possible to study social phenomena using the same procedures used to investigate the physical world. The scientific method proposed by Weber involves the development of ideal types. Although these do not necessarily exist in reality, they have a heuristic and explanatory value. They are hypothetical constructs formed with an emphasis on certain aspects of behaviour and institutions that are empirically observable. The ideal type is therefore theoretically possible but not necessarily empirically observable. Research as a task consists in determining in each particular case the proximity or distance between reality and the ideal image [2, p. 61]. For Durkheim, explanation is defined according to the cause. To explain a social phenomenon is to search for its efficient cause and to define the antecedent phenomenon that inevitably produces it. Secondarily, once the cause of a phenomenon has been established, it is possible to also seek out the function that it fulfils and the utility that exhibits. For Weber, however, to understand is to apprehend (that is, the intellectual seizing, grasping or capture of an object) the inner meaning of social phenomena. In his view, to understand is to apprehend the meaning that each actor attributes to its own behaviour (subjective senses). This need for interpretation, which cannot be undertaken without the mediation of language or without consideration of the internal states of the subject, has resulted in this perspective's being described as qualitative. There is an underlying repudiation of applying an identical methodology to the natural and social worlds. The natural world

is explained, whereas the social world is understood. Qualitative methodology is related to subjectivity and the unconscious (psychoanalysis), the signifiers and signifieds of words and signs (linguistics, semiology), the meaning of these (semantics), the interpretation of symbols (hermeneutics), culture (anthropology), the perception of reality (phenomenology) and society (sociology) [3].

This dispute, represented in outline form by the poles of explanation and comprehension of social reality, has never disappeared, and it has appeared and reappeared in historical waves that present different aspects and states of the debate, as well as different hegemonies among the positions. The result has been that the social disciplines have tried to adapt the analytical procedures of the natural sciences to the investigative process used. At the same time, the natural sciences, the source of quantitative perspectives, have undergone a transformation in their views over the course of the twentieth century. They have moved towards abandoning the extremes of purity and attenuated their position as a result of various contributions. In short, the classic paradigm of the physical sciences has been called into question by the most recent products of "new physics" [1, 3–5].

From an ideological viewpoint, qualitative approaches represent a critical reaction against the inherent conservatism of quantitative perspectives. From a theoretical viewpoint, the qualitative is justified as a reaction to a production of data that are ever more precise and in ever larger volumes while also being of little relevance in understanding social problems. However, the return of the qualitative almost immediately produced a certain qualitative triumphalism [6], and once again a distancing and consequent polarization that slowed down the search for conciliatory models came about. All this has led to the quantitative-qualitative dualism's taking on of new forms and to the gradual enabling of an approach, by means of a third way [7], that considers the two positions to be compatible and complementary. The complementarity principle, which was developed by, among others, Planck, Bohr and Einstein, and which applies

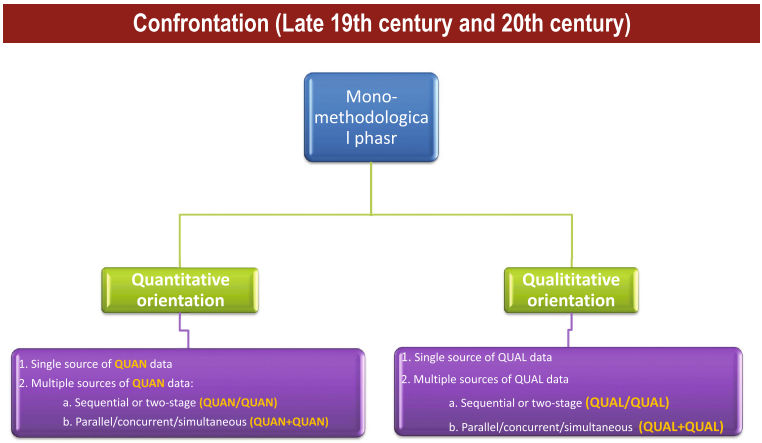

Fig. 1. Produced by the author based on Creswell [9], Hernandez Sampieri and Mendoza [10], Bryman [11], Hernandez Sampieri et al. [12], Anguera [13], Delgado Álvarez [14], and Sánchez Gómez [3].

to the physics' explanation of light, not only reveals the compatibility of the two approaches but also their complementary nature, explaining how light is simultaneously a wave (qualitative) and a particle (quantitative) [1, 5, 8] (Fig. 1).

2 The Search for Harmony Between Quantitative and Qualitative Orientations

Taking this brief theoretical perspective into account, one might think that one of the harmful effects of the quantitative-qualitative dichotomy would be the concealment of other methodological possibilities. This dichotomy has not only operated in the scientific community via the offering of the respective processes. Rather, the defenders of the theory of incompatibility between the paradigms have also presented them as exclusive offerings that are separated into opposing and sealed-off compartments. These authors consider the conflict between the two positions to be almost insurmountable. As Hernández Pina [15] states, advocates of this stance maintain that "the differences are not based so much on numbers and statistical techniques as they are on more substantive issues such as objectivity, validity, reliability and the criteria of truth." Currently, leading scholars such as Teresa Anguera [13] advocate methodological complementarity, even if problems—which in Anguera's view can be resolved—arise throughout the process (Fig. 2).

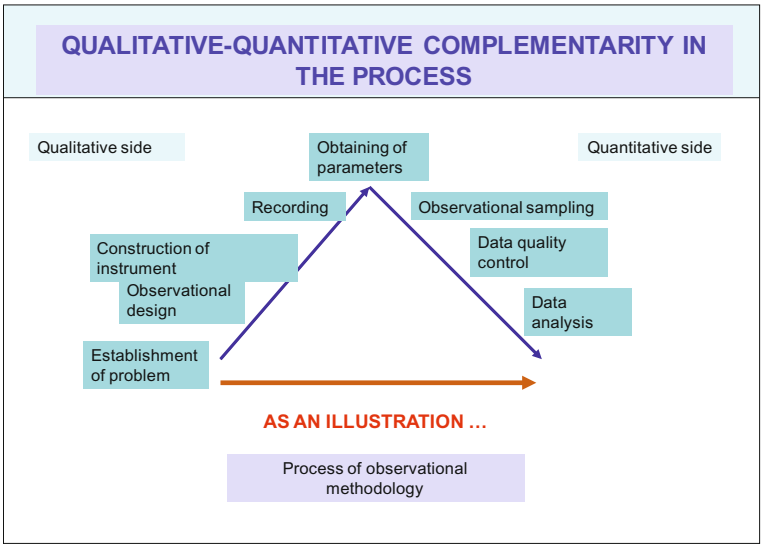

Fig. 2. Quantitative-qualitative complementarity [13]

Those who adopt a stance of discrepancy maintain an attitude of subordinate difference. That is, they argue that only one of the methodologies is valid for the analysis of social reality and has a greater value, meaning, therefore, that the other can only be a

complementary tool. Pure quantitativists thus think that their methodology is the only scientifically reliable one for the study of any phenomenon of social reality. By contrast, pure qualitativists believe that only their approach is able to legitimately encompass social reality. In the more moderate forms of the respective interpretations, the supporters of one perspective accept the other, though they will always and in all cases give it a secondary status and supplementary role only.

The harmonious position, however, appreciates the possibilities of each methodology and respects the contributions made by the two. This does not normally imply that each is given a global value. Rather, they are often confined to specific social spaces to which they are particular and to which their true features are especially suited. The idea is therefore to adopt a dual posture—that is, to accept the duality without sacrificing either of the two extremes. Giving one's backing to the potential of convergence creates the obligation to propose multi- or mixed-method methodological strategies that converge in a compromise between quantitative and qualitative orientations.

In 1998, Bericat [16] proposed three subtypes to the basic strategies of multi-method integration: complementarity, combination and triangulation.

Complementarity refers to integration strategies that incorporate a double and differentiated view of the facts—quantitative and qualitative—in which one complements the view of the other, without there being any overlap. It represents the lowest degree of methodological integration. The end product of this type of multi-method design tends to be a report with two clearly differentiated parts, each of which describes the results obtained through the application of the respective method. The strongest arguments in favour of methodological complementarity according to Sarrado et al. [17] and Sánchez Gómez [5] are as follows: in favour of complementarity

- Qualitative and quantitative methodologies alike, when properly interwoven, provide a broader view of human phenomena.
- No methodology is free from limitations.
- It would be a mistake to identify subjectivity exclusively with qualitative methodology and objectivity with quantitative methodology.
- Research must combine the formal rigour of quantitative methodology with the creativity and flexibility of qualitative methodology.
- Pedagogy requires quantitative studies that enable the causal and correlational dimension. It requires interpretive and subjective studies that allow an understanding of the types of exchange of signifieds. And, finally, there is a need to seek out normative, ethical and ideological dimensions as a basic form of human social interaction.
- Education research conceived in general terms has to be empirical, interpretative, normative and critical.

Combination additionally integrates one method into another, with the intention of strengthening the conclusions generated by the method considered to be the main one. It is not based, therefore, on the independence of methods so much as it is on their complementing of one another. This is the way in which it operates when use is made of discussion groups to improve the preparation of a questionnaire or when use is made of a survey to generalize the results obtained in a research process supported by a discussion group.

Finally, triangulation represents the greatest level of integration, since it entails an understanding by the two approaches of the same aspect of a social reality. In this strategy, what is attempted is the convergence or overlap of the results. The methods are applied independently, but the goal is to submit the level of convergence or divergence of the results to examination [16]. The triangulation strategy is especially useful for validation of measurements in comparative analysis, given the problems surrounding the ability to "travel" from the selected measures and their adaptation to different particular contexts. Triangulation can help with travelling from some contexts to others without making errors of interpretation (Peters, 1998:97-102, cited in Sánchez Gómez) [5]. The use of triangulation can be exemplified through two sides: (a) the first relates to problems of measurement, enabling the validation of a measure through the use of two different instruments that present peculiar characteristics in relation to that objective. Where both instruments produce an identical measure, confidence in the results will increase; (b) the second use relates to the verification of hypotheses. If a same hypothesis can be contrasted with independent methodologies, confidence in the veracity of the results will increase substantially.

An organized logical sequence of stages in the research process should allow this change of perspective (from qualitative to quantitative) to take place without friction or internal tension within the procedure to be followed. This work of integration can be glimpsed in studies from a few years ago by mathematicians and social researchers that were based on of the following propositions [16]:

1. Most of the information that a significant number of researchers in the social sciences work with is qualitative in nature, and so they attempt to foster the development of suitable mathematical analytical patterns. According to Alvira [18], there were attempts to resolve this on three fronts: first, by creating possibilities for transforming qualitative into quantitative through new developments in measurement theory; second, by devising new statistical techniques that use qualitative data; and, third, by creating formal languages that are not necessarily numerical and that allow the processing of data.
2. The second, more radical proposition is based on the idea that one can only expect a quantity for an established quality, and, conversely, that one can only expect a quality in an established quantity [16]. That is, quality and quantity logically require one another if they are not to lose their meaning.

The road ahead may be long and difficult, but it would seem that we are now on the path to this integration of quantity and quality coming about, and although for Bericat [16] complementarity already implies a preliminary degree of integration, we advocate further advances on other levels. The two methodological sides can mutually benefit each other, and often they can be used in combination. It is true that sometimes this option presents serious problems of efficiency owing to high costs in terms of money or time, or owing to shortcomings in training, but in any case there are attempts to put an end to the confrontation of the two perspectives.

More recently, Flick [19, pp. 124–137] has highlighted the importance of linking qualitative and quantitative research and suggests that the relations between qualitative and quantitative research can be studied on different levels, namely:

- Epistemology (and epistemological incompatibilities) and methodology
- Research designs that combine or integrate the use of qualitative and quantitative data or methods, or both;
- Parallel use of qualitative and quantitative research
- Sequential combining of qualitative and quantitative research:
- Mixed methods designs of qualitative and quantitative research;
- Linkage of qualitative and quantitative methods
- integrated longitudinal designs
- Linkage of qualitative and quantitative methods
- Transformation of quantitative data into qualitative data
- Transformation of qualitative data into quantitative data
- Linkage of qualitative and quantitative results
- Triangulation of qualitative and quantitative research in the context of the evaluation of the quality of the research: application of quantitative criteria to qualitative research or vice versa.

For Flick, these levels of relationship could be considered in the following terms:

(a) Indicating of incompatibilities. In the epistemological and methodological dimensions, different ways of relating quantitative and qualitative research can be found. An initial relation is the marking out of the incompatibilities of both types of research in terms of methodological and epistemological principles [20] or of the research-related objectives that they pursue in general. It is often linked with theoretical positions such as positivism and interpretivism, which are involved in a conflict of paradigms.

(b) Definition of the fields of application. One solution to this debate aims to view research strategies on a separate basis, depending on the problem and the research question. Each method refrains from entering the field of the other.

(c) Predominance of quantitative research over qualitative research. This predominance can be detected in both quantitative research manuals and investigative practice. Arguments such as the representativeness of the sample are often used to justify the assertion that only quantitative data lead to results in the true sense of the word, while qualitative data play a more illustrative role [21, p. 278]

(d) Superiority of qualitative research over quantitative research. This position is less common but is more radical. Overman [22, p. 352], for example, argue that quantitative methods are "profitable research shortcuts in the data generation process", while only qualitative methods—in particular hermeneutics—can provide real scientific explanations of facts. Kleining, cited by Flick [21], states that "qualitative methods can live very well without further use of quantitative methods, while quantitative methods need qualitative methods to explain the relationships that they encounter" (p. 279). Other authors such as Cicourel [23], meanwhile, see qualitative methods as relevant in microsociological studies and quantitative ones in macrosociological research.

(e) Uniting of qualitative and quantitative research in one design. For Flick [19, 21], qualitative and quantitative methods can be united in research design in accordance with the following modalities:

a. Integration: continual collection of both kinds of data.
b. Sequencing: qualitative and quantitative research are placed in different parts of the same research process.
c. Triangulation: involves the combination of several qualitative methods and/or the combination of qualitative and quantitative methods. The two methodological perspectives receive additional compensation in the weak points of each method used on an individual basis. However, under this conception, the different methods are autonomous. They operate side by side, and their meeting point is the problem under study. In the end, no method is seen as preliminary or superior. Whether or not the methods are used at the same time or one after the other is less relevant compared with their being regarded as equals in their role in the research [21, p. 280], [19, p. 67]).

(f) Combining of qualitative and quantitative data. The combining of data can be oriented towards transforming qualitative data into quantitative data and vice versa.
   a. Transformation of qualitative data into quantitative data: sometimes there is an attempt to quantify statements made in open or narrative interviews or during observation. Frequencies are established in each category, and these are specified and compared (for example, seven out of ten interviewees said …; most replies focused on…), rather than seeking an interpretation and a presentation of theoretically substantiated findings. This is an implicit transformation of qualitative data into almost quantitative findings [19].
   b. Transformation of quantitative data into qualitative data: Flick [21] asserts that when analysing the frequency of certain responses in interviews, additional ideas may arise that complement the quantitative data, and so "we need to collect and add new data types (interviews, field observations) to explain why some patterns of response arise most often in a survey") (p. 133).

(g) Combining of qualitative and quantitative methods There are few methodological procedures that truly integrate qualitative and quantitative strategies. As Flick points out, questionnaires that include open or free-text questions are defined by some as qualitative research, even if these questions scarcely call upon a methodological principle from qualitative research. For this author, this is not an explicit combining of both forms of research.
   Flick [19, 21] states that if the objective of combining qualitative and quantitative research is to attain greater (broader, better, more complete) knowledge about the problem, the three results are useful. What is needed in the third case (and perhaps in the second) is a theoretical interpretation of the divergence and contradictions. And if both approaches are combined to validate the findings, the third (and maybe the second) case is an indicator of the limits to the validity.
   Roller et al. [24], meanwhile, present a method called hermeneutic classificatory content analysis, which integrates ideas and procedures from Oevermann's [22] objective hermeneutics in a basically quantitative content analysis. Along similar lines is the transfer of data analysed with programs such as ATLAS-ti or Nvivo to SPSS. In these works, the relationship between classification and interpretation is quite unclear. Developing truly integrated qualitative/quantitative methods of data

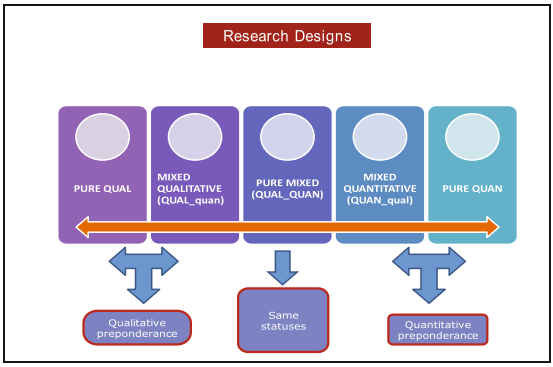

Fig. 3. Adapted from Delgado [21]

collection or analysis is a problem that remains unresolved [21, p. 282]. Delgado [14] says that based on the weight of each approach in the study, different positions along the qualitative-quantitative continuum (gradual combination) are established, giving rise to different designs (Fig. 3):

(h) Linkage of qualitative and quantitative results. Most often, combinations of the two approaches are produced by uniting the results of qualitative and quantitative research. This uniting serves to obtain an understanding of the problem under study that is broader than what an individual approach would have provided or to mutually validate the findings of the two approaches.

Three alternatives can arise out of this linkage of results [19]:

- The qualitative and quantitative results converge, provide mutual confirmation and support the same conclusions:
- Both results focus on different aspects of a problem but are complementary with one another and lead to a fuller approach:
- The qualitative and quantitative results are divergent or conflicting.

3 New Methodological Designs in the Twenty-First Century: Mixed Approaches

As we have seen, the beginning of the century was marked by the traditional confrontation between methodologies. Although in the second half of the twentieth century there was alternation in the dominant paradigm and efforts were made to criticize the opposite stance, at the end of the twentieth century there was a slow climbdown in the conflict, with fleeting outbreaks of complementarity [13]. The twenty-first century began with a third orientation that had been emerging for decades and that has been labelled as the pragmatic approach [3, 10, 14, 25–35] (Fig. 4).

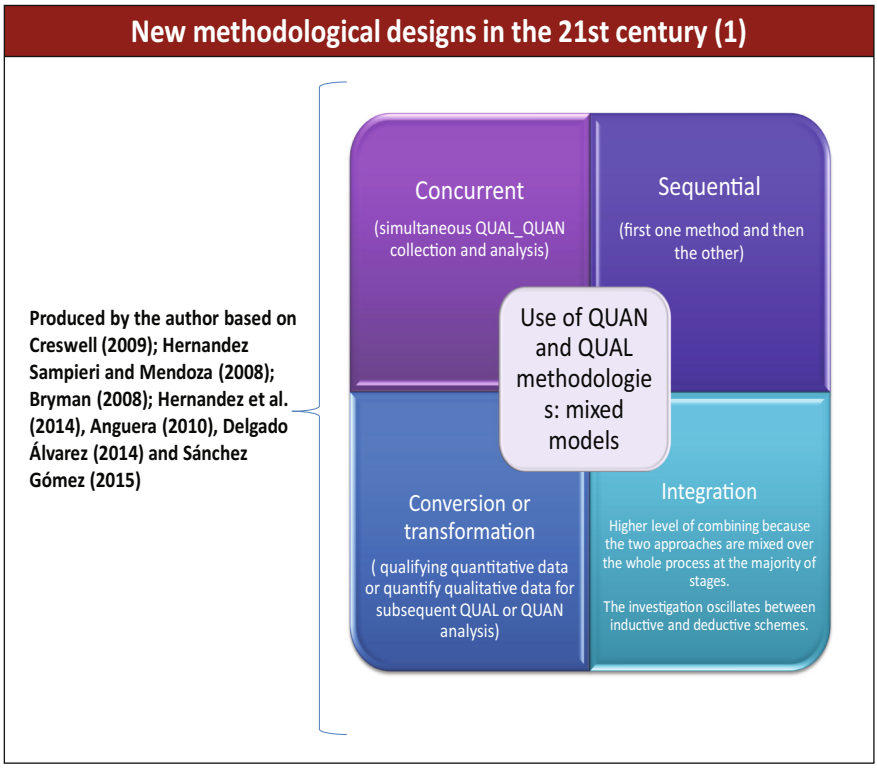

Fig. 4. New methodological designs in the twenty-first century

The pragmatic orientation supports mixed or hybrid methods and models (pluralism and compatibility). It holds that relations between researcher, phenomenon and participants are determined by each particular study and the context. It rejects the dichotomy between conventional dualisms and is oriented towards actions rather than towards philosophical discussions. "Pragmatic" researchers collect, analyse and integrate or connect quantitative and qualitative data in a single study or a multiphase research programme, and they grant the same status to quantitative, qualitative and mixed approaches.

The advantages of the use of this new approach have been set out by several authors in recent years [10, 11, 14, 28, 29, 36–38]. They can be summarized as follows:

Triangulation: (quantitative-qualitative corroboration)
Complementing: Clarification of the results of one method on the basis of the other
Holistic view: comprehensive and complete approach
Development: the results of one method as support for the processes of the other (sampling, collection, analysis of data, new hypotheses, etc.)
Initiation: discovering contradictions, new frames of reference, modifying original approaches with results from the other method
Expansion: one method can expand the knowledge gained through the other

Compensation: the weaknesses of one method can be remedied by the other method
Diversity: different views of the problem
Clarity: Observing items not detected by only one method

1. Credibility and improvement: strengthening arguments, results and procedures coming from both methods
2. But this favourable new context has been possible mainly thanks to a series of events that are enabling the increase in mixed designs. These are, among others: publication of a special issue of British Educational Research Journal (2003) on education research with 8 articles (4 mixed); the creation of the Journal of Mixed Methods Research (2007), in which qualitative methods to develop quantitative measures have started to be used, as have quantitative methods to strengthen qualitative findings, qualitative methods to explain qualitative discoveries, and equivalent quantitative and qualitative methods; a considerable increase in work with and on mixed models (2008–2015), among which the contributions of John Patton, Jennifer Greene, Richard Grinnell and Charles Teddlie stand out [26–29]. The advance of mixed models has also been made possible by the abandonment of radical methodological positions, increases in scientific output, recognition of researchers who use both perspectives, increases in communication between sciences and disciplines, the variety of new quantitative or qualitative instruments and the evolution of new hardware and software technologies [13].

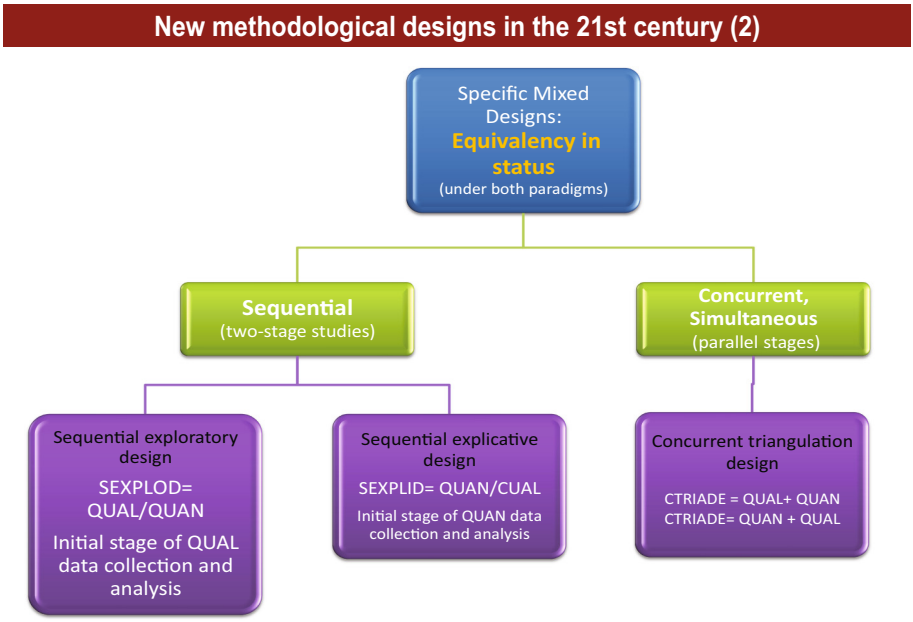

Fig. 5. Produced by the author based on Creswell [9], Hernandez Sampieri and Mendoza [10], Bryman [11], Hernandez et al. [37], Anguera [13], Delgado Álvarez [14], and Sánchez Gómez [3]

3. This increased development of studies based on mixed methodology makes it possible to in turn distinguish different designs: mixed designs with equivalence in status and mixed designs with dominance in status (Figs. 5 and 6).

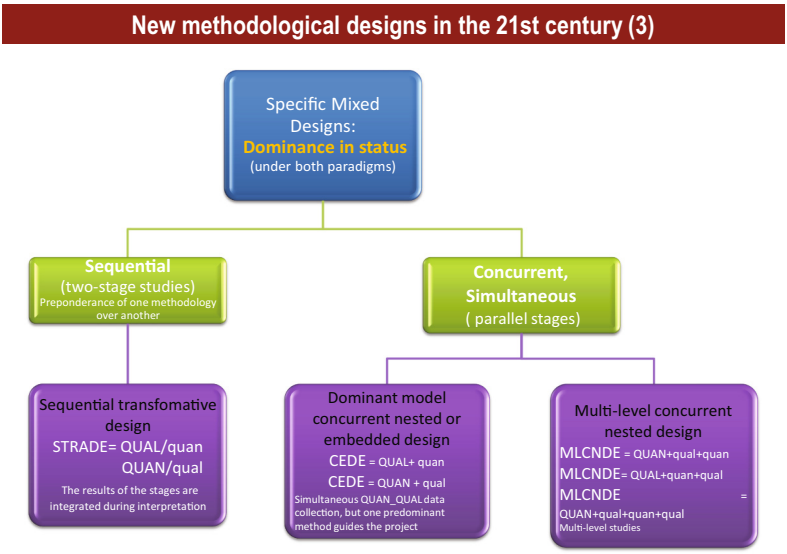

Fig. 6. Produced by the author based on Creswell and Plano Clark [26], Tashakkori and Teddlie [27, 28], Hernández et al. [12], Morse and Niehaus [33], Delgado [14] and Sánchez Gómez [3].

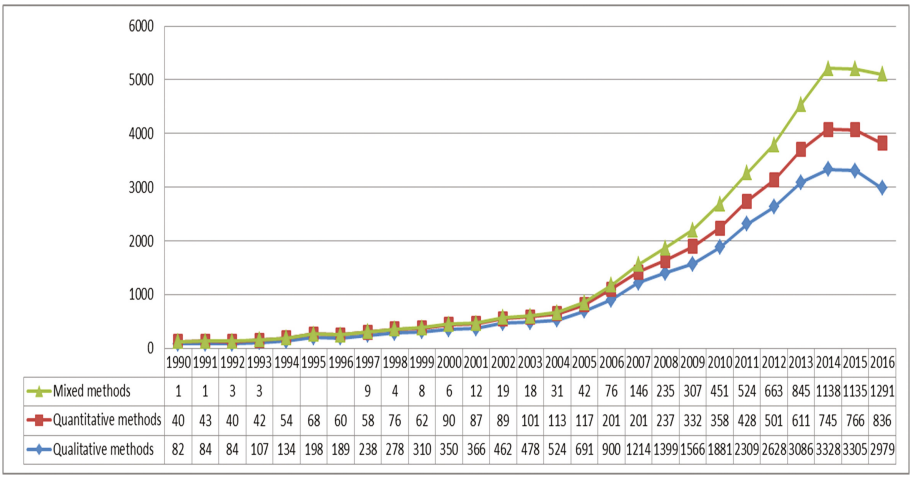

Fig. 7. Evolution of research between 1990 and 2016. Source: data taken from the scopus database. search terms: title-abs-key ("qualitative/quantitative/mixed method or qualitative/quantitative/mixed study" or "qualitative/quantitative/mixed research") and doctype (ar) and pubyear > 1989 and pubyear 2017 and (limit-to (srctype, "j") and (limit-to (subjarea, "soci")

4 Conclusion

Based on the statistics provided by the SCOPUS database for 2016, it can be stated that the future of qualitative research and mixed models is highly encouraging. It is possible to confirm that both approaches have experienced an increase in use and prestige in recent years. If one examines the trends in social sciences research works between 1990 and 2016, it can be observed that out of the 42,494 pieces of research, 29,170 used a qualitative methodology, 6,356 a quantitative methodology, and 6,968 mixed models. That is, 69% of studies were qualitative, 15% were quantitative and 16% were mixed. In 1990, 82 qualitative studies and 1 mixed one were published. In the past year, 2,979 articles published in scientific journals were qualitative, 836 used qualitative methodology, and 1,291 were mixed (Fig. 7).

As Anguera [39, p. 151], [13] states, "the combined use of qualitative and quantitative methodology, given its pertinence to processes and results, fosters a mutual strengthening of the two types of procedure, and it facilitates triangulation through converging operations". Delgado [14] lends further weight to this idea by pointing out that they combine the formal rigour of quantitative methods and the creativity and flexibility of qualitative methods. This is not a juxtaposition, but rather a flexible combination in the investigation's stages of the quantitative and qualitative components. Quantitative/qualitative collection and analysis are intended to integrate results and enable a joint discussion that allows inferences to be made (meta-inferences) so as to better understand and have a broader view of the phenomenon under study. And, Delgado concludes, social sciences studies need quantitative studies that open up a causal/correlational dimension and qualitative studies that allow the types of exchange of signifieds to be understood.

In the field of the social sciences, and in particular in educational research, acceptance of the validity of arguments made by one's opposing counterparts on the part of practitioners on either side of the quantitative-qualitative divide would help to reduce the conflicts that sometimes occur in certain disciplines. A caricature of the nonquantitative researcher is someone who invests all his or her resources into understanding a specific case in all of its complexity, to confront the logical impossibility of not reaching any conclusions in terms of cause and effect. The opposing caricature is that of a researcher who uses all his or her time to conduct statistical analysis using data that contains very little information on the problems of concern. Both sides are correct. Proponents of quantitative methods are correct in arguing that all logical inference problems that populate the development of statistical theory are also present in nonquantitative work. On the other hand, nonquantitative researchers are right to say that the benefit of collecting better information often exceeds what can be gained by finding new forms to torture existing data [40].

It is increasingly evident that qualitative research is not promoted through "occurrences" or by proposing "opinions", but rather through a plan in the procedure and fulfilment of the guarantees that the achievement of the objectives is based on. This entails a commitment to certain values: fostering critical thinking and undertaking a constant search for the truth. A priori, neither quantitative nor qualitative research is superior to its counterpart, and both correspond to the same inferential logical. Both are

equally scientific [4, 5, 41–43], and the two can provide equally valuable information. In addition, if both types of data are integrated, when they coincide the quality of the investigation will be strengthened.

From the preceding paragraphs it can be deduced that not all observations are suited to quantitative measurement, and this is even more the case when working on questions related to participants' specificities and interests and to capturing their stories. Comparison requires the establishment of differentiations based not only on quantity, but also on quality.

Taking into account the above, the problem to be investigated will determine the method of research, thus opening the door to the use of multiple methods in social research. There is therefore a wide range of possible techniques for the collection and analysis of information. The researcher must select methodological options within a broad and diverse thematic field. Social reality is complex, multivariate and difficult to understand. The study of each object can benefit from adopting different methodologies and research designs, which implies a methodological plurality that diversifies the modes of approach, discovery and justification in view of the aspect or dimension of the social reality that is being studied. This is why one can speak of a plurality of methods that are suitable in each case to the object that the researcher seeks to study.

The application of scientific method to the social sciences raises peculiarities and difficulties, but these do not prevent scientific procedure, in the sense of the basic principles that guide scientific activity, being a single whole.

One can therefore speak of method in the singular, because it implies a general position with universal validity for apprehending the world. By contrast, one can speak of methods in the plural because within a field of knowledge or between different areas of knowledge there may be multiple procedures for understanding reality. The specific procedures for the elaboration of scientific knowledge can be manifold.

To the traditional dichotomy between a quantitative methodological orientation and a qualitative one it is necessary to add considerations of the method in relation to making decisions and change and new methodological trends of a mixed nature supported epistemologically by pragmatism [26, 37].

In taking into account the epistemological dimension, we try to provide a response to the questions posed by knowledge of reality, delimiting the nature of the relationship between the individual who seeks to know and what is known: between knowledge and researcher. This is the level of research at which the researcher must specify his or her paradigmatic choice (interpreting the world, science and phenomena).

The 21st century began with a orientation that emerged decades ago called pragmatic approach This approach supports methods and mixed or hybrid models (pluralism and compatibility. It rejects a conventional dualisms dichotomy and focuses on the action rather than onthe philosophical discussion. The "pragmatists" researches collect, analyse and integrate or connect QUANTI and QUALI data in a single study or multi- phases research program; and offer the same status to QUANTI, QUALI and mixed approaches. The advance of mixed models were also possible by the abandonment of radical methodological positions, by the increase in scientific production, recognition to researchers who used both perspectives, increased communication between science and disciplines, variety by the evolution of new technologies and new instruments QUALI/QUANTI hardware and software.

Within this general context, it can be argued that we live an excellent period for qualitative research with social profile. In fact, in most of the researches the use of qualitative research as a preferred methodological approach prevail. Many others, especially the latest ones, are mixed methodology.

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Teaching Inclusive Mathematics for Cancer Child Patients in a Hospital Environment

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Abstract. This article aims to explain how teaching and learning processes of early mathematics education happen on a given oncological hospital in the Brazilian state called Goiás, Brazil. The qualitative and exploratory research is mainly based on longitudinal data, documents, teaching plans and notes, and semi-structured interviews. The data analyses are based on thematic and content methodologies regarding teaching and evaluation. The research identifies complex challenges that mathematics teachers face daily to teach mathematics in hospitals for children who are diagnosed with cancer and are having cancer treatment. For instance, teaching and learning venues being hospital rooms may not the best place for children to learn or for the teachers to work in.

Keywords: Inclusive early education · Teaching mathematics · Pupils with childhood cancer and oncology hospital

1 Introduction

The hospital education service is a type of pedagogical service resulting from a special education policy oriented by the Ministry of Education Office (MEC), structured and organised by Brazilian states and municipalities. It is a policy aimed at pupils of early education who, due to illness, are prevented from attending classes of primary schools. The policy's aim is that the pupil, in the process of treatment and/or recovery, continue the studies, without major losses in his/her learning process.

The pedagogical services can be carried out in both hospitals and pupil's homes, depending on the medical recommendation. In the homes, the teaching, in general, happens individually, however, in hospitals, preferably, are carried out collectively in a classroom designed for this purpose. In hospital classrooms, classes are mixed or composite, that is, they are intended for pupils of different age groups and school levels. When pupils are prevented from participating in mixed classes, due to medical orientation, health conditions or indisposition of the pupil, the pedagogical services are carried out, individually, in the pupil's bed.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_30

Dealing with special situations of pupils with health problems, acting in spaces other than the standard school, confronting situations that demand new knowledge, raises questions of teacher training.

In particular, in the field of mathematics, that teaching has historically been a challenge, in the special context, in our hospital scenario, how is teaching thought and organised? How is the process of teaching and learning mathematics, and the training of this education professional to work in this context?

These research questions led educational researchers to base their studies in order to investigate the subject and its legal bases, raising the main objectives and characteristics in the educational practice of the hospital education service, as well as to understand how the teaching process of teaching mathematics in a hospital education service occurs.

2 The Hospital Education Service and Guidelines for Teaching Mathematics

In Brazil, despite the fact that the first educational activities in a hospital environment emerged in the 1950s, only in 2001 an effective policy was introduced that made it possible to establish such pedagogical assistance to pupils in health care. This assistance originated from a federal law by the Brazilian Federal Constitution [1], Law no. 8,069/1990, which provides for the Policy and Guidelines of the Child and Adolescent (ECA) [2], reinforced by Law no. 9,394/1996, which establishes the guidelines and Basis of National Education (LDB) [3], which was guided by the National Policy for the Integration of People with Disabilities [4] and finally, established by the Resolution CNE/CEB n. 2/2001 [5].

As a complementary document to the Resolution CNE/CEB, in 2002, the Brazilian Ministry of Education Office (MEC) presents specific guidelines on the implementation of hospital education services in Brazilian states and municipalities. This implementation was done on the document entitled "Hospital education services and home pedagogical assistance: strategies and guidelines" [6]. This document presents the principles, foundations and objectives of the hospital education service, the organisation and administrative and pedagogical functioning, as well as guidelines on teacher training and pedagogical practice.

The emergence of a new national education for children and people with disability, the new policy in 2008 suggests profound political and educational changes. Denominated as the National Policy on Special Education in the Perspective of Inclusive Education, it modifies the public attention of the previous policy [4], which assisted pupils with special educational needs. That is, the policy takes into consideration all children and people who require special attention and have special demands, and focuses in three groups of learners: pupils with disabilities, with growth and developmental disorders, and highly gifted/talented.

In Goiás state, the locus of research, hospital and home educational services have been carried out by the state education network since 1999, with implementation of the educational project known as *Projeto Hoje*, developed under the former Superintendent of Special Education. Since 2008, according to the education officer who is responsible

for the hospital and home service in Goiás, although with limitations of financial and pedagogical resources on the part of the Federal Government, due to the new policy of special education of the MEC, the teaching of pupils in health care has not stopped being offered, even because it is a legal right of the pupil.

In 2013, as a result of the evaluation of the social importance of the work carried out in Goiás, the *Projeto Hoje* gains a structure within the Special Education Management of the current Goiás's Secretary of State for Education, Culture and Sport (GSEDUCE), called as the Nucleus of Hospital Educational Care (NAEH).

According to the guidelines of GSEDUCE for hospital education services, the pedagogical work developed by the NAEH aims at attending pupils of early education in the public schools from Goiás state and from other states that are being treated in the hospitals [7].

For the organisation of the home and hospital pedagogical work, NAEH employs the following professionals: director or general co-ordinator, home co-ordinator, secretary, social worker, psychologist, teachers/educators. It should be stressed that the number of teachers varies depending on the local demand for care in each hospital [7].

These services, according to NAEH recommendations, are guided by a pedagogical planning based on the diagnosis of an individual pupil's educational, physical and psychological needs. The class teaching contents must take into consideration the Reference Curriculum of the State Education Network (RCSEN).

In order for the pedagogical activities in the hospital education service to occur satisfactorily, the teacher, besides having abilities related to the special needs of the pupil (relation of the pedagogical field), needs knowledge on occupational and safety health issues, and presents emotional and psychological balance (relation in the field of health) since he/she is in frequent relationship with health professionals and with pupils in medical conditions of suffering and pain, and may deal with many situations of death.

All teachers who work or have already worked at NAEH are women, most with a degree in Pedagogy and Teaching Diploma in Education. The other teachers are licensed in other areas, but none in mathematics. The explanation of this fact, according to the co-ordinator is that the area of mathematics is considered by GSEDUCE as a high priority, and the mathematics teacher is exclusively allocated to teaching activities in school classrooms, and for the main duty of teaching only (except for special circumstance).

Although the right of the child and adolescent to receive hospital and home educational services is recognised, as is the case in Goiás, this is not a national reality. According to Zombini et al. [8], "most hospitals destined to this public do not have space for the service, which ends up generating more inequality, both in education and health, and making full citizenship nearly impossible" (p. 83).

The hospital education service has been characterised as a socially important and necessary activity for pupils with special educational needs. A right guaranteed by law, however not contemplated in the current special education policy [9].

The teaching of mathematics in the state Education Network of Goiás, regular or special, at all levels of early education, is guided by Goiás's RCSEN area of mathematics [10], a document that presents the bases of National Curricular Parameters (PCNs) [11].

The RCSEN for mathematics presents a proposal of teaching mathematics according to four main areas defined by PCNs: numeracy, measurement, shapes, and information

handling. However, Goiás's PCNs are different from PCNs when it presents content and expectations for learning in a sequential way (bi-monthly and yearly oriented) and not fragmented (assuming isolated content). The Goiás's document presents itself as a guide, and has clear, direct, and objective language, and states that the bimonthly content seeks to "bring equity in the teaching and learning process allowing a pupil to progress and continue his/her studies without prejudice" [10, p. 119], which is organised based on the expectations of pupil's learning. The Goiás's mathematics guideline document is also different from the PCNs for not presenting philosophical concepts, approaches or theories. Its content is structured in Tables that show the learning expectations based on the four main areas been taught every two months and yearly.

Analysing the pedagogical practice of hospital education service teachers who work with pupils with special needs, such as pupils in health care, using the Goiás's RCSEN for mathematics as the guiding principle of the service is characterised as an important part of the research.

3 Methodology

Methodologically, the study is presented as an exploratory, qualitative, longitudinal and documentary research.

Exploratory in the sense of investigating information about the phenomenon, although previously studied, not deepened and understood. In this process of knowing, the idea of exploring starts from strategies oriented by the questions and objectives formulated in the scope of the investigation.

Aiming to provide greater familiarity with the purposes of research [12], seeking to identify the essential characteristics of the variables proposed in the study [13], the exploratory research is based on methods and techniques previously selected in its design process [14]. In this sense, the proposed research was supported by a longitudinal study, guided by documentary bases that were available. The documentary data varied from 2008 to 2012, and this length of time was chosen because the documentary sources had not been explored yet, due to a change of orientation of the National Policy of Inclusive Education of the MEC [9]. The actual research was then conducted from July 2015 to January 2017.

The pedagogical hospital education service plans and records of the taught classes were used as primary sources of the research in the Oncological Hospital Araújo Jorge (HAJ). The choice of the hospital was based on the following established criteria: for being the pioneer venue of the hospital educational service in Goiás since 1999; for being acknowledged as the national reference hospital in the treatment of cancer, which brings patients not only from other cities of Goiás but also from other Brazilian states; for receiving large numbers of child patients (focus of the research); for being a medium and long term internship venue (so the classes have continuity); and for being considered as an environment of great complexity for the pedagogical work.

The selection criteria used for including the available documents, archived in notebooks, were: (a) to have the register of pupils enrolled at the initial years of Elementary School; (b) to have the mathematics register for these pupils; and (c) to present the pupil's

annual register, that is, from the 1st to 4th bi-monthly register. In all, a set of 8 notebooks containing the hospital education service planning and report were included in the document analysis. Some notebooks presented additional information such as photographs, memos, folders, NAEH guidelines, information from the school of origin of the pupil, among others.

To facilitate the identification process, the notebooks were sequentially numbered from 1 to 8 (volume available according to the proposed research) and presented as N1, N2, N3, …, N8. Some notebooks, depending on the information volume, were fragmented into two parts, identified by part I and part II. The pupils, when referenced, as a form of non-identification, were recorded by their initial letter of their name.

As a complement to the study, in the sense of deepening, a semi-structured interview was conducted with the NAEH co-ordinator, who participated, at the time of the study, in the support team in the management area. As a guide, the interview had six questions. Theses questions were oriented to clarify and update information on the structure and policy of the education service and hospital classes.

As a secondary source, the legal documents that support the hospital education service were used, being: the Brazilian Federal Constitution [1], LDB [3], Policy and Guidelines of the Child and Adolescent (ECA) [2], National Policy Person with Disability n. 3,298/1999 [4], Resolution CNE/CEB n. 02/2001 [5], Hospital education services and home pedagogical assistance: strategies and guidelines [6] and Goiás's guiding documents for hospital education service [7].

The data analysis was based on Content Analysis from the perspective of Guerra [15], Franco [16] and Bardin [17]. In the process of analysis, careful readings of the documents led us to search for significant elements, followed by a survey of the main ideas, established by the recorded units. The conduction of the thematic and problematic analysis process resulted in the convergence of the recorded units into four categories of analysis, being: the contents worked by the teachers; the teaching strategies adopted in class; evaluation processes for pupils; and beyond mathematics, the latter being an approach that involves questions that go beyond the object of the lesson.

4 Results and Discussions

The chosen hospital of study, HAJ, is one of the ten hospitals in Goiânia, the capital of Goiás, that offers, in partnership with GSEDUCE, the pedagogical education service to inpatients.

The HAJ provides two venues for the service, a chemotherapy room, for individual teaching, and a room more similar to a classroom, for the teaching of collective activities.

The documentary base of this study is the documents (organised in notebooks) of planning (lesson plans) and the registration of the classes held in the HAJ (reports). The lesson plans, in general, present lesson's theme, proposed objectives of each meeting, contents to be worked, methodology, resources, references/bibliography, and the daily register of the pupils that will be taught. Although the documents have the same recording structure, it is emphasised that there is no standardisation of the elements presented in the notebooks.

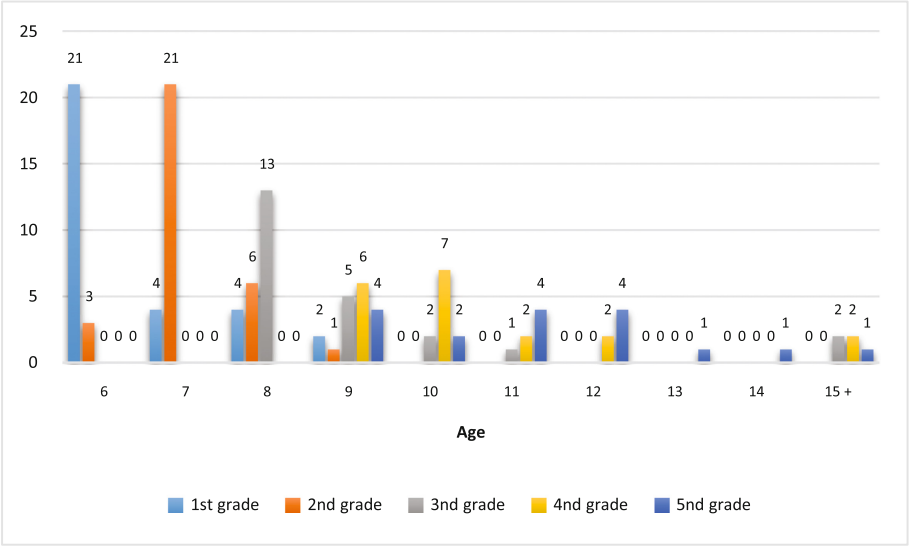
In the period under review, some notebooks had more records of pupils in the final years of Elementary School in the first semester, and in the second semester, there was a greater presence of pupils from the initial years or Early Childhood Education. Other notebooks, however, showed a balanced frequency between the number of students by levels of schooling. In summary, there was no evident pattern of age group of the pupils attended in the hospital classes by series/age or even school level.

A total of 1302 pedagogical appointments were made to 121 pupils from 2008 to 2012, resulting an average of 10.7 attendances per pupils/year. In order to understand the dynamics of the computation of educational service, according to the NAEH's co-ordinator, in a same class with three distinct pupils, is considered three different services, since these present individualised strategies, carefully delivered to each pedagogical moment, series and age of the pupil.

It needs to be stressed that the clinical/medical condition of the pupils attending the HAJ is related to the treatment against cancer, a severe, very high risk disease whose treatment has many adverse effects. The pupil's attendance depends very much on the state of health in which he/she is. Some patients stay for a short time and others extend the treatment for a longer period. There are cases of frequent re-admissions to the hospital, as well as the extension of home care.

Among the pupils enrolled in the initial years of Elementary Education, a variation was observed in the age group as a function of the school year, as shown in Graph 1 below.

The data show that, among pupils of the same school year, there are appear to be noticeable differences between the age groups. As an example, in the first year there are



Graph 1. The Number of Pupils Enrolled by Series and Age Groups from the Initial Years of Elementary School at the Oncological Hospital Araújo Jorge (HAJ). Source: NAEH, from 2008 to 2012. Note that this graph was made by the researchers.

children from 6 to 9 years old, and in the third year children from 8 to 19 years old. Such variability of age and school grade may be explained, among others, by the duration of the health treatment of the pupil in combination with the non-re-enforcement of his/her right to have the hospital education service.

In terms of the mathematics contents that were worked in the hospital classes, these follow the four main areas in the mathematics Goiás's RCSEN [10]. It was also verified that there was no sequential or regularity in the content taught in the hospital venues. Depending on the notebook there was a high or low frequency of a particular content. Due to the hospital class attendance be uneven, it was observed that the teachers did not follow the proposed bi-monthly contents according to the school year and according to what was written on the guiding document. Most of the teachers organised the content in order to meet the main needs and abilities of the pupil, a fact that is explained by the NAEH co-ordinator as an essential guidance for teachers. According to her, teachers were encouraged to promote the necessary pedagogical and curricular modifications, even if they were contrary to the Goiás's RCSEN, in mathematics or other disciplines, because it was a special circumstance such as the hospital education service. This fact is in accordance with what is stated in the LDB, specifically in the articles 58 and 59, which deal with educational service to have autonomy to be organised according to the specific conditions of the pupil, ensuring curriculum, methods, resources and techniques that meet the pupil's needs.

It is important, when considering a bi-monthly curriculum, to take into account the notes of Teixeira and collaborators [18] when they published that pupils, in general, study the contents initiated in their local schools. However, because of their health conditions, and because of the number of classes is reduced in relation to the regular school attendance, they cannot keep pace with their peers at school, hence the need to understand that in the hospital class, pupils are in a special situation and have tailored-designed pedagogical service.

In addition to the issues of curricular adaptation, another point observed was that, as a rule, teachers sought to work the mathematics contents in an interdisciplinary way. In many plannings, mathematics was explored in a thematic involving other areas of knowledge, being more frequent its interdisciplinary relationships with the Portuguese Language and Arts.

As for the teaching strategies adopted by the educators in the HAJ hospital classes, activities were carried out using different resources such as board games, chess, table dominoes and operations, memory game, abacus, golden material, tangram puzzle, engraving, geometric form puzzle, calendar, clock, leaflets, magazines and newspaper. The use of folds or drawing and painting to explore geometric shapes were also frequently used in class.

There were records of various propositional, thought-solving-problem-skills motivation and contextualised activities developed with pupils, such as research on numbers and their social functions, problem solving using shopping leaflets, clock making, using a calendar to identify numerical sequence, and exploring the meaning of time, activities with problem situations from book stories, among others.

It is well known that the use of diversified pedagogical teaching resources is an important pedagogical strategy in the mathematics learning process. For instance,

Morgado [19] publishes that in the hospital class the awakening to the use of game activities during the pedagogic service is emphasized by the recognition of the benefits which they provide in relation to the educational content, by the benefits in the affective and emotional aspects, and by the recovery of the pupil's health. In the hospital service, a playful activity occupies a special place in the learning process.

Oliveira [20] presents that a playful learning, by providing a child with his/her free physical and psychological expression, translates into a privileged instrument of affirmation about himself/herself, which contributes to the process of health recovery.

In the notebooks, the recording of the playful activities as a pedagogical strategy is highly frequent. The playfulness, in addition to bringing moments of joy, fun, pleasure, debate, integration and interaction in the treatment venue, stimulates moments of concentration, creation of strategies, reflective thinking, and making learning more fun and meaningful for the pupil.

From the notebook notes, it was observed that problem solving skills were used in almost all activities involving the taught content or four main thematic areas.

Although HAJ has three computers available to the hospital class that are connected to the Internet, their uses, according to the NAEH co-ordinator, are very restricted and not re-enforced by the hospital's management. The main reason for such restrictions is unknown as she explained, but even so, now and then, teachers made use of such resources in their classrooms. An example of computer use during the mathematics class was found in the N1 notebook. The teacher, in her report, presented a proposed lesson for her five students, using online games involving numeracy. In the N6 notebook, there was a Web based lesson recorded on the Brazilian monetary system.

Bieger [21] presents the importance of creating research environments, and virtual ones are an important space for such activities. Taking into consideration the PCNs, Kobashigawa [22] warns that only the presence of technological resources in the classroom does not promise changes in the way of teaching and learning, for the author "technology should serve to enrich the educational environment, providing the construction of knowledge through of an active, critical and creative activity by students and teachers" (p. 95).

Regarding mathematics history as part of the taught curriculum, there was a low frequency of this matter in the planning and recording of classes. For example, in the N5 notebook there was a record of an activity with the theme "the importance of numbers in our daily life" in which the history of the number emergence and its importance to society was studied in class. Other history of mathematics lesson was linked to the introduction of the Roman numerals and measurements.

In some records, the teachers cited the use of mathematics books, with which the pupils did exercises and activities. However, it is unknown whether the books were adopted by the local schools of each pupil or the books were provided by the teachers. Regarding this, the NAEH co-ordinator explained that although in some cases the teachers made use of the pupil's local school activities, nevertheless, in general, the classes were taught without theses resources. The co-ordinator highlighted that the openness for the teachers to teach their class was essential, considering that this did not mean isolation of the pedagogical work, but freedom for the teachers to exercise their skills, expertise and knowledge.

The pupils' evaluation, according to the co-ordinator, was carried out by the teachers themselves who delivered the educational service, and should preferably take place in a continuous and integral way, valuing the daily activities of the pupils. The teacher's daily records on the education service, according to the co-ordinator, in accordance with the policy guidelines of the hospital classes [7], were consolidated in a report called the Evaluation Report, which was submitted to the NAEH and later on sent to the local school of each pupil.

In many reports the teachers stated some difficulties of the pupils in developing the proposed activities or those planned activities coming from the pupil's local school which shown the need for planning of the future classes.

In the reports, besides the difficulties of the pupils, the teachers recorded their pedagogical progress and effective learning. There were records that show pupils with difficulties in solving problems with fractions and later on other records of the same pupils stating that they were able to solve problems with fractions without major difficulties. Other types of records on pedagogical issues were on the positive change of pupils' behaviours. For instance, initially some pupils refused to participate in the class activities however, at other times, these pupils were attentive, participative and co-operative and helped other pupils to get engaged in the activities.

The evaluation process is characterised as an important pedagogical tool for both the pupil and teachers, since from it the teachers, besides evaluating the pupil's performance, can also evaluate their own practice. Such reflection can guide pedagogical strategies that best suit complex situations.

This aspect, which is present in the hospital classes and which runs through the content analysis of mathematics, is linked to the frequent need for freedom and flexibility in class planning, caused by several circumstances in the hospital environment, among them: pupils' medical condition and side-effects due to the heavy medications received; pupils' inabilities for attending classes according to medical advice; and collective sorrow and mourning because of pupils' losses due to death.

From the information recorded on the notebooks, several situations were identified but they were not considered to be normal daily teaching routines of regular school teachers. Many of these described situations made us, the researchers, feel profound empathy for the hospital education service teachers and pupils.

The main reasons described by the teachers that caused the pupil to be unwilling to attend classes were due to physical problems: pain, nausea, vomiting, fever, fatigue; to the treatment process: application of chemotherapy drugs or radiotherapy, and to blood transfusion. For reasons of order emotional and psychological: fear, sadness, depression, homesickness, among others. Such reasons directly influence the delivery of the proposed classes.

The pedagogical service carried out in hospitals carry great complexity and challenges to the teacher, among which the relational ones stand out. Because each pupil brings with him/her a life history, which relate to the pedagogical learning process, the oncological treatment, and life experience. It is in this sense that the sensitive listening skills of the educator, as Ceccim [23] presents, is necessary in the hospital education service environment.

Of the various themes observed in the readings, certainly the one that caused the greatest sorrow and distress among pupils and teachers was the frequent encounter with death. In the N2 notebook, as an example of death number, there were reports of 10 pupils that died in the same school year. Dealing with situations of pupil's pain, suffering and death from the hospital class has been studied by Branco [24] who concluded that such pedagogical experiences trigger in the teacher, suffering and illness.

In several situations the HAJ teachers could not teach due to lack of pupils with reasonable health conditions for class attendance. In other cases, even if the students were present, they could not keep up with the classes.

The reports allow us to perceive the work complexity developed in the hospital class. Zombini et al. [8] show that being a hospital education service teacher means

> to promote dialogue, to explore the hospital environment with the hospitalised child, to perceive in the student his/her main needs, health limitations, and educational problems for learning. So that based on these constraints, the teacher can elaborate a pedagogical practice that is adequate to pupil's reality, thus contributing to the construction of new knowledge that is necessary for positive learning and for helping to restore health (p. 74).

Although it is understood that the educator working in the hospital class needs careful, sensitive and attentive skills. This professional also needs workplace knowledge and psychological skills to deal with frequent challenges imposed in the hospital teaching field. Moreover, according to Teixeira et al. [18], these important professional skills appeared to not been addressed either in a basic or advanced level.

5 Conclusion

Through the data (information, reports, descriptions and references) that have so far been presented, we have highlighted that the hospital class is a special educational service that is important and indispensable for the inpatient pupil, since his/her right to education is guaranteed by the Brazilian federal law, despite of his/her impossibility of class attendance that is depending on his/her health condition.

Regarding mathematics teaching in the initial years of primary education in the hospital context, we have emphasised that the teachers' main concern should be to provide meaningful experiences, relating to contents to daily life, seeking interdisciplinary as the class guiding principles, to promote fun and games activities as a learning strategy for pupils.

We have also presented the main needs for training the teachers that are working in educational or hospital care at pupil's home. In addition to the challenges faced by teachers from various educational areas who teach mathematics for children who are having cancer treatment, the hospital work conditions that are related to exposure to germs, infections, high-risk diseases and complex environment have been acknowledged.

At last but not at least, we have reported, our own research experience, for conducting the data analysis of observation and longitudinal data (which for some people may be seen as sheets of papers, however, for us these papers provided information on essential pedagogical resources), that the hospital classes, entangled with challenges and complexities inherent in the educational field of is an important tool for social inclusion

of educators and their pupils who are experiencing living with childhood cancer and oncological treatment.

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How Does Qualitative Explain Specific and Different Tendencies in Quantitative Findings?

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Abstract. Theory suggests different strengths of quantitative research approaches, especially its generalizability. This paper, however, argues that generalizability sometimes can also become a limitation of the quantitative research design when the focus of a study is on how a certain issue immerges in a certain context, as quantitative methods often remove context and individual experience from the generalized findings. In this specific research on the university-enterprise collaboration (UEC) for enhancing graduate employability in Vietnam, qualitative interviews are used to compensate this deficit of quantitative questionnaires. Specifically, when universities and employers have different opinions about UEC, follow-up interviews help explain the disagreement between these two groups of participants. In other words, the qualitative findings of this study help answer the questions 'how' and 'why' certain tendencies immerged in the quantitative findings.

Keywords: Quantitative · Qualitative · Generalizability · University-enterprise collaboration · Vietnam

1 Introduction

Quantitative researchers often rely heavily on correlational techniques to test theories, and generalizability, or the extent the researcher can draw broad inferences from particular cases under their research is considered one of the significant strengths of quantitative research. There is an underlying assumption that psychological and social phenomena have an objective reality, the patterns of which are stable and knowledge of them is additive [1, 2], and that the causal effects between these phenomena can be investigated for generalization which allows prediction [3]. Indeed, by extensively collecting data from a large sample and establishing correlations between given variables and outcomes, quantitative data allow other researchers to validate original findings by replicating the analysis [4]. Moreover, the quantitative data also facilitate comparisons between organizations or groups to determine the extent of agreement or disagreement between respondents [5]. Generalizability is also viewed as the external validity of the quantitative research [3].

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_31

Qualitative researchers, on the other hand, see the world as constructed, interpreted and experienced by people in their interactions (with their own personal and contextual circumstances) [6–8]. Thus, the goal of qualitative studies is often not to generalize, but to provide a rich, contextualized understanding of human experience through the intensive study of particular cases [9]. Qualitative researchers view social phenomena as relational, it exists between people, thus asking a group of people to respond to a certain questions and open rooms for these people to raise issues that matter most for them may yield more nuanced information than data derived from surveys [4, 10]. By spending extensive time with the research participants, qualitative research aims to probe for underlying values, beliefs and assumptions that determine actions among certain groups of people [5]. Generalizability in the eye of the qualitative researcher is only related to the transferability of the collected data [3]. In other words, when quantitative data help to determine the extent of agreement or disagreement between different groups of respondents, qualitative data explain why and how that agreement or disagreement does exist.

This paper does not want to draw a line between quantitative and qualitative research. It also does not aim to compare the strengths and weaknesses of these two main domains of research. Rather, the underlying motivation in writing this paper comes from the process I conducted a sequential mixed methods research project with quantitative surveys preceding semi-instruction interviews. The analysis of quantitative findings shows hard-to-understand and even contradicted results from universities and enterprises regarding the university-enterprise-collaboration (UEC) in Vietnam. Luckily, the follow-up interviews with university and enterprise representatives did help explain how and why such different points of view existed. It is suggested that the strengths of one research approach can also become its limitations. Specifically in this study, generalizability of the quantitative approach addresses the disagreement between the university and enterprise respondents, however, it cannot explain why such disagreement exists, and thus, it creates confusion. The exploring nature of the follow-up interviews indicates that many important characteristics of the participants under research, such as their beliefs, their identities, and their perceptions cannot be meaningfully reduced to numbers and to be generalized without reference to the local context in which people live and work.

2 Background Information of the Study

The higher education-employment interface has gradually gained the support from many higher education systems worldwide, and many universities have taken on board employability or the development of skills desired by the employment market. There seem not much more concern about the intrusion of skills into the curriculum [11] or the fear that academics are required to do ‘double-duty’ of delivery of the excessive content and skill development [12]. Under the call and the pressure for responsiveness from both the government and from the student, equipping students with work-ready attributes has become an important mission of many higher education institutions worldwide [13]. Initiatives and collaborations have been set up and developed, all with the same aim: to better prepare students for the labour market.

Initiatives and practices that connect theory to practice and aim to help students become familiar with the real world working context have become popular in many universities: problem based learning, work based learning, placements, internships and enterprise learning. These initiatives all require the input and collaboration of universities and enterprises. Work integrated learning (WIL) is the term most popular used to refer to the cooperation between university and industry aiming at enhancing graduate employability. Numerous studies discuss the benefits of WIL in increasing work-readiness for students. First, it is claimed that WIL helps and also requires students to integrate theory and practice [14–17]. Students are given opportunities to be involved in the real context of work to reflect on the knowledge they have learnt in the university context and apply that knowledge in the practices at work to solve the real world problems [18, 19]. Second, by connecting theory and practice and exposing students in the real world problems, WIL helps students develop their skills in a meaningful way. And thus, it improves the work readiness and competitiveness for students [20, 21].

Nonetheless, meaningful, relevant and worthwhile WIL experiences require the active and conscious participation, cooperation and collaboration of all related stakeholders [22]. The design and implementation of WIL programs is often reported as challenges to both universities and organizations involved. For both universities and enterprises, agreeing to collaborate for WIL programs means that they need to get out of their comfort zones. For universities, they have to shift their autonomy academic culture by taking on board the application of theory in a practical based setting [14]. Similar to universities, getting involved in WIL programs also takes organizations away from their familiar activities of doing business. Another challenge for both universities and industry partners is how to set work placement goals which constructively align with academic learning outcome and gather constructive, multi-source feedbacks to evaluate performance and identify areas for future development [23]. This requires them to improve their communication and coordination, and indeed, to work together to address thoroughly collaborative problems such as managing different expectations and competing demands in relations to curriculum, pedagogy, roles, resource and performance indicators [24, 25]. This requires time, effort, understanding and mutual trust between the two. These requirements often appear more easily talked than done.

Studies have reported different cases of WIL and how universities and enterprises in many countries do to resolve conflicts to develop a sustainable and effective collaboration for enhancing graduate employability. My study also aims to investigate the current stage of the UEC collaboration in Vietnam, to explore their conflicts and find ways to develop a sustainable and workable WIL in the Vietnamese context.

3 Research Methods

This study is an explanatory sequential design [26, 27]. It started with a quantitative survey, the questionnaires were adapted from the questionnaires developed by Davey and his colleagues [28] when conducting their research about university-enterprise collaboration in Europe. In Vietnam, this survey was also used by the T & C Consulting Group [29] when they investigated the perspective of enterprises about the

collaboration with universities in Vietnam. With my study, I wanted to explore the perspective of both parties (universities and enterprises) about this collaboration. I also wanted to develop and extend the understanding of UEC in Vietnam in a richer way than a study using only quantitative methods. Thus qualitative interviews were developed based on the quantitative results to address the underlying reasons for the significant findings emerged from the quantitative findings. Moreover, qualitative interviews also allowed me to address the local context, historical and cultural features which directly or indirectly affected the quantity and quality of the collaboration between the higher education system and the local industry. This would lead the way to more feasible and practical solutions to ease the university-industry cooperation in the Vietnamese context.

The quantitative data were collected from October 2015 to March 2016. As an exploratory research, this study aimed to approach universities and enterprises in various forms and locations in Vietnam. I use both my personal network[1] with the snowball technique to find appropriate participants for interview[2] and external networks via VCCI (Vietnam Chamber of Commerce and Industry) and university directory to approach the target participants. Nonetheless, with VCCI and the university directory, the online surveys were sent to all of their enterprise members or Department of Training in different universities, regardless whether they had set up UEC or not and regardless whether they are interested in the discussion of the issue.

The university survey gathered 226 valid responses with a high proportion of university/department getting involved in UEC (82.7%). The sample size of enterprise representatives was higher than that of university representatives (261), however, the proportion of the participating enterprises who had been engaging in some forms of UEC from the collected sample was lower (64.4%) than that of universities.

Following the principles of the exploratory mixed method research design [26], the information gathered from the quantitative surveys in the first phase was used to guide the second phase of follow-up interviews. After being collected, the quantitative data were coded and analysed using SPSS software to provide an overall picture and understanding of the current UEC situation in the Vietnamese context. The significant factors emerging from the quantitative data were noted and used for designing qualitative interview questions.

111 survey participants (59 from universities and 52 from enterprises) indicated in their returned questionnaires their willingness to be interviewed. Ten participants from each group were selected for the second phase interviews. Participants were selected according to their representativeness, genders, and their availability within the time frame of my fieldwork. Because the majority of the interviewees had a very tight schedule, individual face-to-face interviews were arranged with each of them in the time and place that was most convenient for the participants. The interviews were conducted from March to May 2016.

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[1] I have been working in the HES in Vietnam for more than 19 years with various connections with different universities in the system, and as a member of the Human Resource Link, I also have connections with people who are in charge of human resource issues in enterprises.

[2] That means I sent the survey to the participants that I know and asked them to pass it on to the ones in charge of the UEC matter like them that they know.

The recorded interviews were first transcribed into plain language before being imported into Nvivo for thematic analysis. Apart from the audio files and the transcription, field notes taken by me during the interviews were also imported together into Nvivo for coding and analysis. Nvivo was very helpful for me to store, organise and manage the data. Since the software assisted much the process of data coding, transcriptions and filed notes reviewing, and the revisiting of the audio recordings for comparing, contrasting and blending data, Nvivo appeared to be a very strong software to ease the inductive analysis of qualitative data [30].

The use of both SPSS and Nvivo provided a good way for me to manage the data, to bounce the data, and to compare the findings. Most of the time, the qualitative data were very helpful to explain the results of the quantitative data (as the interview protocol was developed from the quantitative findings). However, in some cases, the analysis of the qualitative data came up with some new themes and sub-themes, which may look contrasted to the quantitative data findings or did not come up in the initial analysis of quantitative data with SPSS. So, very often I had to come back and forth between the two sources of data to look for expansion, contracts or linkages between the two sources, and SPSS and Nvivo were really helpful to assist me through the whole process. They also helped me to keep track of what I had done, and this made the analysis process less timing and painful. In short, the process of blending the data from two sources for illustration, comparison, infusion, linkage and lending of the findings was handled with the help of these two types of software. The pragmatic approach also allowed me to move back and forth between the two databases to triangulate the findings and to increase the transferability of the research results.

4 The Disagreement Between Universities and Enterprises

The purpose of this paper is not to deliver all the findings from my research project; rather, it aims to discuss how qualitative phase can explain the reasons for the disagreement immerging in the quantitative results between the two groups of respondents. In this specific paper, I want to discuss the result of the question 'who is the one who takes initiative in setting up the UEC?' In the Vietnamese context where the connection between universities and enterprises has been claimed to be very loose [31–33] and both of them still have many internal problems needed be settled [33], knowing the one who is willing to take the first move to invest in the UEC in that context is important as it shows that they now can see the importance of that collaboration and can somehow sacrifice some other aims to work for the common benefit. The research result was also expected to indicate the level of willingness of these two stakeholders in getting out of their comfort zones and in working toward a meaningful, relevant and worthwhile WIL practices for enhancing graduate employability. Nonetheless, the result indicated a significant difference between the data of universities and enterprises regarding this question (See Fig. 1).

What is worth to mention is that this finding is consistent with the findings of T & C Consulting Group [29] and Huynh's [34] who each investigates the point of either enterprises or universities about the UEC. Specifically, T & C Consulting Group investigates the perspective of enterprises about the collaboration with universities.

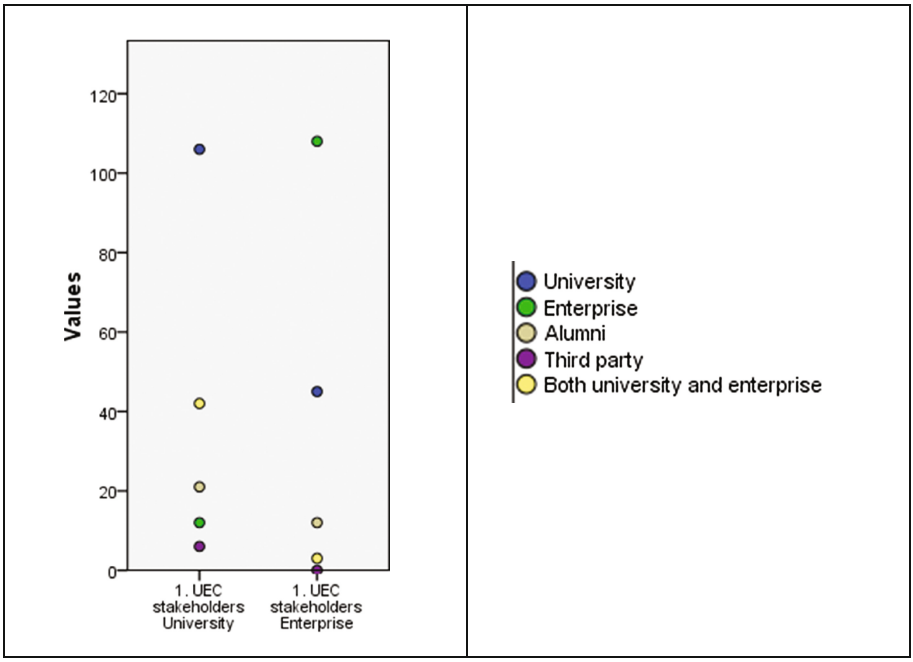

Fig. 1. The one who takes initiative in setting up UEC

Their survey results show that employers are often the ones who first approach universities to suggest collaboration and they are also the ones who suggest the collaboration plans and forms. These employers often complain about their difficulties in communication with universities and in understanding universities' goal when students are sent to their organizations for internships or placements. However, in his study, Huynh [34] raises the voice of universities complaining that although universities want to set up on-going and sustainable collaborations with enterprises, enterprises are not easy approachable. Huynh also claims that most enterprises come to universities just for recruiting graduates and advertising their company images or products, they do not normally actively approach universities to discuss about the collaboration in teaching or training (either for their staff or for university students) or for research collaboration [34].

It is reasonable for both the T & C Consulting Group and Huynh to draw their conclusions as they only investigate the point of view of one involved party, i.e. either enterprises or universities in their specific studies with their specific participants and in specific times. However, with my research, pulling up the different points of view without explanation may easily lead to confusion. Indeed, even I myself when analyzed the data could also not figure out why there was a significant difference between the view of universities and enterprises when it comes to the issue of the one who takes initiative in setting up the collaboration.

5 How Qualitative Explain Specific and Different Tendencies in Quantitative Findings?

In order to explore the reasons behind the different perspectives between university and enterprise, I develop the following questions for the semi-structured interviews:

- When do you approach a university/enterprise to discuss the collaboration?
- Who do you normally want to set up the collaboration with?
- What is your aim when setting up the collaboration?

The interviews, then, revealed some worth notetaking issues. When being asked, all interviewees whose universities or enterprises had been involved in some forms of UEC also assured that they organizations were often the active party in the collaboration, only few acknowledged the role of the other party. Although this confirms the finding of the quantitative data, it does indicate a disagreement between these two groups of participants. Luckily, the discussion with the interviewees in the second phase helped explain why that disagreement existed. When discussing UEC activities, most of the time the interviewees talked about the student internships or student recruitment. This reveals limited types of UEC universities and enterprises in Vietnam often get involved in (indeed, this supports the finding about the few popular UEC types in the quantitative phase). For university representatives, they often cared about the collaboration to help them send students to industry for internships (which is traditional and compulsory part of the curriculum in Vietnam). Only few interviewees whose universities specializing in technology and engineering mentioned some other forms of collaboration, i.e. research collaboration for technology enhancement or technology transfer. On the other hand, the stories about collaboration with universities among participants from enterprises were stories about recruitment. When being asked if there was no need to recruit new staff, they would come to universities to seek collaboration or not, they often confessed (after a bit of silent) that they had never thought about that. They suggested that they - the ones in charge of UEC in their companies - were often the HR staff/managers, and often came to universities just because they wanted to find potential staff members from those universities.

The interviewees from small and medium enterprises (SMEs) indicated that normally the only case which made them think of the collaboration with universities was when they experienced difficulties in recruiting the fresher. Most shared the same point as:

> *I think when enterprises come to universities, they only come for recruitment, and it is harder to carry out other activities because firms often do not have time.*

Both universities and enterprises participants confessed that the relationship between universities and enterprises was almost formed for the short-term/current aims such as for sending students to internships (universities) or for recruitment (enterprises), and it was often considered as asking for help from the other partner. One interviewee who is in charge of the UEC in a university suggested:

We are too busy with other duties all year round, so when it comes to the internship of students, we just call back the previous organizations that we often sent students to them. The collaboration is more like asking for help. We ask them to accept our students to conduct internships in their organizations.

Participants from enterprises, both FDI and local, both big and SMEs, also suggested that they rarely actively came to take part in the collaboration with universities, apart from the collaboration with the aim to attract students to come to work in their organizations. In short, both universities and enterprises only thought about the collaboration when they needed the collaboration for their own purposes; and their times often do not match. Enterprises come to universities when universities are busy with other plans, and when universities look for enterprises who can accept their students for internships, not many enterprises accept students. This is one of the reasons why both universities and enterprises often complain about the lack of enthusiasm from the other party.

The second reason revealed in the interviews was that employers often came to negotiate the collaboration with the top universities such as Hanoi University of Science and Technology or Foreign Trade University, who are often overwhelmed with too many invitations for UEC. In the meantime, many lower ranked and more professional oriented universities were struggling to attract enterprises to either come to their universities for recruitment related activities, or to accept their students for internships. Although this tendency is easily understandable, it does reflect the dilemma of the Vietnamese higher education system where even the most privileged universities in the system is still mainly applied science universities (not research oriented). It is suggested that Vietnam needs to ease the process of universities ranking and classification to better allocate the resource and increase the efficiency of their practices.

6 Discussion and Conclusion

This study reveals that the collaboration between universities and enterprises in Vietnam is still at its very early stage. Both parties seem to see their benefits in the collaboration, but are still struggling to find ways to develop a cooperation that works. They still need to improve communication and coordination, or to work together to address thoroughly their problems in managing different expectations to develop a win-win collaboration [24, 25].

The findings of this study illustrate that generalizability, the strength of the quantitative research, can also indicate a limitation. If this study investigated the perspective of only enterprises, its finding would be consistent with the findings of the T & C Consulting Group [29] that the UEC in Vietnam is still loose because only enterprises work for this collaboration, and that enterprises are the first ones approaching universities to suggest collaboration plans and forms. Nonetheless, if looking at only university perspective in this study, the findings support Huynh's [34] claim that the lack of initiative and enthusiasm from the enterprise is a reason for the difficulties in strengthening the UEC in Vietnam. However, when putting the perspectives of both parties together, the finding becomes confused and the quantitative data cannot explain why the different perspectives existed and who was really the one taking an active role in this collaboration. The qualitative interviews that followed, however, revealed another

picture about the problem, and who initiating the collaboration does not seem to be very important, instead, how to develop a win-win situation in the UEC in Vietnam has become an issue. In other words, at the current stage, Vietnamese universities and enterprises only want to set up the collaboration when they need it, and often, they ignore the benefits of their partner. The connection, thus, is often loose, one-off, and even considered as an 'as for help' process. This indicates difficulties in this very initial stage of the UEC in Vietnam. This hidden message is worth taken into consideration for policy and action recommendation much more than the converse trends found in the quantitative data. In this study, the qualitative findings helped answer the questions 'how' and 'why' there existed different findings in the quantitative phase.

The findings of this study also confirm that qualitative methods can provide a rich, contextualized understanding of human experience [9]. When being used as the second phase in an explanatory sequential study, interviews can yield more nuanced information than data derived from surveys [4, 10], especially when the data in the survey is limited self-explained or is confusing. This study also suggests that important characteristics of the participants under research, such as their perceptions cannot be meaningfully reduced to numbers and to be generalized without reference to the local context.

Acknowledgments. I would like to acknowledge the Alexander von Humboldt Foundation for their fund granted for my postdoctoral research project, the results of which is discussed in this paper.

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The Use of NVivo in the Different Stages of Qualitative Research

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Abstract. When researchers take their first steps in qualitative research, they face the great lack of models to follow regarding the method to use in the analysis of data, on some occasions falling into the temptation of coveting the high level of systematisation employed by researchers working with quantitative data. This article offers a basic theoretical contribution that allows researcher to approach qualitative data analysis and the use of the NVivo software, highlighting its advantages and describing the main functions at each moment of a qualitative investigation, placing particular emphasis on the analysis process.

Keywords: NVivo · Software use · Qualitative methodology · Data analysis · Analysis process

1 Introduction

CAQDAS NVivo - from a holistic perspective - not only provides help in information or data analysis, its usefulness covers the entire process of a qualitative investigation. From a very generic point of view, qualitative research can be understood as "localised activity in a certain place and time that situates the observer in the world" [1, p. 48]. Its intention is to make the world visible thanks to interpretive practices and the use of a series of materials that are going to be particular to it such as observation, narration, interviews and the analysis of textual, digital or audiovisual documents. Furthermore, its habitat or research context will be natural settings, which involves us approaching the phenomenon that is the object of our study with an open vision, attempting to interpret them from the very words and actions of the people participating in the research process.

The open view previously described means that researchers may be moving in a wide spectrum, allowing the coexistence of paradigms within it that can go from the positivist or post-positivist, based on Grounded Theory and deductive logic, which will situate its narrative in the mould of the scientific report, to the socio-critical, represented by many sides, but all of them identifying critical theory as a foundation of a type of report removed from the scientific model, and which may become expressed in

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_32

the form of an essay, story, fable, historical, economic or sociocultural analysis, or autobiography [2].

With this panorama described in mind, perhaps the question that we would have to ask is whether CAQDAS NVivo is able to provide an answer to the wide diversity described or whether, on the contrary, it is not designed to respond to all of them. The answer is easy: the software is simply a tool put at the disposal of researchers. It doesn't determine or obstruct the paradigm or methodology along which we move. This decision will always depend on the researcher, based on the ideological, epistemological, ontological and methodological position, but not forgetting that qualitative methodology normally occurs when multiple methods are employed to [3, 4] search for a better understanding of the phenomenon that is the object of our study.

More than a tool, CAQDAS NVivo is a complete bank of work put at the disposal of the "qualitative *bricoleur*". This concept, widely used in the field of qualitative research [5–7], offers us an extremely graphic idea of the versatility with which researchers can move when carrying out their work. The availability of an excellent bank of work is not a guarantee of success. The true guarantee of its quality will be the artisan who, with wisdom, will have known how to select the appropriate tool from the bank to carry out his work. What we can guarantee is that we are facing software which, in good hands, can help us greatly in our investigative process.

If we specify that which has been put forward to this point, we find that, when facing a qualitative investigation, we will have to opt for one tool or another depending on the point of the paradigmatic spectrum where we are situated, and despite being at risk of not being able to include the multitude of tendencies and focuses that could arise, we can identify four important tasks to carry out:

1. Research design. The researcher must contextualise the experience to be studied. It is the moment to decide the most appropriate methodology and affirm our beliefs on the basis of the paradigm that sustains us.
2. Data production and analysis. It will be the task *par excellence* of the researcher, tackled from the rigorousness of a selective display or from the amplitude that allows us to initiate production from an informant or key context. It will be possible to adopt an inductive, deductive or mixed focus. The end point will be to achieve the understanding of the phenomenon studied, affording it visibility.
3. Identification of existing theories. Prior theories may determine the production of data or theories gathered from the inductive production and analysis. In both cases other versions of the phenomenon that is the object of our study should not be ignored.
4. Report construction. This last task is key in the process. The focuses can be many and their production will be orientated based on the audience that the report is aimed at. If we want to emphasise that the qualitative research is understood as a process of improvement, the reports should be indebted to the people who have participated in the process, independently of whether we can also create reports to provide a response to audiences of a more academic and/or scientific nature.

2 NVivo in Research Design

Research design, as put forward by Cheek [8], should cause the researcher to become aware of the context in which it is going to develop. Up to this point there was always the myth that qualitative research could be carried out at low cost or with no funding whatsoever, but the current reality tells us that all research requires funding for two fundamental reasons: being able to cover the costs it implies, and promote the work carried out. This necessity can mean we are obliged to scarify our axiological and methodological beliefs and approaches in order to adapt ourselves to the dominant culture in the sphere of research.

Once this clarification has been realised (we recommend [8], pp. 53–93), Denzin & Lincoln [9] establish five levels of research and reflection when setting out the design of an investigation:

1. Where is our paradigm of reference going to be in terms of the context, participants, method, production techniques and data analysis? In short, the paradigm and the process to follow must be specified for the sake of its consistency.
2. Are the materials (methods and techniques) going to be appropriate for providing a response to the problems contemplated and the change we wish to produce?
   From these two initial questions, the rest are going to open the door for us to the social phenomenon that we are going to investigate.
3. What is our object of study going to be? Materialised in the queries (orienting objects or possible hypothesis, according to our paradigm of reference) and the people or phenomena that we will attempt to view from the investigation. This question will be answered with a greater or lesser degree of flexibility, according to our paradigmatic positioning. Situated in the positivist/post-positivist side, it will be necessary to explain internal and external criteria of validity, and the utilisation of sample selection techniques. If we place ourselves on the opposite side, or the social-critical paradigm in any of its manifestations, where before we found an absolute rigidity, now we enjoy maximum flexibility when carrying out and putting into practice the design of the investigation.
   The study object determines a perspective with which a phenomenon is tackled, and as such, it is a problematic reasoning of reality, [10]. Analysing and studying reality does not consist in the *recollection of empirical data*, rather, it is the construction of data from a specific viewpoint, which is related to what has been denominated, that is, the theoretical, political and ethical view and position, [11] which will be specified in the principles of actuation and the methodological option.
4. What strategies are going to be appropriate to provide an answer to the object of study? Before continuing, it is worth clarifying the difference between *methodology* and *method*. The methodology is the philosophical framework or the way of thinking and studying social reality, whereas the method is the group or procedures and techniques for producing and analysing data [12, 13]. There are a wide range of methods available to us and, from the coherence with the previous reflections, we will have to opt for the one or ones that can provide us with the best answer. We can become social or educational ethnographers; Case Study researchers; interpreters of social phenomena in their multiple manifestations; analysts of reality from

logical-deductive strategies, applying Grounded Theory; active participants of investigation focusing on action, technique or critique, or focus ourselves on a clinical qualitative research model centred on the questions that arise from daily practice different contexts, including health, education, and social action.

With the previous matters answered, we reach the last question:

5. Which research tools or techniques are we going to select from our bank of work to provide a response to the queries generated? We can basically group them into four large areas: observational, documental, narrative and dialogical. On some occasions it will be necessary to opt for one and on others a combination will be necessary if our queries want to go further than knowing the *what* to look into the *how*, *where* and *why* of our investigation. Quality is not always found in the quantity or diversity of techniques or participants; sometimes we discover it in the study of the singular, although it is translated into one participant and a single technique. Excellent autoethnographies demonstrate it thus (we recommend [14, pp. 262–315]).

Quivy & Van Campenhoudt [15], in their design proposal for a qualitative investigation, open two basic demands for the tackling of this first step in our research: self-reflection and the consultation of external sources.

How can the NVivo software help us in these two processes?

To begin the self-reflection process our first decision should be to *create a new NVivo project*. This decision, which may seem obvious, is not usually made by the majority of researchers, who consider the program to be exclusively a data analysis tool.

From here, it is the moment to work with the *internal sources*, and within these we have a key tool designed to gather together implicit beliefs and theories, both prior and constructed throughout the process by the researcher; we are talking about *memos*, which are still nothing more than editable text documents which allow us to collect all reflections and notes that could be relevant to the investigation. The way of organising them in different *folders* or *subfolders* is for the researcher to decide. To summarise, we could say that memos would be the equivalent of the researcher's diary.

As a complementary tool to the *memos*, and seeking a better understanding and comprehension of the social phenomenon we are going to study, CAQDAS NVivo - within the *Explore* menu - supplies us with the *mind* and *concept maps*. In the first case it helps us create, via a hierarchical and ramified structure, a conceptual scheme of the design elements of our investigation. In the second case, we are able to generate a freely designed map that is not necessarily hierarchical, in which original ideas and concepts can be combined with elements already generated in our project (resources, nodes, classifications,…). This second possibility of creating deductive maps allows the establishment of relationships and inferences between the ideas and queries of the researcher, and the theories constructed by the participants, reflected in the categories (nodes) created in the analysis.

Regarding the consultation of external sources, they can be produced in different intensities based on the paradigm that supports the investigation. From positivist and post-positivist approaches, it will be a key task to undertake upon starting our investigation, and with a great degree of depth, as we will prioritise deductive over inductive analysis processes. If, on the other hand, our investigation is framed within the constructivist or socio-critical paradigm, the stress will be on the voice of the participants,

their theories and beliefs, to which, in this case, from the inductive processes, the approach to already constructed external or formal theories will be progressive and simultaneous with the emergence of the implicit theories of the participants.

In both cases, CAQDAS NVivo offers us a series of tools that we are going to find very useful for the documentation process. At this point we are going to focus on the two most common which are currently at our disposal: paper and digital documents. For the former, the tool available is the *external*, which is a bibliographical record of those resources that cannot be included in our project as an *internal*. The externals are going to be equivalent to the bibliographical records or summaries that are usually made when we want to document a research project. The advantage is in the fact that, being incorporated into the project, they are available for categorisation and codification in the same way as any other resource (internal or memo).

In the event that the documental source is in digital format and is compatible with the software, the possibilities for its management increase. In a logical, ideal situation, the steps to carry out would be as follows:

1. Carry out a search for books, articles or any other document via the different databases to locate relevant information on the topic that interests us.
2. Use any of the *bibliographical reference managers* available and which NVivo subsequently recognises to import the information it generates (EndNote, Mendeley, RefWorks and Zotero).
3. From the previous step, NVivo import all of the information generated, organising it in the project automatically via the option of the *Data, other sources* menu, selecting the management system used (EndNote, Mendeley, RefWorks and Zotero).

Within the queries to external sources, Quivy & Van Campenhoudt [15] mention the convenience of holding interviews with experts on the topic with the goal of specifying it. These documentation interviews can be totally or partially transcribed (only fragments of value) in CAQDAS NVivo. In this case, the recording should be made in *audio* or *video* for the file to then be incorporated into the project file from the option that it offered to us in the *Data* menu, and proceed to its transcription. If we do not wish to lose the link to the audio or video file, we would have to create it as an *external*; in the event that we are only interested in the interview text, we could transcribe directly to a *memo*.

Lastly, with a view to a more in-depth reading of the texts, and seeking to make the opinions, questions or theories of the researcher visible, we could use the link options within the *Analyze* menu, and it should be pointed out that from these we can incorporate *notes* in the texts analysed, which bring together ideas or reminders, *"see also" links* to establish relationships between documents, *hyperlinks* to external files or documents available on the internet and, finally, create *links to memos* with the document that we are analysing. In Fig. 1 we can see a summary of the strategies that can be used at this first design stage of the investigation.

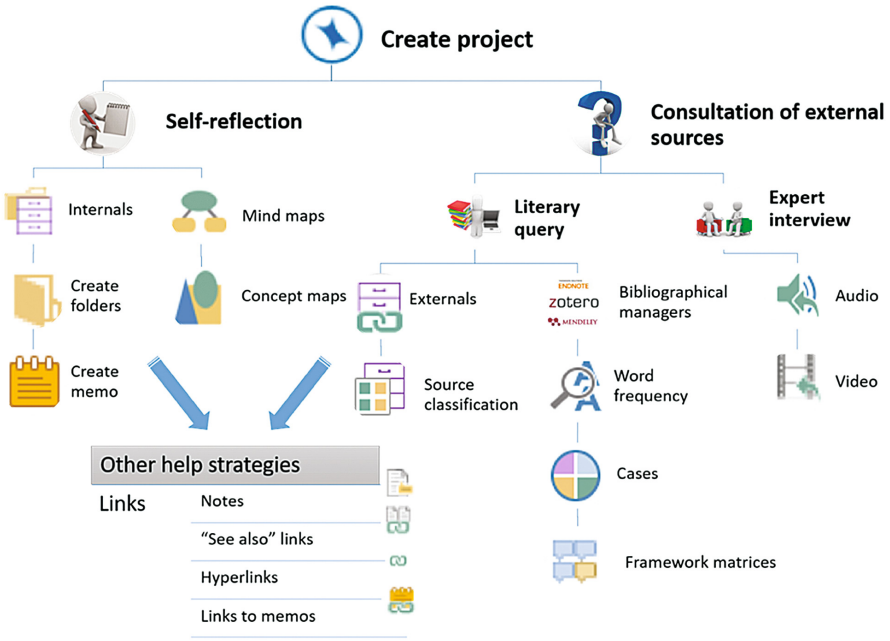

Fig. 1. NVivo strategies in qualitative research design

3 NVivo in Data Production and Analysis

How is data production and analysis carried out? In the arc that we drew at the beginning of this article we saw how qualitative research moves in a wide paradigmatic spectrum; the reality of the situation is that there are production and analysis focuses that are very far apart and even opposing, despite sharing a single cohesive concept. If we take a global approach to tackling the problem and, at the risk of being dichotomous, we can start out from two models:

In the first, again taking the principles of experimental design of the Sciences, we find ourselves before two clearly defined moments: data collection and analysis. The qualitative investigations that are nourished by it normally identify some participants (really a sample), intentionally selected, which looks for representation. It is frequent to observe in the designs an initiation from previous theories, making the act of data production the purely mechanical act of creating a preset number of observations, interviews, focus groups and any other information collection technique. That is, the stress in deduction rather than induction, and there is usually preference for an analysis that tends to work from the particular, depersonalising the participants, in order to generate or test a general theory.

In this second model, we can see that it is the singular that is important, the participant, from whom we will construct the substantive theory from his or her own implicit theories. The start of the data production is generated from a key informant. The process is transformed into a productive spiral, fed back from an exercise of

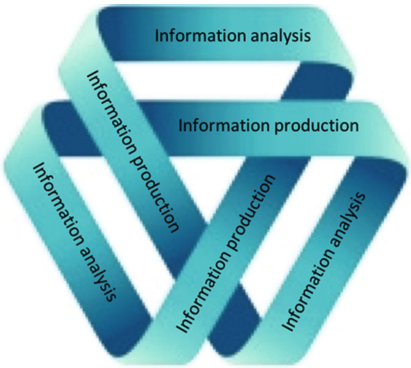

Fig. 2. Process of analysis in an emerging qualitative research design

constant to-ing and fro-ing from analysis to production. This constant game which, as in the Moebius strip, never has a beginning or end, will stop when the researcher decides that the knowledge generated on the social phenomenon studied is sufficiently relevant to take the context as saturated (see Fig. 2).

What can NVivo contribute to facilitate data production and analysis to the researcher? (See Fig. 3) Economy, credibility and quality of our investigation.

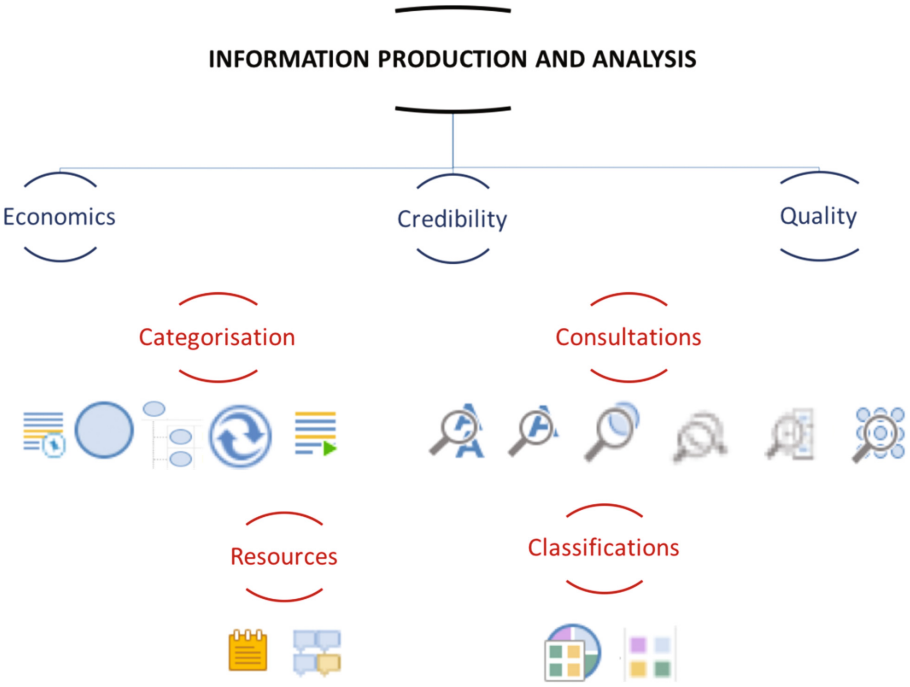

Fig. 3. NVivo strategies in data production and analysis

Economy, because it facilitates the most arduous tasks of qualitative research, especially the identification of central categories and subcategories, and their subsequent codification. It is convenient to unify concepts to avoid confusion. The software identifies the category as a *node*. This concept is more appropriate for as, as it breaks the classic linearity, and encourages working from the reconstruction of the discourses, by way of the weaving of a network. In this way, we can habitually read how the codification assimilates the *indexing* concept, used more in the sphere of the digital network and understood as the incorporation of content to an index (nodes). As well as these tasks, it will allow us to carry out specific *text searches*, *classify* the participants, assign *attributes*, construct *framework matrices* that facilitate discourse analysis, etc.

The second contribution is credibility. One of the main criticisms aimed at qualitative research is its lack of rigour in analysis processes. It is frequent to see how in a report the methodological path carried out is not shown, in many cases, a sensation in which the reader does not know if the theories of the participants prevail, or the specific view the researcher is makes of them. We are not ingenuous; asepsis in the qualitative report does not exist, nor is it recommendable if we put forward that the truth is polyhedral and depends on the angle from which it is observed. But from this point to not leaving evidence of the analysis process carried out there is an abyss that we cannot allow. This credibility can be made visible with CAQDAS NVivo through the use of different query options such as *matrix coding*, *coding*, *compound*, *word frequency*, etc.

The consultation strategies that are going to be employed will also depend on the paradigm within which we are positioned in our investigation, and the method or techniques we are using to produce the information.

Lastly, we will find the third contribution of the NVivo software in the improvement of the overall quality of the investigation. We can still find, in the 21st century, colleagues who defend the purity of qualitative research tooth and nail against the attacks it is receiving from the world of technology. We simply have before us a tool (we consider that in the face of all it is a work bank) and the decisions of how, when and for what to use it will always be in the hands of the researcher.

What is evident is that a greater depth in the data produced, the possibility of establishing relationships between the whats, the whys, the hows and the whens, the possibility of growing the singular into the particular from the identification of attributes, polishing the analysis from the construction of matrices or being able to carry out a comparison of the discourses of the participants, leaving evidence from the framework matrices, means an improvement in the quality of the investigation.

4 NVivo in the Identification of Existing Theories

The critical stage in the creation of qualitative research reports occurs at the moment when we have to move from the description of participants' theories to their fusion with the interpretation made by the researcher from them, constructing the substantive theories of the investigation. We are used to linear reports which imitate the design of an experimental report and respect its big moments, but which are camouflaged by the qualitative terminology. Instead of the state of the question, on the majority of occasions there is a non-critical superposition of the dominant theory in the field. From this point,

we move on to the exposition of a methodology that, on occasions, lacks even modesty and maintains concepts such as sample, subjects, study variables, research hypothesis; it is rare to find starting questions which, if they do appear, are more often than not accompanied by objectives that are usually repetitions of the former, defined from respect for established guidelines. The next step is to put forward some results that, in general, are limited to a descriptive sequence of the categories, constructed via the summation of a constant cycle of textual quotes followed by the explanation of the researcher, which is saying the same thing with other words. There is then a discussion, disguised as an interpretation of results, in which formal theories put forward in the initial question stage cross with the substantive theories constructed with the participants, to end with some conclusions that focus on the most significant aspects of the investigation.

Against this model it should also be pointed out that there are excellent investigations which, starting out from the questions and motivations that led to the beginning of the study, open the range from a mixed analysis, in which substantive theories emerged crossed with the dominant ones in the field, and an excellent incorporation of the paths followed to reach the described destination. Notwithstanding, it must be said that these are in the minority.

How does NVivo help us in this process? Putting at our disposal a wide range of tools, which gives us the power to test the questions that will be generated throughout the analysis process. We can generally find this range of tools in three spaces in the program in the main menus: Analyze, Consult and Explore (see Fig. 4).

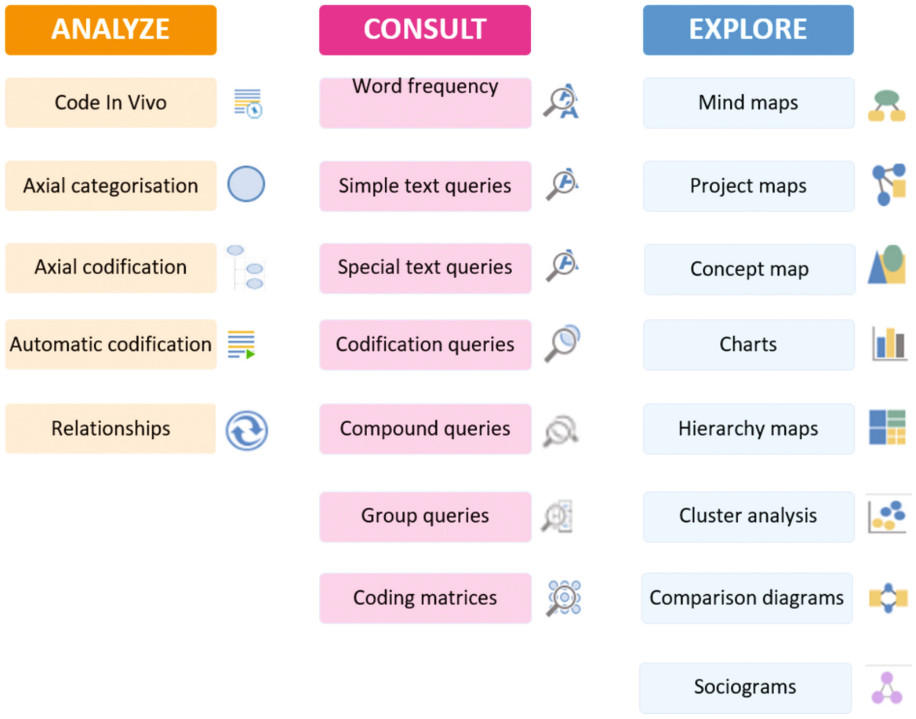

Fig. 4. NVivo strategies in the identification of existing theories

From the *Analyze* menu, once the main categories (nodes) have been examined, we continue with categorisation searching for and establishing *relationships* (associative, unidirectional or bidirectional) between these categories and analysing those that CAQDAS NVivo calls *feelings*, which collect emotions or aspects that are very positive, positive, negative and very negative in relation to the content of each node.

The *Query* menu opens all of the tools that allow us to carry out different *search strategies* and *matrix coding*.

Lastly, the *Explore* menu provides us with the possibility of creating *maps*, which can be mind maps, of projects maps or concept maps; the possibility of carrying out approximations of visual analyses in the following formats: *chart*; *hierarchy chart*; *cluster analysis*; *comparison diagram* and *network sociogram*. The only thing that the software does not give us is creativity, imagination, intuition, curiosity and evidence that all researchers need to undertake the deductive processes of the analysis.

5 NVivo in the Creation of a Report

Once this point has been reached it is complex to be able to go deeper without reiterating the aforementioned points if we want to draw attention to the convenience of the change of mentality that should operate in our community of qualitative researchers. Despite this, as we mentioned in the previous section, we have taken the clothes of experimental designs off. Few take risks, except in the field of anthropology, to offer report proposals that are more coherent with the principles that govern the qualitative. We understand and respect that the spectrum we operate in is wide, and in many cases there are more discrepancies than agreements between researchers which, in theory, we move in the same ecosystem as qualitative research. But it would be necessary to start plotting out limits to the idea of "everything goes" as a report. Still respecting that carrying out qualitative research contains a part of significant artistic creation and that the type of reports is and should be diverse, we must start establishing some minimum guidelines that strengthen the paradigm and afford it the credibility and quality demanded of us from other fields of knowledge.

In this space CAQDAS NVivo provides us with the possibility of incorporating all types of graphic images that facilitate the understanding of the processes carried out. In addition, it permits us to generate maps, already mentioned, which serve to provoke a more agile and quick understanding of the contributions made. Furthermore, its complete compatibility with Office allows us, via copy and paste strategies, to be able to bring any information produced with the program to our word processor or spreadsheet. This path is bi-directional, to which it works perfectly in the opposite sense. It also allows us to export reports in PDF format, or images that we can then include in a document generated with the word processor, to create the research report.

6 Conclusions

Simplifying the possibilities of CAQDAS programs - especially NVivo - is one of the most common errors of qualitative researchers, even leading to their denial from a position that we could now label as classical. Denying the benefit of making use of the technological advances that facilitate the qualitative research process is to take a position of denial that is, today, sterile and useless, which would not permit us to make advancements in the important aspects.

We should be very aware that under no circumstance do current CAQDAS programs, especially NVivo, which we understand to be the most useful of those in existence, attempt to substitute the researcher. The questions of the before and the during of the investigation, access strategies and information production are functions that we cannot delegate to the program. However, we do find within it the help that facilitates the processes, the detailing of the analysis and the offering of the evidence that will give the investigation a greater quality.

The software is simply a tool put at the disposal of researchers, and the uses and risks that may exist around the use of information technology in qualitative research do not originate from the nature of the program itself, rather from the attitudes of the researchers; thus, NVivo conditions the ideological, epistemological, ontological and methodological positioning of an investigation.

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Understanding Higher Education Teaching, Learning and Evaluation: A Qualitative Analysis Supported by ATLAS.ti

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Abstract. Teachers' education has been studied by Ferreira (2014), Gatti (2009; 2013), Alves (2011), Garcia (2010), Tardif (2010), Imbernón (2009), Patto (2004), and others, who discuss it on Basic Education level. We investigate how university professors who teach future teachers understand teaching foundations, which is a great field for studying in Brazil. This research is conducted based on AVENA Project in two Brazilian universities. Our main objective is to analyze possible patterns on understanding teaching, learning and evaluation in teacher`s training courses. We also analyzed students understanding in the same courses. In this article, we present a methodological path chosen, because of the great amount of the collected data we used *ATLAS.ti* software, which we chose because of the possibilities of organization for qualitative analysis.

Keywords: Qualitative analysis · Higher education · Teacher training · Software

1 Introduction

Teacher training has been presented under different perspective along education history. We can highlight some times, the end of the 19th century and beginning of the 20th century when schooling network and school Republican Project that support elementary education were organized. According to Gatti and Barreto (2009) the establishment of teacher training high schools opens teacher education in Brazil, although not as university level. "[…] we should remember that in that time, and for decades, education was scarce and offer to very few people". (Gatti and Barreto, 2009, p. 36)

That initial time stimulated literacy teacher training, however, each state could organize it independently according to oligarchies hegemonic interests of the time.

Between 1930 and 1970, when research institutes such as INEP[1] was created, it is a time when research are specialized and support public policies to teacher training,

[1] Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira Anísio Teixeira National Institute for Education Studies and Research.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_33

which resulted to a greater bibliographical collection towards studies and discussion on Brazilian education.

In this historical course, Basic Education teacher training is followed up, sometimes closer, sometimes not so much, on different approach and perspectives, such as initial and continuing teacher education. However, little is investigated on professors who teach those future teachers who will work on Basic Education, and it seems to us, a very important point in order to understand teacher education in Brazil.

According to Garcia (2010, p.12), initial education does not start during under graduation courses, rather, it takes part along the whole student life, "teachers develop mental patterns and beliefs about teaching from this great observation stage student experience". This student experience is, according to the author, informal and little reflexive which leads to a praxis close reproduction of known models, influenced much more for emotional rather than rational reasons. If we consider the major model of school in Brazil since the second half of the 20th century, we find the technical basis as the logic which built thoughts about education for most teachers.

Patto (2004) thinks that teacher training courses should ensure philosophy in the course design, not that students should know its history, but that they have the chance to reflect about their on education, that is, "[…] in a world crossed by atrocious pragmatism, […] it is the only possibility to rescue teachers from an underground, secondary, object place they have been put by a non-innocent technicality".

Imbernón (2009, p. 5) agrees with Patto (2004) by claiming that

> If we start to reflect on what results from education theory and practice lately and let us be carried by what education tradition tells and proposes and put away our (pre)judgments about education, maybe we can start seeing things with a new look and try to change and build new ways to understand teaching and its education in order to transform education and help to build a fairer society.

This thought justifies the current discussion about continuing teacher education, for the education that begins when teacher is a student and gradually broadens during under graduation courses, is not enough to ensure teacher professional identity, not even enough knowledge for transforming education.

According to Garcia (2010, p. 18) professional identity is built since the beginning of school and

> {…} it goes along his/her working life. This identity does not come out automatically as a result of a degree; rather, it is built, shaped. And this requires individual and group process which is complex and dynamic, that leads to subjective representation about teaching profession.

As representation, teaching identity is individual, but also collective, because it is either connected to individual teaching journey as to its professional context. Life histories, school experiences, and all cultural capital are elements to build a teacher individual identity, however, teaching cannot be taken away from its institutional context, where work conditions, institutional rules and interpersonal relationships redesign representations they have about their profession.

Thus, we ask what do university professors who form future teachers think about teaching, learning and evaluation? If these are teaching practice foundations in any level, do professors understanding about it interfere on future teachers identity?

These issues emerged when we took part on a research about higher education assessment in a project named "Mapping higher education assessment", granted by Fundação de Amparo à Pesquisa do Estado de São Paulo – FAPESP (Proc. 2012/18530-3), a Brazilian research funding agency, at São Paulo State University (UNESP) at Assis, coordinated by PhD Raquel Lazzari Leite Barbosa. That research is part of an international research about Higher Education Evaluation, Teaching and Learning coordinated by Domingos Fernandes for AVENA Project – Portugal and Brazil Higher Education Evaluation, Teaching and Learning: Perspectives and Reality (PTDC/CPE-CED/114318/2009), conducted by Lisbon, Évora, Coimbra and Minho universities. Currently it has branches in several Brazilian states such as: Amazonas (UNAMA), Pará (UEPA) and São Paulo (USP and UNESP).

AVENA Project aims at describing and analyzing teaching and assessment practices developed in different courses within those universities and understanding the relationship among those practices and students` learning, by considering their academic performance. This investigation was born from a premise "that teachers' conceptions and experiences are related to the way as teaching and evaluation are organized". (Fernandes 2009 apud Devesa 2012, p. 12)

Between 2012 and 2015, when "Mapping higher education assessment" began, students and professors answered questionnaires about their understanding on teaching, learning and evaluation in their Pedagogy teacher`s training courses at UNESP/Assis and Faculdades Integradas at Ourinhos. Professors were also interviewed about their teaching and assessment practice, and students about their understanding on the same issues. During that time we wrote articles and participated on seminars where part of these data was shown.

As they thought about teaching, learning and evaluation, teacher`s training courses students and professors from UNESP at Assis and from Pedagogy course at Faculdades Integradas at Ourinhos, some questions issues came up: (a) What kind of relations university professors and students set among teaching, learning and evaluation? (b) Do public university students and professors have different representations from those shown by private institutions students and professors? (c) Can results revealed in Brazil be compared to those produced in Portugal? (d) Is there a pattern on students and professors' answers that can be considered as a group representation about teaching, learning and evaluation on teacher`s training courses?

So, the objective of this project is to analyze data from UNESP e FIO and from qualitative analysis identify possible patterns about teaching, learning and evaluation on university professors and students understanding and next compare with the results shown by AVENA Project researches.

As we get close to the senses involved in university classrooms we can understand some aspects of school culture that prevail on universities, so, by understanding the relations between students and professors, as well as knowledge which form future teachers. Considering that there are few studies on higher education teaching, learning and evaluation relations, this proposal may help teacher education in teacher`s training courses.

The issues we present here emerged from the data got from questionnaires used in the research; however, the issues led us to qualitative analysis.

Qualitative approach is a set of practices that can reveal the insight people have on the investigated phenomenon, for the experience is imbued with built beliefs and conceptions.

It is important to highlight that AVENA Project foresaw other instruments to get data which allows qualitative analysis, such as semi structured interviews and focal group.

People interviewed present their view on teaching, learning and evaluation, school education foundations and are aware of their intentions and insights.

In this investigation, subjects are university professors and students from public and private institutions in São Paulo state, Brazil. So, there is much information that needs to be organized and studied, thus, enforcing the support of technological resource. Hence, we chose Atlas.ti software to help organizing, categorizing, and analyzing data.

2 Methodology

Getting close to knowledge can lead us to different paths. Here we tried to know university professors and students understanding about teaching, learning and evaluation, mainly concerning current public and private university space. These perspectives promote comparison of different information and data, as well as the references which guide this study.

We understand qualitative research as a common thread to the idea that knowledge is a social, cultural, historical product; therefore, knowledge subject is the result of a historical context with determined time and space within cultural processes. So, it is necessary to bring to light knowledge subjects voices within space and time experienced by them as teachers in order to understand culturally built feeling.

This study is supported by AVENA Project proposed path, nevertheless it is broader as we organize data by using qualitative analysis software.

2.1 Data Collection

The study started by organizing data collected the named institutions which are the UNESP and FIO students and professors answers to the questionnaire made by AVENA Project researchers, from Fernandes et al. (2012 apud Davesa 2012, p. 55) reference matrix. After getting the questionnaire answers we started the interviews with professors and students by using semi structured, also made by AVENA Project researchers.

Thus, firstly, questionnaires were applied based on Fernandes et al. (2012) matrix that consider teaching, learning and evaluation as objects and each one is related to a set of dimensions which describe, distinguish and analyze each object practice.

So, from this matrix a questionnaire was built, analyzed and validated by AVENA Project researchers. It had 45 questions divided into the three objects - teaching, learning and evaluation. We used four levels Likert scale: totally disagree, disagree, agree, and totally agree. The same questionnaire was applied to students and professor, and it was sent to them on Google Drive e-form by email. This material was put into excel table in which filters were applied so that we could know important aspects

concerning the researched objects, that is, teaching, learning and evaluation. These three objects are organized by dimensions that were used to outline conceptions, practices and the relation among the objects.

Secondly, we had semi structured interviews, whose questions were also organized by AVENA Project. The objective of those interviews, still in course, is to know students` and professors` understanding on how teaching, learning and evaluation take place and each object identify some guiding items as: (A) TEACHING: (a.1) task nature used by professors; (a.2) class structure and dynamic: (a.3) Consistency/ Connection/Insertion between teaching and learning; (B) LEARNING: (b.1) students participation; (b.2) Strategies; (C) EVALUATION: (c.1) Understanding; (c.2) Nature and Functions; (c.3) players role; (c.4) Connection with leaning; (D) CLASSROOM ENVIRONMENT: (d.1) environment description; (d.2) Relation/Interaction between professors and students inside and outside the classroom; (d.3) Students relation among themselves; (d.4) Players satisfaction.

With the suggested questions there is a guide for the interviews with professors and students. Transcripts were done in the first interviews in order to analyze them, but then we realized that the amount of data was increasing tremendously, and the oral discourse is significantly important for this kind of study. Even though there was a semi structured script, we tried to stimulate the interviewers to talk in a way that they produced a continuous discourse so that they could demonstrate their knowledge and insights. We found out that the use of audio record with no transcription lead us to the interviewer expression and intonation, so software use was imperative. Along with this material, there are records and memories performed during the interview, produced by interviewer while interacting with the participant, several records that are absorbed to the data.

Generally, in this kind of investigation there is a great amount of data, as the interview material, field records, complementary documents, references, and so on. So there is a risk of losing precious information when searching for answers. According to Verdú et al. (2015), there are two necessary operations to build knowledge. First, data are split and categories and concepts are created in order to conduct analysis. The second operation is meaningful textual restoration and researcher interpretation. Organizing data following these operations was possible by using Atlas.ti, software that is part of the methodology applied in this research.

2.2 ATLAS.ti

Choosing a software to support researcher organizing data for further qualitative analysis is directly bound to the study design.

According to Muñoz-Justicia and Sahagún-Padilla (2015) qualitative investigation means to validate a great deal of data, even with plural and different approach, methods and techniques.

Since the beginning of this research, we identified the need to organize a great amount of data from interview and observation, analysis records, material categorization etc. but we also searched for a program whose functions helped us to set different relations among categories, then based on this design we found ATLAS.ti.

ATLAS.ti (acronym in Portuguese for File for Technology, Life World and everyday language – extension "ti" means text comprehension) is an information program developed to analyze texts, audio, images, videos and geodatabase. It was launched between 1989 and 199 in Berlin Technological University. In 2013 a Spanish version came up, in 2012 version 7 and in 2016 version 8 was launched.

This program does not do qualitative analysis that can only be done by the researcher; however ATLAS.ti helps to systematize and deal a great amount of information, also speeds up data analysis. There are two levels of analysis, textual and conceptual. The first creates quotations, and notes to the text file, while the second works data by setting relations among, codes, categories, quotations and notes created so that we can interpret them.

The initial organization of this software is the creation of hermeneutics – UH, that represents organization space for primary data, quotations (or fragments preset by the researcher), codes and notes. Primary documents are data got from the interviews (that can be analyzed directly from audio with no transcripts), images as photos or videos, geodatabase got from different sources of maps. In ATLAS.ti, quotations represent fragments identified by the researcher as meaningful unity that need to be highlighted, such as words, sentences or pieces of images or even of a discourse. Codes are a sort of category created by the researchers that reduce primary documents linking quotations that are connected to each other by preset criteria. These codes can be translated into concepts that connect analyzed texts, images and audio. During primary documents analysis, when each quotation is identified, the researcher has a space to take notes, that is, he/she can register part of analysis, identify theoretical frame which can expand analysis etc. These notes help researcher when conceptual level begins, that level in which different data are related. So, there is an organized progression of the most significant points of the analysis. There are Families, which are groups of objects that have common characteristics, and represent a step to establish relations between highlighted quotations and codes.

The software enables the researcher to establish different relations among organized data, such as relations among quotations, codes and notes in various combinations, creating a logical relation among them. Defined by the researcher, combination is an important analysis element that can be graphically represented or edited for network view. Network view enables a complex organization intuitively by using graphical representations, as conceptual maps that can associate ideas from different relations, such as opposition, analogy, causality and so on.

3 Final Remarks

Our research which has just started does not present any conclusion, for up to now we are getting to know the software and starting to organize data, define investigation design and understand how Atlas.ti can help qualitative analysis. So, here we try to emphasize the use of Atlas.ti software in a qualitative research mainly when there is a great amount of data. We draw to a close that researchers like this enhance qualitative analysis when supported by this software. However, it is important to consider the problem, objectives, the path set by the researcher and the study design. By using

ATLAS.ti we can establish different relations, hence, expand the study universe. We point out that the software is only a tool to store, organize and cross data. Analysis, possible relations as well as chosen categories can only be performed by the researcher supported by his/her research design theoretical framework.

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A Categorical-Generative Theory of Social Processes: Towards the Ontological and Mathematical Foundations of a Grammar-Based Model for Qualitative Research

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Abstract. This paper proposes a mathematical model to describe the dynamics of flows of events that evolve, conditioned by a specific set of structures and contextual conditions, such as complex, dynamic, and contingent social phenomena. A discrete rule-based model for patterns of sequences of events deduced from Generative Grammar Theory and Category Theory depicts theoretical propositions and identifies causal relationships in empirical evidence. Regarding the ontological and epistemological assumptions of Critical Realism, the proposed modeling methodology adopts the logic of retroduction instead of the logic of falsification as a knowledge-extending means of drawing explanatory inferences from data in a systematic way.

Keywords: Critical realism · Category theory · Generative Grammar Theory · Social ontology · Process tracing

1 Introduction

The object of studying the social sciences is inherently complex, without a doubt, but there are many different understandings of complexity. Thus, there is no unifying paradigm of scientific knowledge production to assess the validity of scientific propositions in empirical domains under the assumptions of complexity.

In this sense, complexity relates to the systems that have emergent behavior, a result of interactions between their component parts defined by deterministic relationships, but it is not intelligible using normal scientific methods. On the other hand, complex systems can be, at least in some parts, reasonable and predictable because they are used to behaving according to regular patterns in some specific ranges of space and time, although they can also exhibit an apparently random (i.e., chaotic) behavior in other situations.

The original version of the chapter was revised: Author corrections have been updated. The erratum to the chapter is available at 10.1007/978-3-319-61121-1_38

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_34

One of the epistemological paradigms bearing in mind social complexity is *Critical Realism* [1], named after *Scientific Realism*, whose core ontological assumption is the existence of non-observable mechanisms that, under specific conditions, contingent in space and time, can yield regular patterns of events. From this point of view, theories become simplified representations of the social reality that are always incomplete due to the infinite configurations of contextual conditions and the lack of information about all the operating structural relationships in different empirical domains.

There are also methodological obstacles to tackling complexity. The complex behavior emerges from the interaction of the single parts of the system, but direct observation cannot unravel many theoretical relationships of such class. Any complex system is not reducible to its constituent parts in isolation. Consequently, patterns of either events or properties may be the only observable thing about a kind of either emergent behavior or entity in the empirical domains, but they comprise both comparable and incomparable features due to universal laws and contextual specificities taking place.

Most positivist methodologies of system analysis estimate the hypothesized features as random variables and stochastic processes, regarding only a quantitative value for chance or probability of an event outcome to happen by ignoring all variations as noise whenever they are unsystematic. The general properties of phenomena, rather than the specific ones, are prioritized. The possibility of change in behavior due to variations of space and time in the empirical domain, particularly due to feedback information and adaptive structural evolution, used to be neglected in such models.

The positivist techniques can successfully describe the structures of a system that are linearly deterministic, but the post-positivist techniques try to describe the irreducible complex relations in a social system whenever the approximation by the former conventional methods is not satisfactory. Even so, some complexity-oriented techniques are used in an *ad hoc* way in most of the social sciences because there is no unifying mathematical model for understanding complex relationships in the same way that there is the Regression model for linear relationships.

Some solutions arise from Generative Science [9], an interdisciplinary approach to natural and social research that assumes their complex, dynamic, and contingent behaviors are generative processes. This approach to scientific inquiry undertakes that a finite set of deterministic relationships between the conceptual objects, which continuously interact with some of the others, can generate infinite, unanticipated patterns of emerging, complex behavior. Usually, such social behavior follows in a path-dependent, regular pattern, but often an unforeseen or even contradictory pattern may occur, which requires further explanation.

John von Neumann [14] proposed the first generative model: *cellular automaton*, the abstract structure of a system of interacting entities or states that, under deterministic rules and parameters, displays complex behavior. Later, Noam Chomsky's *Generative Grammar Theory*, in [4, 5], provided a new representation of the concept distinguishing classes of formal languages for each type of cellular automaton, according to their specific algorithmic complexity level. Nowadays, the idea that cellular automata represent a particular class of the more general model of *Dynamical Systems* is notorious.

A social system is dynamical, if and only if, it *evolves* along with time, which implies a transition from an initial state (g_0) to an end state (g_t), both described by a set

of variables or discrete symbols. The dynamical systems can be discrete or continuous in their states and in time, linear or non-linear in their dynamics (i.e., in their equations), and deterministic or non-deterministic in their transitions (i.e., each state is strictly determined by the preceding states, or not). The cellular automata are discrete-state and discrete-time dynamical systems.

In contrast with the linear, deterministic systems studied in the normal sciences, the complex systems can exhibit an apparently random or chaotic behavior so that the prediction of the next state transition is too difficult in practice. In such cases of unpredictability, initial conditions establish deterministically the evolutionary path of the system along with time, but they are usually unknown or not precisely measured. Any small variation in the initial conditions of such chaotic systems can lead to an entirely different development path.

The state transition rule in all dynamical systems is the function that describes their evolution along with time, regarding what future states follow from the current state. Often the system can be *non-deterministic*, i.e., some state transition is not uniquely determined by its source state and the input symbol, or even *stochastic*, i.e., apparently randomly-generated events can lead to any of the alternative outcomes in the same system state.

Although the evolutionary path of chaotic systems is unpredictable, a qualitative assessment of its behavior is feasible. All the system states in which the process development path is probably going on can be identified, as well as the states ruling the system dynamics by attracting the development path to their neighborhood, such as either a strange attractor or a sink state.

This paper provides a modelling methodology to capture complex features of social processes to support the qualitative assessment of social behavior in empirical settings. Such a model is deduced from the Generative Grammar Theory but presented in the framework of Category Theory, [8, 13], regarding both the ontological and epistemological assumptions of Critical Realism [1].

2 Understanding the Mathematical Foundations

2.1 Generative Grammar Theory

The concept of generative grammar represents any set of rules that produce sequences of discrete elements (i.e., strings or sentences of symbols) that belong to a formal language. Any such grammars (G) must explain how a finite set of *production rules* (P) applied to a finite set of *symbols* ($\sum$), an *alphabet*, can generate an infinite set of strings, a *language* (L).

Consider a generative grammar $G = (N, \sum, P, S)$ and its respective generative binary relationship $\Rightarrow_G$ in $(\sum \cup N)^*$. A formal language L(G) is a set $\{w \in \sum^* \mid S \Rightarrow_{G^*} w.\}$ of string-like sentences derived from a finite number of applications of the production rules in $P \in (\sum \cup N)^*$. Such computational derivation begins with the nonterminal symbol S comprising the set $\{w \in (\sum \cup N)^* \mid S \Rightarrow_{G^*} w\}$ of all possible derivations.

The production rules (P) denote relationships between strings formed by elements of the alphabet set ($\sum$), named *terminal symbols*, existing in each of the elements of the set of system states (N), named *nonterminal symbols*, which take place on the right side of at least one of the rules. At least one production rule must have the nonterminal symbol $S \in N$ at the left side, denoting the initial system state.

The mathematics of Chomsky's Generative Grammar Theory defines a hierarchy of classes of formal languages that highlights the distinctive properties that result in increasing levels of complexity for the sequence patterns of terminal symbols. The grammar of lowest complexity describes the class of *Regular* languages, which restricts all production rules to the sentential form $A \rightarrow a$, B (or $A \rightarrow B$, a) and $A \rightarrow a$. Next in the computational complexity scale, the class of *Context-free* grammars, in which there is at least one recursive rule, i.e., with more than one nonterminal symbol at the right side as $A \rightarrow B$, C. Lastly, the class of *Context-sensitive* grammars, in which there is at least one rule with a nonterminal symbol at the left side that denotes the contextual conditions for the rule to apply as A, $B \rightarrow A$, C.

Generative Grammar Theory has enough descriptive power to support the design of systematic methods for Sequence Analysis [10] of the critical events of a social process. But this rule-based formalism may not be structurally compatible with the functional formalism of other models for quantitative, comparative studies.

2.2 Category Theory

Category Theory is only a descriptive approach to scrutinizing mathematical structures (e.g., rings, groups, sets) and its comprising of abstract core concepts as collections of *objects* (i.e., nodes, domains), and the mathematical relationships between them as *morphisms* (i.e., arrows, functions).

The concept of *morphism* means that any internal, structure-preserving map between a pair of objects of the same category has one source object named *domain* and another target object named *codomain*. The precise meaning of such morphisms in Category Theory relies on the particular mathematical model under study (e.g., in Set theory, the morphisms are set-theoretic relationships).

There are five axioms declaring the core features of a category C. First there is a set of *objects* – **obj(C)**. Second, there is a set of *morphisms* – **hom(C)** $\subset \{f_i : A_i \rightarrow B_i\}$. Third, there is both a *domain* A_i and a *codomain* B_i, for each morphism f_i in the **hom (C)** set for the category C. Fourth, there is only one operation, which is *composition* of pairs of morphisms – if f_1: $A \rightarrow B$ and f_2: $B \rightarrow C$ then $g = (f_2 \circ f_1)$ is g: $A \rightarrow C$. Fifth, there are two properties: the *identity* of composition – if i_A: $A \rightarrow A$, i_B: $B \rightarrow B$ and f: A $\rightarrow$ B then $(i_A \circ f) = (f \circ i_B) = f$; and the *associativity* – $(h \circ g) \circ f = h \circ (g \circ f)$. Any set-theoretic relationship that infringes at least one of such axioms is not a category in the mathematical point of view.

In addition to the concept of morphism, there is the *functor*, a structure-preserving map from a pair of source and target categories, such that any functor is a *homomorphism* between a pair of structures. Precisely, each morphism of the source category must map to another on the target one while preserving the structure of the pairs of objects in the category of origin (i.e., a composition of morphisms). In other words, a

functor is a set of morphisms from all the morphisms of the source category to those in the target one.

In this sense, *natural transformation* is a map from one functor into another while preserving the structure of the categories involved in such a way that it is also known as a *morphism of functors*. The functors between a pair of categories constitute a category itself, i.e., a *functor category*, in which the functors are the objects and the natural transformation between the functors is the set of morphisms.

When a functor between a pair of categories has an *inverse* functor, both them are regarded as *functionally equivalent* categories [8]. All morphisms of such functor are *isomorphisms* between pairs of morphisms of the source category to the target one. Analogously, a natural transformation that has an inverse is a *natural equivalence*, *natural isomorphism*, or *isomorphism of functors*.

Category Theory has been established to substitute Set Theory as the foundation for mathematics, but they are complementary in practice because they describe both the external and internal structures of mathematical objects of a category.

There are categories for models in all fields of mathematics. For example, there is a SET category for sets and set-theoretical relationships as objects and morphisms, and both the PSET and REL categories for the same objects, but with morphisms as ordinal functions (e.g., greater than, lower than) and other binary relations. And GRF category for objects like graphs and morphisms like edges between the nodes on it. There is also the VEC category for objects like vector spaces and morphisms like linear transformations.

In this regard, a *Concrete category* is one whose objects have underlying sets of values, and morphisms map to functions between these underlying sets. The Concrete categories denote some class of objects, each defined with a faithful functor, i.e., an injective functor to Set category (i.e., F: C $\rightarrow$ SET). They provide sets with additional external structure, as they assign to every object of C its underlying set, and to every morphism its underlying function.

Category Theory makes the links between many fields of science by discriminating the elements of mathematical structures and by mapping the relationships between them. That is the case of the theory proposed here as a link between Generative Linguistics and Social Sciences.

3 Conceptualizing Social Process

In the next sections, there are two definitions of the concept of Social Process: one is philosophical, with foundations in the Scientific Realism, and the other is mathematical, with foundations in the Generative Grammar Theory.

The Generative Grammar model is the structure of sentences of a formal language. Any sentence is comprised of other sentences until each one comprises a single symbol in the alphabet. Any concrete social process is like a structure of processes, i.e., a process comprises other processes until each one comprises a single event using a terminal rule as the generative function. But the functional formalism of a Grammar category must explicitly reflect it. This is the role of Category Theory in the formalization of a Generative Grammar model.

The morphisms of the Social Process category are mapped to the types of production rules of the Generative Grammar Theory as a means of the representation of the non-observable mechanisms that generate such sequences of events.

3.1 An Ontological Definition of Social Process

Consider *Social Process* as an ontological concept concerning a pattern of sequences of critical events in the empirical domain. Consider also *Social System* as another ontological concept regarding one or more overlapping *Structures* conditioning the behavior of one or more interacting *Agents* that produce such events in series.

In a given social system, many social processes may be evolving simultaneously as sequences of critical events that result from actions of one or more social agents conditioned by a specific set of structures of social nature or not. Since the social system is the *locus* of interacting entities (i.e., agents as people, organizations and technologies, social structures of economic, cultural and institutional nature, and non-social structures, such as the geography in the local environment), the social process is a kind of patterned sequence of critical events of social interaction that recurrently takes place in each action situation.

When social agents go for action, such decision-making event is supposedly linearly determined by some existing *Conditions* in a specific space and time setting in the empirical domain. Social phenomena do not necessarily have such a deterministic nature, but decision-making events that rational agents generate in a rule-based fashion use to be regarded as such [11].

Agents take some contextual conditions at the moment of the decision-making event as causal parameters under the influence of the operating structures in the state of the system right before the intended action is actually implemented. In fact, many social process models rely on such an ontological assumption of causal determinism for decision-making events. This suggests the definition below:

Definition 3.1.1. In a given system state, a *linear rule or relationship* describes the property of *causal determinism* in the abstract structure of the system whenever any possible measure or sequence of symbols of the outcomes of generated events is proportional or directly related to the known conditions.

Now consider not only a single event, but a pattern of sequences of events may result in the next state transition. Such transitions are non-linear, sequence-generating relationships whenever there are open possibilities for a pattern of event outcomes in the next state transition, but they are still deterministic because there is only one pattern of recursively generated sequences of events even though there is an infinite set of instances of it. This suggests the definition below:

Definition 3.1.2. In a given system state, a *recursive rule or relationship* characterizes the property of *causal non-linearity* in the abstract structure of the system whenever any possible measure or sequence of symbols of the outcomes of generated events is not proportional or not directly related to the known causal conditions.

Now consider a situation in which there may be a lack of information about both the structures and contextual conditions operating in the social system, i.e., the decision-making procedure of the involved agents runs with incomplete information about the current system state. Consequently, more than one pattern of sequences of events can result of the same set of the known conditions in a given state, and the behavior of the social system in such a state is *ambiguous*, i.e., there is uncertainty about which one of the alternative state transitions from the same system state is going to rise.

This kind of random or stochastic occurrence of alternative patterns of sequences of events in the same system state is regarded as non-deterministically generated because of the uncertainty about the conditions of the generative mechanism operating in the social system structure. This suggests the definition below:

Definition 3.1.3. In a given system state, *ambiguous rules* and *an ambiguous relationship* characterize the property of *causal non-determinism,* or *causal ambiguity*, in the abstract structure of the system whenever there are alternative patterns of sequences of events randomly generated in such an unpredictable way.

Consider any state in a self-loop transition. There are a finite, non-estimable number of repetitions of the pattern that triggers such transition back to the same system state during the evolving path of this social process instance. The behavior of the social system is *self-recursive* in such state, i.e., there is an unpredictable, temporary tendency to trigger such a self-loop state transition. This suggests the definition below:

Definition 3.1.4. In a given system state, a *self-recursive rule or relationship*, i.e., one that is recursive but from a domain set to itself, characterizes the property of *causal circularity* in the abstract structure of the system whenever any possible measure or pattern of symbols of the outcomes of generated events is not proportional or not directly related to the initial conditions because they can occur repeatedly in such an unpredictable way.

A self-recursive relationship also implies causal ambiguity at the same system state whenever there are no means to estimate how many reprises of self-loop transitions will take place. There may be ambiguous rules with at least one alternative non-self-loop state transition to make finite the number of repetitions of the former, i.e., a loop-exit transition.

Finally, any complex, dynamic phenomenon is sensitive to the initial conditions. The context-sensitive relationships can eliminate causal ambiguities by identifying configurations of causal conditions that lead to each alternative transition or outcome in such system state in a predictable way. This is the main goal of explanation in Critical Realism.

Definition 3.1.5. In a given system state, a *conditional rule or relationship*, i.e., to the known control conditions, characterizes the property of *causal contingency* in the abstract structure of the system whenever patterns of sequences of symbols of events in such configuration-dependent state transitions are conditionally generated.

Such an ontological model can be implemented by a mathematical model of discrete time and states deduced from the Generative Grammar Theory. The rules of a grammar are not presented in functional form, although their rules and the grammar itself can both

correspond to injective functions whenever they are deterministic. Because of it, there is a benefit to formalize a social process grammar using Category Theory.

Category Theory is such a tool that demonstrates the natural equivalence of mathematical structures, for example, a qualitative model in the form of grammar and another quantitative model of a comparative study. To do so, it is needed to translate the rules of production into their functional form in a categorical structure.

The most algorithmically complex grammar class, the Context-Sensitive Grammar (CSG), encompasses all the models of the Context-Free Grammar (CFG) class. The latter also encompasses all of the models of the Regular Grammar (RG) class. As each type of production rule must relate to a type of morphism, the natural equivalence between the Social Process category and the Generative Grammar category with the greatest computational complexity, the CSG, needs demonstration, which is the same as the demonstration of the equivalence between any generic form of CSG, with an unrestricted number of non-terminal symbols in the rules, and the Penttonen Normal Form, which is also known as the One-sided Normal Form [16].

3.2 A Categorical-Generative Definition of Social Process

Consider the concrete category of Social Process P. Each object $S \in Obj(P)$ is the domain set of all sequences of events (i.e., all instances of a kind of process) that can be generated in the corresponding System State (S). Each morphism $f \in Arr(P)$ is both the state transition that occurs right after the generation of an event, or a sequence of events at one of the ends of the process instance under development and the injective set-theoretic relationship to the finite discrete codomain set of all possible resulting sequences of events. Such mathematical structure means that any process results from the same or another process after the occurrence of either a single event or a patterned sequence of events. In a categorical structure of Social Process, each object is also a type of process, i.e., all implementations are a kind of "process of processes".

Each type of production rule must correspond to a type of morphism. In respect to the Occam's razor principle, Penttonen Normal Form (PNF) is the endorsed CSG formalism: $A, B \rightarrow A, C$ (i.e., strictly context-sensitive rule); $A \rightarrow B, C$ (i.e., context-free, recursive rule) and $A \rightarrow a$ (i.e., terminal rule). By definition, there is no sense in admitting the empty string (ε) when the non-occurrence of an expected critical event is not a consequence of the theory.

As a result, any social process is a pattern of sequences of events formed by a pair of constituent sequences of events that also represent types of processes themselves, as *sub-processes*, for which there are nonterminal symbols at the right side of the recursive production rule. Each sub-process is a possible system state taking place in the evolving path of an instance of the encompassing process in which it takes part.

Such a transition function from an unidimensional domain of event symbols to an unidimensional codomain of sequences of a single event relating the *instantiation* of a single event outcome is a terminal rule ($A \rightarrow a$). Such a transition function from a bi-dimensional domain of sequences of events to an unidimensional codomain in which all sequences are instances of a process comprising the *concatenation* of a pair of sub-processes is a recursive rule ($A \rightarrow B, C$). The first defines a kind of *instantiation*

function for types of events, while the second one defines a kind of *concatenation* function for pairs of patterns of sequences of events. These two rule-equivalent functions are represented by distinct, homonymous morphisms in such an abstract categorical structure for social processes.

Take note that the recursive, rule-equivalent concatenation morphism – denoted by "+" – is *polymorphic* because it represents three generative functions having the same types of arguments – a pair of sequences of events – but distinct meanings – an *empty string* (ε), the same resulting type of process (i.e., either $A \rightarrow A, B$ or $A \rightarrow B, A$), and the default case for a pair of distinct types of processes (i.e., patterns of sequences of events). The first two meanings for concatenation morphisms take place when one of the two patterns of sequences of events is either an *empty string* (ε) – a *specialization* function – or the same resulting type of process – an *extension* function. Thus, the proposed theory establishes four kinds of generative functions and another accessory function, which is not part of the grammar but integrates the graph structure that is equivalent to the grammar structure.

Definition 3.2.1. For each terminal rule $A \rightarrow a_1 \mid \ldots \mid a_n$, there is an *instantiation* function defining a type of event A on a set of event outcomes $\{a_1, \ldots, a_n\}$.

Definition 3.2.2. For each linear rule $A \rightarrow B$, there is a *specialization* function redefining a type of event or a type of process.

Definition 3.2.3. For each recursive rule $A \rightarrow B, C$, there is a *concatenation* function of a pair of processes as a new type of process defined by the Cartesian Product operation $B \times C$.

Definition 3.2.4. For each left-recursive rule $A \rightarrow B, A$ (or a right-recursive rule $A \rightarrow A, B$), there is an *extension* function defined by the Cartesian Product operation $B \times A$.

Definition 3.2.5. In $A \rightarrow B \times C$, the $B \leftarrow_{(L)} B \times C$ and $C \leftarrow_{(R)} B \times C$ are the accessory *projection morphisms* for the left and right terms of the Cartesian product ($\times$) because they do not take part in the grammar itself. There is the equivalent, inverse form of the Cartesian Product's morphism, $A \leftarrow B \times C$, too, but all transitions are hypotheses about the ongoing social process that can fail, so that there is no way to consider such an inverse form taking place in a derivation path.

3.3 Implementations of the Social Process Category and Their Instantiations

There are infinite implementations of the categorical structure of Social Process for the same pattern of sequences of events and there are infinite empirical instances of them, too. Both concepts are functors named *implementation* and *instantiation* of a type of process. The former functor preserves the structure of an abstract category such as the Social Process to a concrete category conforming to some theoretical model. The last one preserves the structure of a concrete category for the theoretical model to another concrete category for the empirical data (e.g., an instance of PSET), representing the

relationships between each theoretical construct (i.e., an object of the concrete category) in the underlying ordered sets.

The instantiation functor F: P → PSET means that for any concrete category P, the derivation of a sequence of events is in the PSET category with a monotonic ordering function that strictly sorts the elements of all sets as if they were just one big sequence of events (i.e., a *log* of the outcomes of all activated events in the process instance). Such a functor takes a bulk of ordered, empirical data as evidence against the model of a concrete category of Social Process (P), regarding the rules activated in such a hypothesized derivation path that resulted in the process instance under study.

Finally, to make sure of the compatibility of the results of research projects relying on distinct mathematical models either based on quantitative or qualitative approaches, as well as to accumulate scientific knowledge, practitioners can demonstrate the *natural equivalence* of pairs of such models using Category Theory. Such a new procedure for the evaluation of research quality, called *structural equivalence validity,* resembles that *construct validity*.

There are many other mathematical categories with natural equivalence to the Social Process category as proposed here. For qualitative research approaches, Generative Grammar Theory provides formal language categories of increasing complexity – specifically, *Regular*, *Context-Free,* and *Context-Sensitive* grammars. For quantitative research approaches, drawing on Probability Theory, there are the Hidden Markov and Stochastic Context-Free Grammar models representing versions of the Regular and the Context-Free grammars with stochastic variables. Such models can describe any concrete social process in all empirical domains with accuracy, but both can benefit from a kind of grammar modeling methodology grounded on empirical data.

3.4 The Contextualization of a Concrete Social Process Category

Both the recursive and contextual features of grammars are also supposed to be the features of the social structures under investigation, which is the ontological assumption that social systems work as cellular automata to produce action events held by agents. In this sense, the formal definition of the Social Process category must consider such features in an explicit way.

The contextual conditions in a system state, at a specific moment in time, determine the expected state transition when this is not the case of a randomly generated event by a set of ambiguous rules.

In regard with the functional form requirement, both the instantiation function and the specialization function can become equivalent to a strictly context-sensitive rule. But such feature operates only during a derivation procedure because the past pattern of sequences of events (i.e., the context) influences each derivation step at its own time. In other words, the context is not a *structural* property of the Generative Grammar category but a *computational* property of the Cellular Automaton category (i.e., the parsing algorithm), which is identified with the capability to get know what state transition took place before (i.e., the last function call associated to a morphism of the concrete category).

The problem of contingency in the causal description must be solved *dynamically* by picking one of the alternative morphisms *statically* defined as a sub-domain set of

sequences of events. The definition of a domain set by the union of a number of sub-domain sets having all the possible instances of the social process resembles the problem of partitioning a search space in Decision Theory. The solution takes place only after running the decision procedure until the end.

4 Conclusions

A research strategy of multiple cases study using the Process Tracing approach aimed to theory refinement, relying on both a systematic procedure of Sequence Analysis and a discrete, rule-based model deduced from the Generative Grammar Theory is the objective of this research project, [2, 3]. Usually, Process Tracing research approach tackles the object of study in a purely narrative form that is not in compliance with the common quality standards of quantitative studies in Computational Linguistics, and even in many of the Social Sciences.

Category Theory is the tool to support the description and analysis of mathematical models either discrete or continuous in nature (i.e., for either qualitative or quantitative data under study). Such formal, general notation can define the validity of functional equivalence of the theoretical relationships in a pair of distinct, empirical models in use. In this sense, the transformation of abstract concepts in such a starting model of data analysis into functionally equivalent concepts in another analytical model preserves the internal structure of the existing relationships between them. This assumption is also true when it is the instance of a structure-preserving map from the empirical patterns observed in the collected data to the theoretical model given. Such research quality criterion of structural equivalence validity is not common place in most of the methodological references for the Social Sciences yet.

The social theories use to have a linguistic nature, but common linguistic issues such as homonymy, metonymy and polysemy can harm the scientific knowledge accumulation and progress of sciences themselves. In this sense, Category Theory can provide the tools to handle theoretical knowledge based on empirical evidence. Several existing mathematical categories were already proposed for social science research, [7, 12]. There is a need for formal language representation of social phenomena and it is now working for many other applications in the Information Science and in the Computer Science. It may be the case of an ongoing ontological shift to a unified *Categorical Social Science* [19].

Social process is probably the most common ontological concept taken as the object of studying in the research projects of social sciences. Category Theory can show the links between distinct fields of science such as Computational Linguistics and Social Sciences that rely on related ontological concepts like routine and competence.

There are few research frameworks using grammars for either institutions [6], social processes [15] and social organizations [18], but they all have in common both the lack of contingency and the linear constraint on the rules for social relationships. The same limitations exist in set-theoretic tools for data analysis like QCA [17]. This work suggests a framework deduced from both Category Theory and Generative Grammar Theory to overcome restrictions in model building of processes. But in fact, a

Categorical-Generative Analysis can benefit such theoretical frameworks and use such data analysis tools in a complementary way.

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Corpus Linguistic Analysis: How Far Can We Go?

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Abstract. The present paper aims to explore methodological approaches to the examination of corpus linguistic data with particular attention to higher-level analysis. Fundamental assumptions in corpus linguistics are questioned, including the concept of repetition and so of token and type, parsing of items, the use and interpretation of metaphor, and the sociolinguistic and pragmatic elements in all utterances. Using purposely collected corpus data from very limited corpora, the paper aims to underline the importance of qualitative approaches to linguistic analysis even in the ostensibly highly quantitative field of 'traditional' corpus linguistics. Preliminary conclusions suggest that the complexity and richness of corpus linguistic data make qualitative analysis very demanding, but of unquestionable potential significance. The final proposal is for a small-scale corpus approach to accompany the mass linguistic data of large corpora, offering different analyses and results that might be valuable for fruitful comparison and triangulation

Keywords: Corpus linguistic data · Token · Type · Repetition · Metaphor · Pragmatics

1 Introduction

Language corpora are getting both larger and smaller. We have certainly come a long way from the Brown Corpus of the 1960s or even the British National Corpus, with data collected mostly in the 1980s and topped up a decade or so later. From corpora numbering a million or even a hundred million tokens, we now find ourselves talking in the billions for large, well-funded corpora. But at the same time developments in the technology of memory and processing hardware, along with the ready availability of various software packages, have ushered in an age of micro-corpora, constructed on an individual basis, with a specific focus. Data collection has also changed, as more and more examples of language use are available in digital form, reducing the costs and keying-in times involved in actually putting together a corpus. This paper suggests that the time is ripe for a reassessment of what corpus linguistic analysis is, and how it can and should be done, especially with regard to the relationship between very large and small, specific corpora, and, most of all, with regard to the kinds of analysis we can carry out. Perhaps a reevaluation of certain assumptions that have been made in corpus linguistics would be timely.

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_35

1.1 General Language Corpora

Indeed, despite the significant work on corpus linguistic methodology from Sinclair onwards, and the credibility that large corpora enjoy, there are some principled doubts about general language corpora. Claims to describe 'general language' might immediately be met with theoretical skepticism as to what 'general language' is exactly (here we meet a common sticking point in corpus linguistics, where what is a perfectly usable and useful definition in common, everyday use becomes very problematic in detailed, objective study[1]). This is compounded by sampling issues (breadth and depth are both significant difficulties), and remind us that simple claims as to size are inadequate as measures of the reliability and especially the representativeness of any corpus. Put simply, if certain text types have been excluded a priori (and they often are, typically for reasons of convenience or legality) then the general appellation is generous, if not misleading. There is also a synchronic assumption in much corpus investigation. A large corpus inevitably takes significant time to construct and collect, let alone the period of time dedicated subsequent work on the data. A corpus is always a historical document by the time it is published or made available for independent interrogation. Any analysis of data must take into account the need to in some way contextualize them in a chronological sense and this is a very challenging task.

1.2 Small is Beautiful?

Along with the continued interest in developing large, highly quantitative examinations of language, there is has recently been a growth in what we might term 'do-it-yourself' corpora. A laptop computer and an internet connection are all that is needed to assemble some kind of corpus of language, and many studies have been produced apparently on something along these lines (for an example, see Milizia 2012 [1]). There are some real advantages to this approach: the limited scope and consequently limited claims to representativeness, the greater potential for contextualisation, a possibility of re-examining every assignation or tag, should this be of interest, and a natural propensity for limited text to be subjected to qualitative analysis. But most of all, these mini-corpora offer much greater opportunities for cross-comparison with other small corpora or with the much larger generalised ones available. Perhaps it is only here that we can hope for replicability of data. Criticisms have been made regarding the risks of small (and so potentially highly unrepresentative) corpora and the likelihood of bias, and indeed 'cherry-picking', both of samples and interpretation of results in data, but perhaps the interface of discourse analysis and corpus linguistics can only be attempted at the micro level at present. Certainly the question of relating textual data to reality is a thorny one, but we might suggest that it can first be explored most fruitfully at the micro-corpus

[1] Another, more significant example of this is the very real difficulty in defining a word, or in identifying types as being truly different from other tokens already occurring in the corpus: a typing error might be an intentional, rhetorical variation, or a personal idiomatic peculiarity. The current paper is partly a result of meeting precisely this difficulty in data from a small corpus (see Sect. 2).

level, hoping for insight into how to relate language data to social, political and personal elements of meaning and use, or at the very least helping us to understand the complexities of real data, and why they do not always fit into categories 'traditional' corpus linguistics may assign them to. Several questions thus formed the rationale of the present study: does a close, qualitative reading of the data produced by a small corpus reveal aspects of language that a largely quantitative reading of a much larger corpus will tend to miss? Are there certain cohesive or intertextual aspects of language use that escape traditional interrogations of very large corpora? Are some elements of language behaviour (errors, rhetorical variations, idiosyncratic and stylistic choices) likely to confound quantitative readings of data? In short, do smaller corpora offer anything more to the pursuit of accurate linguistic description that is the task of current corpus linguistics?

2 The Israel-Palestine Corpus

To attempt to examine theoretical issues related to data, its collection, analysis and evaluation, a micro-corpus was created. The stated aim was to create a corpus of politically sensitive language use in an international setting. The data were collected on a single day in August 2014 from a single source: an online discussion page in the Guardian electronic edition, appended to a news report. The choice of the discussion page of the Guardian was based on personal familiarity with the news source and its editorial policy, an awareness of the subject matter and the likelihood of finding strongly argumentative and polemical linguistic behavior. Ease of access to data was also an issue: a smaller ad hoc corpus had been created previously as a dry-run, purely for technical purposes (testing collection procedures). The total number of tokens was 100,000, and the data were quite intentionally recorded in a familiar Microsoft Word file, allowing for ease of use and emphasizing the simplicity and immediacy of approach. Analysis was thus highly qualitative from the outset, as the aim of the study was to categorize data according to higher levels of language behavior (systems of cohesion, discourse features etc.). The coding process was lengthy, some of this even being carried out on paper, with simple color-coding for discrete linguistic aspects (e.g. discourse markers, apparent spelling mistakes etc.). The search function of Microsoft Word was used to check manual observations and counting, but was found to be surprisingly tricky to utilize effectively owing to small (one-letter) differences in tokens, problems with inflections and other issues. A single researcher was responsible for coding precisely because the small size of the corpus allowed for this, but of course there is an awareness that any analysis or inferences risk being significantly subjective.

The context of the discussion (the highly contentious Israeli-Palestinian crisis of 2014) was deliberately chosen in order to investigate language use online in politically sensitive contexts, but an important aim of the research was to observe the construction of the corpus itself and identify critical issues associated with it. Further corpora were collected on different days purely for comparison.

2.1 Immediate Dilemmas

Even such an ostensibly simple set of data presented significant difficulties. Collection was dogged by framing: most contributions were framed by three or more lines of brief text that essentially separates each contribution from the next. As much as 13% of the total data was excluded for this reason, but immediately higher levels of discourse analysis came into play, as text was then data without the frame that supported it in the original context (and participants in the debate might well use these frames for jokes or references). The type-token distinction immediately presented itself as an especially significant and insoluble problem. Is a misprint a new type or can we adjudge it just another token? Some typing errors seemed to be intentional, as plays on words or rhetorical strategies, but here subjective, discourse-based evaluations were required simply to 'correct' identification. The conclusion is that counting is surprisingly tricky at the micro level, and we may ask whether there are always subjective elements in any quantifying procedure.

It also became clear that the data collected were more filtered than was originally expected (and than any linguist would prefer). Taboo words were often automatically edited (or skillful re-spellings employed to evade the censor, again complicating the token-type distinction).

It transpired that the raw data was hardly that, and its preparation was more invasive than had been planned (e.g. some answers to comments remained hidden during a first sweep for collection and decisions as to inclusion were made). This is perhaps a reminder that every corpus is actually an artefact in its own right. The role of subjective behavior was present at many levels: initial assumptions, sampling, processing decisions, tagging, concordance line reading and perhaps more naturally at the discourse level. The question of leaving things out should not be ignored either.

2.2 A Few Illustrative Examples

Repetition of tokens, usually referred to as frequency in corpus linguistics, proved to be a much more complex issue than is traditionally believed. There was ample evidence of rhetorical exploitation of a particular word on numerous occasions for effect, thus stymieing any attempt to count simple occurrences. In accordance with theorists such as Bakhtin [2] or poets such as Maxwell [3] we may suggest that the very concept of a pure repetition of a linguistic item is controversial. Certainly it vitiated against confident quantification in this corpus. And this is a fundamental question in corpus linguistics.

An example from the corpus will illustrate the problem succinctly:

panpipes TonyPantsonFire
04 August 2014 2:44pm 1
"Wolf!"
"Wolf!"
"Wolf!"
"Wolf!"
"Wolf!"
"Wolf!"
"Wolf!"
"Wolf!"

We are left to decide whether this contribution constitutes eight tokens of a single type (the noun 'wolf') or even one single token, made up of a repetition that is essential in order to create the ironic reference to the proverbial idea, 'cry wolf once too often'. Whatever our discourse-based categorization, we certainly have a problem in calculating the frequency of the word 'wolf' in our corpus. Indeed, it was to occur three times soon afterwards in clear reference to this first contribution. This gives us little to say about the frequency of this lexical item in our corpus as an example of current English usage, but much to say about the complexity of counting in corpora in general. Distortions may be ironed out with massive numbers of tokens, but we lose fascinating complexity. Concordance lines were also found to be inadequate as a quick means of establishing context for occurrences: very often the thread of cohesion extended over various interventions and required far more than a one-line co-textual representation.

Other issues concerned the use of highly suggestive names as communicative devices in addition to being identifying terms (e.g. the two names in the example given above: 'panpipes' and 'TonyPantsonFire'). Again these required higher-level analysis (especially regarding their apparent pragmatic aspects), particularly because they were invariably presented as single words even when they were recognizably complete phrases or sentences (again calling into question total token counts). Metonyms and metaphors also presented suggestive, but at the same time, demanding questions of categorization. Expressions such as 'the charity of concrete' required a substantial amount of contextual information to unpack (here reference is made to the payments made for the rebuilding of damaged constructions, which becomes clear in later contributions), while other metaphors were used and ironically reprised with a reversal of meaning: 'rubbing their hands and lapping it up', which referred to one side and then the other. Threads based on shared metaphorical representations continued and repeated, while significant 'weblog redundancy' was also found, including explicit verbatim repetition of previous postings.

All of these features point to a clear conclusion: the science of corpus linguistics cannot neglect discourse level analysis. Ricoeur underlines the importance of predicate level analysis to understand metaphor and other instances of language use [4]. Another area where discourse level analysis was deemed necessary was that of highly informal discourse markers used regularly in contributions, underlining the hierarchical as well as indicative function they often have. It is hard to imagine an adequate description of a couple of tokens such as 'Hey guy' without the use of conversation analysis and pragmatics in general. It would be misleading to assume that the 'guy' here is a mere recurrence of the noun, name, or term of address. Even more so with other discourse markers:

'yeah, right'; 'yep'; 'nope'. Difficulties of identification and counting again surfaced with variations such as 'Ohhhh' and 'Righhhhhhhhhhhhhhhhhhhhhttttttttttttttttttt', which clearly have rhetorical, spoken-language connotations. The need for higher level analysis seems ever present. It might also be regarded as a positive thing, however, as it forces us to confront issues that perhaps are concealed in much larger corpora, but present nonetheless.

3 Some Concluding Suggestions

There is a host of problematic issues that is raised in the construction of this simple, very limited corpus, and it is proposed that they may have significance at all levels of corpus linguistics. Essentially a corpus is a record of 'parole' and so every occurrence has its history, and so, its uniqueness. Corpora are always to some extent diachronic because they deal with original instances of language use and so have a location, and a social and political context. Once we remove these elements, we can measure better, possibly, but we risk losing full sight of what we are measuring. Fairclough is clear in his view of this: he claims that corpus linguistics "simply counts words and co-occurrences between words … but omits essential properties of actual language use"; indeed, he even describes corpus linguistics as only "a tool which can serve analysis" [5]. The present study suggests that although this caution is admirable, it perhaps underestimates the complexity inherent in any corpus, whether it is visible or not. Although a corpus of around 100,000 tokens seems tiny by current standards, some inferences can perhaps be made from this study about the sheer complexity of linguistic behavior. We can also question whether frequency is really such an objective yardstick. The main benefit of hands-on, limited corpus analysis is repeatability: any of the categorizations of readings of data presented here can be tested with a corpus of similar construction today, and again tomorrow. Certainly we have the suggestion that there is a place for small, intimately examined corpora alongside massive general corpora, and that they both need one another.

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Indices of Change: Analysing the Indexical Properties of Data from Psychotherapy Case Work to Discern Patterns of Therapeutic Change Over Time

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Abstract. With reference to semiotic theory, a form of data analysis is proposed that explicitly unpacks the indexical properties of data from psychotherapy case studies. The approach is observed to happen within the therapeutic hour as a co-production between the client and their therapist. Thus analysing the data in this way seeks to address two common charges against traditional research into psychotherapy processes: that it fails to capture the true value of the therapy and lacks the sensitivity to measure outcomes. Two case vignettes will demonstrate the utility of this approach in lived context, with meaning emerging as therapy continues.

Keywords: Psychotherapy · Case study research · Practitioner research · Change process research · Semiotics

1 Introduction

In recent decades, research into the processes and outcomes of psychotherapy have come under increasing criticism for not capturing the value of therapy as understood by practitioners [1], nor generating appropriately sensitive means of measuring outcomes for therapy clients [2]. Research methodologies that studied psychotherapies on the basis that a process, e.g. a psychotherapeutic method, could be tested against an outcome, e.g. whether a client scored better on measures of wellbeing, were not able to capture the complexity of the therapeutic exchange [3]. The now established field of *change process research* (CPR) considers not just the existence of causal relationships between process and outcome, but also the nature of those relationships; including the sequential nature of change during and across therapy sessions [4]. The analysis of case studies presents particularly rich opportunities to reveal those processes [5]: in addition to capturing the longitudinal nature of the psychotherapy process, case studies offer a form of 'narrative knowing' that it deeply contextualised [6].

Whilst we do not provide a comprehensive review of existing theory in CPR, in this paper we will make reference to several exemplary theoretical approaches. However our purpose is to propose a novel approach to the analysis of case data that we consider to prove complementary to these existing strands. We seek to draw attention to a

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_36

naturalistic form of data analysis that can be observed to take place within the ordinary therapeutic hour. Emergent ideas may be treated by both the client and their therapist to reveal meanings through association and hidden underlying patterns. Such data include the emergence of symptoms, whether psychological or psychosomatic; trigger events associated with those symptoms; happenings within the therapeutic relationship and extra-therapeutic events that apparently heralded change; and the appearance of signs, both material and experiential, associated with change.

1.1 Indicators of Change – Existing Concepts in Change Process Research

Skjerve et al.'s *topic change* approach takes the transcript data from therapy sessions and ascribes individual utterances e.g. words, phrases etc. according to their topic – the focus of conversation [7]. These topics are constituted out of a sequence of utterances that is only broken by a shift to another topic. Once a sequence of utterances is identified to form a topic, this can then be analysed for the *perspective* taken on the topic e.g. whether the topic is regarded positively or negatively, the emotional content corresponding to it, the client's own appraisal of cause and effect etc. Skjerve et al.'s method identifies longitudinal recurrences of a topic and seeks to discern shifts in perspective over time.

Significant events studies discern important moments in therapy by reference to multiple sources including client feedback forms on what they considered helpful about therapy and video-recorded interviews [8]. These significant events are considered sequentially as representing the unfolding process between therapist and client through time. These studies typically seek to tie indicators of change within therapy to indicators of good outcome post session and post therapy. It is the concreteness and explicit nature of the significant events that mean this approach is attractive to practitioner researchers in developing 'micro theories' [9].

Gonçalves et al. devised a systematic approach to the coding of case data designed to identify what were discerned to be *innovative moments* in therapy [10]. The concept of an innovative moment emerged from narrative therapy and is defined as the expression of an idea or an action by the client that would not be predicted by the dominant story they tell about themselves. The emergence of an alternative self-narrative is considered by narrative therapists as a crucial opportunity to facilitate psychotherapeutic change [11].

Whether we seek in individual data an indicator of shift in perspective, a significant event or an innovative moment, a high degree of context sensitivity is necessary on the part of the researcher. Data considered prima facie, without a rich appreciation of the client's life history and styles of meaning-meaning are likely to yield generic inferences. Implicit in the idea of making inferences from explicit and concrete data is the capacity to look beyond the data: to treat them as emergent 'signs' in the therapeutic process and consider what they 'signify' and it is this aspect of the analysis that leads us to consider the indexical properties of case data.

2 Indexicality

Indexicality is one of three fundamental sign modalities identified in the semiotic theory of Charles Sanders Peirce; the other two being iconicity and symbolism [12]. An index is a sign that 'points to' an object by virtue of having some contiguity with it in its own context. If one were to look out across the horizon and observe a pillar of smoke it could be reasonably deduced that there was fire below. In this example the visible pillar of smoke serves as an index for the presently invisible fire. Indexicality has utility in disciplines such as medicine - a blood test that revealed abnormal levels of glucose may serve as an index for diabetes; and ecology – the presence of species such as the stonefly or of blood worms in a river serve as indexical of the levels of pollution in the river [13].

2.1 The Utility of Indexicality in Psychotherapy Research and Practice

Psychotherapists similarly observe indices in the stories their clients present to them. When a client reports struggling to get out of bed in the morning, if their attendance at work becomes erratic or they neglect to attend to personal hygiene, these may well be indexical of a state of depression and the therapist will want to explore the greater context in which these signs apparently sit. Likewise if the client reports a new confidence in social situations, that others have noticed them smiling or brighter than before, or that they find they have a 'spring in their step'; these may be considered to be indices of a recovery from depression, that may have been facilitated by shifting patterns of thought, beliefs, relation to others etc. Certain indices may also represent ideas that the client is presently unconscious of or is too ashamed to discuss directly. For example, a client reacts very negatively to a passing comment the therapist made about their relationship with a family member – the intensity of the reaction betrays some presently hidden significance that is not being made explicit in the consulting room.

2.2 Coding and the Emergence of a Change Orientation

In coding case data, and particularly in the induction of analytic themes, individual items are implicitly treated as signposts; pointing beyond themselves to greater phenomena. In the therapeutic situation, individual indices will be landed upon because they are perceived to have an implicit semiotic potential e.g. they appear to signify a departure from the client's dominant narrative. This is usually 'felt' between therapist and client before its meanings are explored together. Alves et al described the coding of client utterances as innovative moments where they appeared as 'exceptions to the rule, as they introduce novelty into a client's life' [14]. These indices can be observed to cluster around what Alves et al identify as 'protonarratives' that in successful therapy will evolve into a 'new self-narrative' [15]. These stages may be considered as analogous to tiers of analytic induction. The therapist may explicitly ask the client to consider the bigger picture – "what do you think this tells us about what change looks

like for you"? Gonçalves et al describe the client as 'decentering' in this exploratory stage, which is being able to stand back and consider the merits of alternative self-narratives – this allows the client to project themselves into the future and sustain the change [16]. Individual indices may be considered as markers representing phases of change e.g. that the client realizes they are going through at the moment; these discernible stages of change have been observed in Styles' assimilation model [17]. In the medium to longer term these phases might be considered to constitute sequential steps in a consistent pattern of change e.g. the establishment of a new self-narrative, such that the client can look back and realise that they are "in a different place" now.

We will now demonstrate the utility of this approach using two case vignettes. The vignettes are the amalgamations of many actual therapeutic cases, with particular details altered as necessary to protect anonymity.

3 Case Vignettes

3.1 Maryam

Maryam was just in her fifties when her husband was diagnosed with a lung cancer – within two months he was dead. She came for therapy one year after her husband's death – she'd returned to work relatively soon after his death and recognized she hadn't properly grieved. Now she was beginning to have strange depersonalisation attacks, that felt like 'out of body experiences'. After several sessions' the therapist mentioned, almost in passing that "it sounds really lonely". Although she didn't say anything at the time the therapist's comment had stuck with her – "yes, it really is lonely". When she returned she talked about this with her therapist and they explored further her feelings of alienation. She realized in that session that her strange 'out of body experience' would not be surprising given how disconnected she felt from everybody since her husband's death. Her daughter lived far away, and when friends and colleagues ever asked her how she was she just replied that she was fine – it had become automatic. Maryam understood that she needed to feel reconnected with the world around her and so resolved that if she was asked how she was she wouldn't just automatically reply that she was fine but would be honest.

Maryam came to a session and talked about a dream that she'd had: She was on the way to the train station, using several different modes of transport, as she was to meet her husband who had been away for a long time. After a long and arduous journey she arrived at the station and as she stepped onto the train platform she saw that the train was already disappearing off into the horizon. The meaning for Maryam was clear – in therapy she said that she knew as though for the first time that she would never see her husband again. This helped her to realise that the house she was living in had become a kind of museum to the life that she had shared with her husband, and that she had remained in it in a state of 'suspended animation'. She made the decision to move closer to her daughter, who was herself about to become a mother. One session towards the end of her therapy upon arrival she noticed that she felt genuinely pleased to see the therapist; feeling the warmth of his greeting in return. This felt important to her and upon exploration she realized that it had made her feel that she was no longer

phantom-like, but that she had a future. Previous to this she had felt no desire or inclination to have a social life and to return to activities she had enjoyed before her husband's death, now she felt in a place to reconnect with old friends and took up lessons in flower arrangement and needlework.

3.2 Andrew

Andrew came for therapy after several angry outbursts directed towards family members and colleagues at work about which he felt ashamed and afraid. With the therapist's encouragement Andrew began to tell his life story. Andrew's own father had died when he was just a baby and his mother remarried, going on to have more children. Andrew grew up feeling that he was different, and even that the family would be happier without him in it. The therapist suggested to Andrew that he carried a great deal of anger with him from his childhood that could not be directed legitimately – it wouldn't seem 'fair' to direct his anger towards his stepfather, his mother, or even his deceased father, but as a consequence it spilled out over relatively trivial frustrations. Andrew had noticed that his angry outbursts only occurred when he felt under pressure at work; that his results would be scrutinized as being poor quality in comparison with that of colleagues. When asked to consider when else he might have felt this way he was able, for the first time, to associate this with his childhood experience in the family home. As a consequence he was able to stop seeing his outbursts as frightening and random - he began to understand that they followed a pattern.

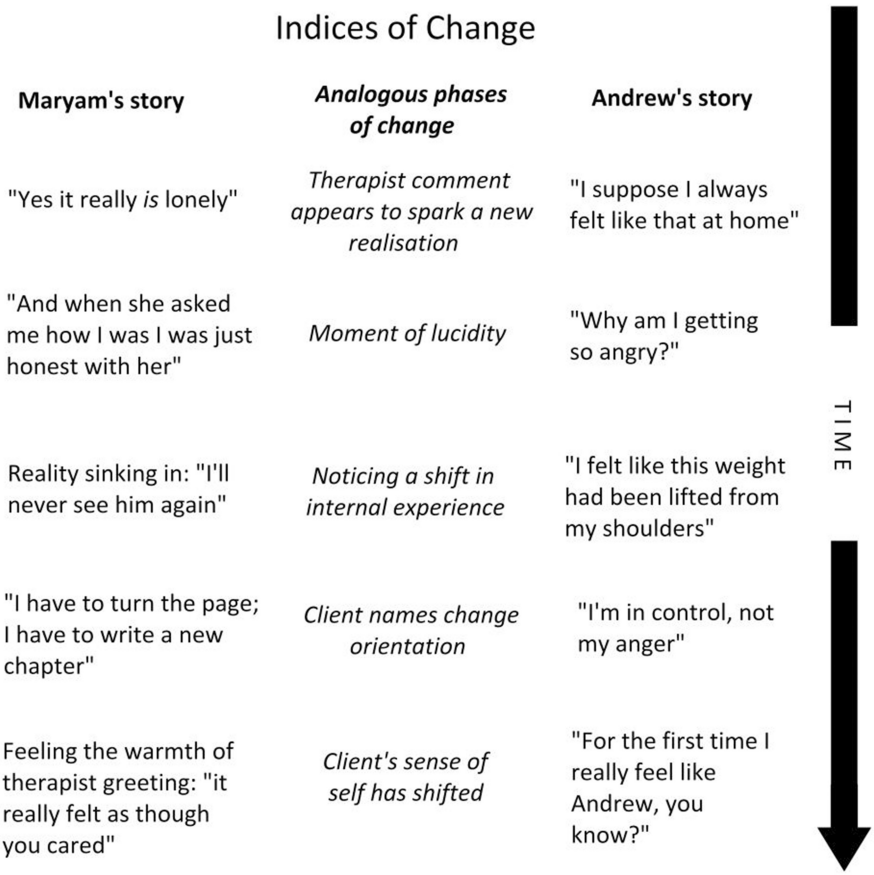
The following session Andrew reported an experience when he'd been driving and another driver had selfishly pulled out in front of him on a busy road at rush hour. Andrew had flown into a rage disproportionate to the event. However in a moment of clarity had caught himself – why am I getting so angry? – and recalled the discussion of the previous session. After the event Andrew noticed a profound feeling of calm. He coined a phrase that became a guiding rule for him: "I'm in control, not my anger". As he put this rule into practice, other people began to notice that he seemed brighter and more at ease. Andrew confirmed that he felt different: not having to be perfect all the time; he realized that he was well liked, and that his work was of a good quality, saying for the first time, he really felt like "Andrew".

The included figure overleaf illustrates how from the narrative data of the vignettes, individual elements can be selected for their indexical properties. Each of the indicated phases of change is 'discovered' by Maryam and Andrew and their therapist through curiosity about the indices as they emerge in therapy.

4 Conclusion

As is typical in case study research, originating within unique local contexts, questions of generalization need to considered carefully. Stake proposed a form of 'naturalistic generalisability' [18] contingent on the practitioner observing points of contact between a study and their own experience e.g. 'that reminds me of my work with X and that insight might be useful'. Elliot advocated a research approach similar to the precedents

established by a body of case law to discern patterns of psychotherapeutic change and the conditions that facilitate change between cases [19]. In the language of the present study: a unique case study may be considered as indexical of more generalized therapeutic phenomena. Thus, we will now apply this novel analytic approach within a case series of psychotherapeutic work undertaken by the first author. In addition to identifying patterns of change within cases, attention will also be drawn to analogous patterns of change between cases: to what extent are these patterns congruous; to what extent do they diverge?



In this paper we have demonstrated how a naturally-occurring exploration of the indexical properties of case data takes place between the client and their therapist in the ordinary therapeutic hour. Furthermore we have proposed that this same indexical analysis may be utilised in complementary fashion with existing approaches to data analysis within the Change Process Research tradition. The deliberate and purposeful exploration of the indexical properties of case data may also provide a useful tool for

counsellors and psychotherapists in their training, for example in increasing their sensitivity to the signs (indices) that emerge within the therapeutic conversation and may point the way to significant therapeutic change.

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Use of the Atlas.ti Software to Analyze Workloads in Primary Health Care in Brazil

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Abstract. The objective of this study was to present and discuss the contribution of the Atlas.ti software in the analysis of qualitative data from a research on workloads of Primary Health Care (PHC) managers. The Software allows to create a Hermeneutic Unit containing all the research data facilitating the analysis of results. Through the resources available in the software is possible to select the more significant quotations assigning codes, and also articulating codes into families which assist in the construction of analytical categories. The research results showed that the work of PHC managers is permeated with challenges, including the need for adaptation to assist the follow-up of PHC teams in Brazil. The study led to conclude that Atlas.ti contributes to streamline the data analysis process, share findings among researchers from different realities, and promote the dialogue between results of qualitative and multicentric studies.

Keywords: Software · Qualitative research · Primary Health Care · Health manager

1 Introduction

The use of software packages can be a relevant ally in qualitative research. The purpose of such tools is to streamline the analysis process through the management of files and coding, where the researcher is the agent endowed with intuition and creativity, directing the research. The researcher manage the software resources deciding what and how to code, and also the depth and the completion of the analysis process [1].

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_37

Since the mid-1980s, technological development has boosted the use of computers in research. The use of softwares in analysis of data from qualitative researches is known as Computer Assisted Qualitative Data Analysis Software (CAQDAS) [2, 3]. CAQDAS includes several softwares, among them: HyperRESEARCH; NUD * IST (which evolved into NVivo); Qualrus; Atlas.ti. In Brazil the most used softwares are Atlas.ti and NVivo [4]; the first was the one chosen for data analysis in the present study.

Atlas.ti is a program that facilitates the systematic analysis of data in qualitative research, archiving a large amount of data obtained through various instruments such as interviews, observations, documents, and in various formats such as text files, videos, audios, among others. Users can purchase and obtain the license of the software, or download a free trial version with limitations of encoding capacity and file sizes.

The Laboratory of Research on Labor, Ethics, Health and Nursing - PRAXIS at the Federal University of Santa Catarina (UFSC) started to use Atlas.ti in the first decade of the year 2000, and more intensily with the start of the research on professional workloads in different care settings. Since then, this software has been used in several researches. A professor and member of PRAXIS has promoted training courses for researchers in several Brazilian universities, significantly expanding the dissemination and qualification of Master and PhD students in the process of data analysis in qualitative research using resources from Atlas.ti software.

The research chosen to exemplify the use of software for qualitative data analysis was developed with managers of Primary Health Care (PHC) or Basic Care (BC), as it is known in Brazil. The Family Health Strategy (FHS), implemented in Brazil in 1994 as the Family Health Program (FHP), is part of Basic Care/PHC and guides the organization of work and the production of care. The BC/PHC is also assumed to be fundamental for the strengthening of the Unified Health System (SUS), as reorganizes the care practice with a view to universalizing the right to health and providing care to individuals, including their family and social context. The FHS is considered the main source of information for municipal managers, who organize and are responsible for the functioning of Family Health teams (FHt), defined by the National Basic Care Policy (NBCP) [5].

In this context, the work process of managers and of the FHS/BC/PHC in Brazil, includes activities such as: participating in the creation of plans to implement the FHS; expanding and implementing new FHt; fostering the structuring Health Care Networks (HCN); promoting the qualification of teams through Permanent Health Education (PHE); and establishing self-assessment processes for both management and staff, as provided by the National Program for Improving the Quality and Access to Basic Care (PIQA-BC) [5, 6].

Furthermore, the PIQA-BC establishes that the work process of managers include: to participate in the definition of the territory for Basic Care Unities coverage; assuring the minimum composition of the team(s), so that there may be a minimum offer of health actions, according to the NBCP; providing regular and consistent information to the Basic Care Information System (BCIS) or the e-SUS BC system; allocating resources so that PHC qualification may occur; organizing the coordination of this level of care; implementing institutional and matrix support, such as the Family Health Support Center (FHSC); undertaking measures that will lead to improvements in the

working conditions of the teams; requesting and supporting the implementation of the external evaluation process of the teams by the Brazilian Ministry of Health (BMH) [6].

The PIQA-BC aims to stimulate quality improvement and increased access to PHC through continuous assessments based on indicators. For its development, the involvement of workers from different management spheres (municipal, state, federal) of PHC teams and users was adopted as a guideline for organizational change, along with a culture of planning, negotiation and contractualization [7].

The complexity of the activities carried out by PHC managers in Brazil brings challenges for the effectiveness of this care model, and also effects on the workloads of these professionals, which may generate wear and tear. Because of this complexity, research on the relationship between the management work context and workloads is challenging. Thus, the following question is raised: could a software for analysis of qualitative data contribute to a better understanding of the relationship between PHC management and workloads?

In this sense, this article aims to present and discuss the contributions of the Atlas.ti Software to analyse qualitative data from a survey on workloads of PHC managers in Brazil.

2 Methodology

The present study has descriptive and qualitative approach guided by historical-dialectical materialism for analysis of the labor process and by the theory of Workloads [8].

In order to understand how the labor process takes place, it is necessary to know the elements that compose it, that is, the work object, the instruments, and the work itself, understanding the relationship between them. This whole process must be analyzed in two dimensions: technical and social [8].

The observation of the concept of labor process shows that this is pertinent to understand the connections between work and health, since, besides specifying the relation between work instruments, work objects, and work itself, it also makes possible to study their historical character [9]. In this way, the proposal of this study is geared to the human work in the health area, and its influence on the increase or reduction of workloads of PHC managers, in order to understand different elements of the labor process and their implications on the health of these workers.

Workloads are elements found in the labor process that interact with each other and with the worker's body, which can generate wear and tear or illness. Loads are classified into groups, such as physical, chemical, biological and mechanical, that have external materiality to the worker body and become new materiality as they interact with it. There are also the physiological and psychic loads; these are expressed in transformations in their internal processes, gaining materiality in the worker's own body. Psychic loads are grouped into psychic overload and psychic underload. The first relates to prolonged tense situations and the second to the impossibility of developing and making use of psychic ability [8].

Thus, loads can physical (noise, heat), chemical (powders, smoke, fibers, vapors, and liquids), biological (microorganisms) and mechanical (generating bruises, wounds,

fractures). Physiological and psychic loads can be expressed in transformed bodily processes, since they are related to materializations in the body of the worker, such as the rupture of physiological rhythms caused by alternation of shifts [8]. However, they do not act in isolation, but in combination with each other, determining the overall logic of the work process faced by the worker. The identification of the present loads is only possible with the understanding of the work process [8]. Thus, the challenges and complexity of the work carried out by PHC managers can interfere with increasing or reducing the workload of these professionals.

Thus, the workload reference guided the analysis of codes in the software, which were shared in the network of researchers on the subject.

Qualitative methodology was chosen to carry out the study because of its potential to analyze and interpret phenomena in a deeper manner, describing the complexity of human behavior, responding to subjective questions such as beliefs, values, motives, attitudes, desires, that characterize the human being and which cannot be reduced to the operationalization of variables [8], consonant with the objective of the study.

Data were collected between 2014 and 2016 from PHC teams, including PHC managers working in the South and Southeast regions of Brazil. The selection of the sample was intentional and included teams whose quality of performance in the PHC stood out in the sense of approximation to what is recommended by the Brazilian MH. Twenty-three PCH managers from 21 basic health units and 12 municipalities, located in the states of Paraná and Rio de Janeiro, were selected. Inclusion criteria for participants were: to be a FHS manager, formally recognized by the municipal health department and to have acted as such for at least one year.

Semi-structured interviews followed scripts seeking to identify/characterize: (a) the work developed by the managers; (b) the organizational structure of the institution and the socio-political macro-scenario of the municipality where the FHS teams are inserted; (c) the composition of the teams; (d) the management process of the Basic Health Units (BHU) and teams; (e) the organization and division of work in the teams; (f) the characterization of the FHS care model; (g) aspects of the work in the FHS that contribute to increase and/or reduce the workloads of managers.

In the first stage, the data collection took place through semi-structured interviews. Through this, the interviewer developed the process of interaction with the interviewee, allowing the approach to complex topics, exploring them in depth, seeking to understand the perspectives and experiences of participants, and data not available in documentary sources [11].

In the second stage of the study, we performed observation and documentary analysis in the managers' work scenarios. At this stage, the choice of municipalities and FHS units was intentional. Observations and documentary analysis focused on elements present in the work process that contribute to increase and decrease the workloads in the management of PHC. These observations also followed a pre-structured script, were carried out in the work scenarios of managers during their daily managerial tasks. A field diary was used to qualify the records.

The documentary analysis evaluated the documents that best characterized the work process of these workers, allowing better understanding and evaluating the health reality and the activities of managers. Among the available documents were minutes of

meetings, team schedules, team reports, employee holiday/break schedules, municipal decrees and laws.

Thus, triangulation of instruments, namely, individual semi-structured interview, documentary analysis and observation, was used for data collection. Triangulation in data collection and analysis is widely used in qualitative research and was chosen to deepen the knowledge about the workloads of managers. Triangulation minimizes fragmentation and increases the dialogic capacity of expressions of different individuals [10]. This process requires that methods, techniques and strategies be triangulated with scientific precision, taking into account the specificities and adequacy of each one to the analysis process, in a distinct and at the same time combined way [12].

The resources of the Atlas.ti version 7.0 (Qualitative Research and Solutions) were guided and associated with Bardin's Thematic Analysis [13] and analyzed according to the workloads reference of Laurell and Noriega [8].

This research was developed respecting the ethical precepts recommended by Resolution 466/2012, and was approved by the Ethics Committee in Research with Human Subjects (approval number 638.904/2014 and approval number 971/2010, amendment number 1.355.565/2015). Participants were invited to sign two copies (one for the researcher and one for the participant) of the Informed Consent Form and the Authorization Term to Record interviews. The right to information, to withdraw from participating in the research and the right of anonymity in the treatment of the information obtained was guaranteed to participants.

2.1 Data Analysis Process

The Atlas.ti 7.0 software is a tool with primordial characteristic of interactivity with more diverse formats of files, and it is organized in a way that allows the creative intervention of the researcher during the process of collection and later analysis of data, essential in qualitative research [14].

A Hermeneutic Unit (HU), that is, a file with the research data, was created for storage and data analysis. All interviews and observation records were inserted in this HU; the documents obtained from de documental study were used for a better understanding of the context and were not inserted in the software.

Each interview transcribed and each text with observation records of managers' work were entered in the software as Primary Documents, and they received an order number given by the software itself. Quotations identified in the primary documents on the most significant sections were assigned codes, and then Families were organized into two macro categories: "sources that increase workloads of managers in PHC" and "sources that reduce workloads of managers in PHC".

All this process was guided by the Bardin's Thematic Content Analysis [13], operationalized using the Atlas.ti 7.0 software and followed three phases. The first phase corresponded to pre-analysis. In this moment, the material was organized, the central ideas that composed the corpus of the research were systematized. The second phase involved the exploration of material in three steps: (a) choice of registration units; (b) selection of units (quotations); and (c) assignment of codes. In the third moment, results were treated. In this moment, inference and interpretation of data take

place, and codes are grouped into familiies. In Bardin's content analysis [13], the treatment of material occurs by codification, when data collected, taken as raw, are listed through the excerpts, aggregation, and enumeration, seeking a representation of the content or of its expression. Categorization happens in two phases: (a) inventory, in which elements are isolated; and (b) classification, in which elements are divided in order to organize the messages. In this way, the classification leads to the production of a system of categories, providing the representation of raw data in a simplified manner, but which brings up invisible data [13].

Operationally, the pre-analysis occurred internally and externally to the software. First, researchers did the transcription and exhaustive reading of the collected data. In the sequence, in the sharing of this first material and with the creation of the Hermeneutic Unit, new readings and sharing of pre-codes were carried out (Fig. 1 shows an example).

3 Workloads of PHC Managers

According to Laurell and Noriega [8], it is necessary to consider and understand the concept of the labor process in order to analyze it, including the process of production surplus value, as well as the production of goods. They point out that, in order to understand how the work process takes place, it is important to observe its concrete logic, that is, its development in capitalist production, which occurs at a specific historical moment, allowing the extraction of surplus value absolute or relative. The work process is the materialization of the process of creation of values and the division of labor [8]. However, the work process presents several elements that interfere in the workers' health, wear and tear and illnesses [15].

From this study, it is possible to understand the importance of understanding in what way and under what conditions the work of PHC managers is carried out. The analysis of the data with the aid of the Atlas.ti resources contributed to give more confidence to the researchers in the analytical triangulation. This is especially true because the resources involve a large amount of data, obtained by different instruments.

Figures 1 and 2 illustrate the central findings related to the sources of increase and reduction of workloads of participants, which are created with help of the software.

The Fig. 2 illustrates another possibility of presenting the results extracted from the software. This second form, if chosen, shows the main aspects of the work developed by managers that contribute to reducing their workloads.

The results show that the work of PHC managers is permeated with challenges. Among the main challenges were meeting the demands with an insufficient number of professionals in the teams, limitations to perform care in rural areas, the need to adapt to meet the PIQA requirements, work overload and lack of physical structure/resources. These factors increased the workloads, wear and tear of managers.

The PIQA increases the managers' workloads through the establishment of change processes, seeking to meet requirements, especially regarding the instruments for registration of actions in printed format. This has increased the demands related to implementation of protocols and mapping of areas covered. This fact is evident in the speech of a manager and was found in the observation:

Fig. 1. Categories related to sources of increase of workloads of managers. Source: research data (analyzed using Atlas.ti 7 software), 2017

Name	Founded
Reduces the load – planning actions/organizing the service	42
Reduces the load – changes with implementation of the PIQA	24
Reduces the load – teamwork	17
Reduces the load – good intersectoral/interpersonal relationships	16
Reduces the load – autonomy	9
Reduces the load – learning/exchange of knowledge/information	8
Reduces the load – matrix support	7
Reduces the load – environment/supplies/equipment	7
Reduces the load – electronic medical records	7
Reduces the load – interpersonal team relationships	6
Reduces the load – personal accomplishment	5
Reduces the load – support from the secretary/resolution of complicated cases	5
Reduces the load – good relationship with the Health Secretary	5

Fig. 2. List of sources of reduction of workloads in the management of FHS. Source: research data (analyzed using Atlas.ti 7 software), 2017

> The PIQA has influenced a lot, because there are several indicators, several items that they evaluate, we tried to adapt as much as we could, but it is not easy because it is too much. I suffered a lot when I started working with the PIQA because I did not have any knowledge of what it was, and the teams too, because they were asked to do several things, things that were done, but which did not use to be recorded […]. (MAN6).

> These include the facade of the Unit, identification plates; identification of cars; the evaluation worksheets, as well as in the municipal law of PIQA transfer to employees as an incentive (Observation note).

Thus, the PIQA showed to have a strong influence on workloads, whether increasing them at the moment of implementation, due to the requirements to be met in order to achieve certification, or reducing them, by positively influencing the work organization of the teams and of the manager. Furthermore, the planning of

actions/organization of the service to meet the requirements arising from the implementation of the PIQA, the teamwork, good interpersonal and intersectoral relationships and autonomy were meaningful for reducing loads.

The day-to-day work process of managers, sometimes permeated by difficulties and potentialities, reduces workloads to the extent organization and planning are implemented, teamwork is strengthened and self-knowledge through evaluation of the process itself is achieved by professionals, as explained in the following speech:

Yes, if we do not talk, we do not work, because our work is continuous and is a teamwork, and thus, doubts, changes of flow happen, and then we have to sit down with the team and plan, ask ourselves, has what we have been doing worked out? Is it effective? Or do we need to rethink? It is always necessary to evaluate the results […]. (MAN9).

FHS nurses help a lot in the execution of the activities of managers. They help to solve situations/problems and to close reports. During observations, it was noticed that they discussed and realized the revision of standard operating procedures of the unit (Observation note).

Workloads are influenced by several aspects. These include structural conditions of the health units, the composition of the teams, the availability of training resources, the affinity with the PHC care model, and the way managers perceive their daily lives in the labor process. However, strategies must be built based on the recognition and self-assessment, in order to reduce workloads in these scenarios. One of them is the PIQA, which reorganizes the work process of managers and guides the planning of health actions.

The professionals in charge of management in the researched context encountered innumerable requirements. These can also be experienced by other components of the teams. However, they face the burdens that are typical of their position. Developing coping strategies is indispensable for these professionals in order to meet the demands of the FHS labor process and the complexity of this care model.

The Atlas.ti software contributed to streamline the process of data analysis, aggregate and analyze the findings of different realities, share findings among researchers and carry out in depth observations of results of studies with qualitative approach. This process highlighted studies considering subjective aspects of daily life of health professionals that are extremely relevant for the construction of new ways of coping with burdens.

The workload reference guided the elaboration of codes, which were shared in the network of researchers with the aim of guiding the analysis.

The use of the technological resource represented a choice of the group of researchers. The potential of these tools to conduct studies in other realities is emphasized. They contribute to the safe sharing of databases and standardization of data analysis process, favor multicentric researches, which are widely encouraged worldwide, and allow a better apprehension of reality, which is very often mentioned as a limitation of studies, especially qualitative researches. In Brazil, this is potentially relevant in view of the continental dimension of the country, the diversity of contexts, the long geographical distances and other barriers that prevent researchers to meet.

The importance of using softwares of this nature comes also from the possibility of optimizing economic resources and the agility in the process of conducting studies.

However, these tools have a cost and require a period of training to qualify researchers to master them. It is recognized in this context that training processes do not always use tools of this nature, and this can lead to estrangement at the moment of implementing these resources.

4 Conclusions

The research process using a qualitative analysis software allowed us to conclude that workloads influence in the work process and in the occupational health of Primary Health Care (PHC) managers.

Data analysis is one of the most important steps in research. The way data analysis is conducted, associated to the use of reliable technological resources, can lead to successful understanding of the object studied. However, data analysis depends on the mastery of tools and their affinity and possibility of adding theoretical and methodological frameworks proposed in the study.

The present study highlighted that the software used as a tool to aid in data analysis allowed streamlining the organization of inserted files and facilitated the analytical categorization. The technological resource in the qualitative analysis of workloads of PHC managers contributed to data triangulation, assuring greater reliability and indicating that, as the resources available in the software are mastered, their use contributes to streamline the analysis and provide greater confidente to researchers in qualitative studies, which often involve a large amount of data. Further studies on the subject taking into account the work process of health professionals are recommended in order to qualify the PHC in other countries, as well as the reporting of other technological resources that may contribute to research in this area.

Acknowledgments. Thanks to the National Counsel of Technological and Scientific Development for the financial support for the development of the research.

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Erratum to: A Categorical-Generative Theory of Social Processes: Towards the Ontological and Mathematical Foundations of a Grammar-Based Model for Qualitative Research

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Erratum to:
Chapter "A Categorical-Generative Theory of Social Processes: Towards the Ontological and Mathematical Foundations of a Grammar-Based Model for Qualitative Research" in: A.P. Costa et al. (eds.), Computer Supported Qualitative Research, Advances in Intelligent Systems and Computing 621, DOI: 10.1007/978-3-319-61121-1_34

In the original version of the book, the following corrections have been updated in Chapter 34:

Email address "bruno.rocha.braga@ifb.edu.br" has been positioned below "Federal Institute of Education, Science and Technology of Brasília, Brasília, DF 73380-900, Brazil".

Acknowledgements in Page 410 and the reference of "Fundação de Amparo à Pesquisa do Distrito Federal" have been removed.

The updated online version of this chapter can be found at http://dx.doi.org/10.1007/978-3-319-61121-1_34

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1_38

Author Index

A.P. Costa et al. (eds.), *Computer Supported Qualitative Research*,
Advances in Intelligent Systems and Computing 621, DOI 10.1007/978-3-319-61121-1