Innovation, Technology, and Knowledge Management

Marta Peris-Ortiz
José M. Merigó Lindahl *Editors*

Sustainable Learning in Higher Education

Developing Competencies for the Global Marketplace

Springer

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Series Editor
Elias G. Carayannis

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Series Foreword

The Springer book series *Innovation*, *Technology*, *and Knowledge Management* was launched in March 2008 as a forum and intellectual, scholarly "podium" for global/local, transdisciplinary, transsectoral, public–private, and leading/"bleeding" edge ideas, theories, and perspectives on these topics.

The book series is accompanied by the Springer *Journal of the Knowledge Economy*, which was launched in 2009 with the same editorial leadership.

The series showcases provocative views that diverge from the current "conventional wisdom" that are properly grounded in theory and practice, and that consider the concepts of ***robust competitiveness***,[1] ***sustainable entrepreneurship***,[2] and ***democratic capitalism***,[3] central to its philosophy and objectives. More specifically, the aim of this series is to highlight emerging research and practice at the dynamic intersection of these fields, where individuals, organizations, industries, regions, and nations are harnessing creativity and invention to achieve and sustain growth.

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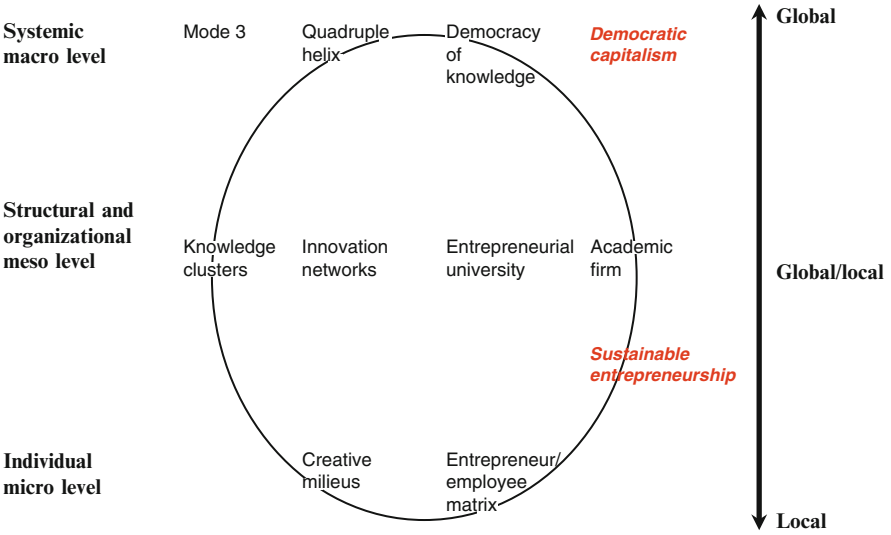
[1] We define *sustainable entrepreneurship* as the creation of viable, profitable, and scalable firms. Such firms engender the formation of self-replicating and mutually enhancing innovation networks and knowledge clusters (innovation ecosystems), leading toward robust competitiveness (E.G. Carayannis, *International Journal of Innovation and Regional Development* 1(3), 235–254, 2009).

[2] We understand *robust competitiveness* to be a state of economic being and becoming that avails systematic and defensible "unfair advantages" to the entities that are part of the economy. Such competitiveness is built on mutually complementary and reinforcing low-, medium-, and high-technology and public and private sector entities (government agencies, private firms, universities, and nongovernmental organizations) (E.G. Carayannis, *International Journal of Innovation and Regional Development* 1(3), 235–254, 2009).

[3] The concepts of *robust competitiveness and sustainable entrepreneurship* are pillars of a regime that we call "*democratic capitalism*" (as opposed to "popular or casino capitalism"), in which real opportunities for education and economic prosperity are available to all, especially—but not only—younger people. These are the direct derivatives of a collection of topdown policies as well as bottom-up initiatives (including strong research and development policies and funding, but going beyond these to include the development of innovation networks and knowledge clusters across regions and sectors) (E.G. Carayannis and A. Kaloudis, *Japan Economic Currents*, p. 6–10 January 2009).

Books that are part of the series explore the impact of innovation at the "macro" (economies, markets), "meso" (industries, firms), and "micro" levels (teams, individuals), drawing from such related disciplines as finance, organizational psychology, research and development, science policy, information systems, and strategy, with the underlying theme that for innovation to be useful it must involve the sharing and application of knowledge.

Some of the key anchoring concepts of the series are outlined in the figure below and the definitions that follow (all definitions are from E.G. Carayannis and D.F.J. Campbell, *International Journal of Technology Management*, 46, 3–4, 2009).



Conceptual profile of the series *Innovation*, *Technology*, and *Knowledge Management*

- The "Mode 3" Systems Approach for Knowledge Creation, Diffusion, and Use: "Mode 3" is a multilateral, multinodal, multimodal, and multilevel systems approach to the conceptualization, design, and management of real and virtual, "knowledge-stock" and "knowledge-flow," modalities that catalyze, accelerate, and support the creation, diffusion, sharing, absorption, and use of cospecialized knowledge assets. "Mode 3" is based on a system-theoretic perspective of socio-economic, political, technological, and cultural trends and conditions that shape the coevolution of knowledge with the "knowledge-based and knowledge-driven, global/local economy and society."
- Quadruple Helix: Quadruple helix, in this context, means to add to the triple helix of government, university, and industry a "fourth helix" that we identify as the "media-based and culture-based public." This fourth helix associates with "media," "creative industries," "culture," "values," "life styles," "art," and perhaps also the notion of the "creative class."

- Innovation Networks: Innovation networks are real and virtual infrastructures and infratechnologies that serve to nurture creativity, trigger invention, and catalyze innovation in a public and/or private domain context (for instance, government–university–industry public–private research and technology development coopetitive partnerships).
- Knowledge Clusters: Knowledge clusters are agglomerations of cospecialized, mutually complementary, and reinforcing knowledge assets in the form of "knowledge stocks" and "knowledge flows" that exhibit self-organizing, learning-driven, dynamically adaptive competences, and trends in the context of an open systems perspective.
- Twenty-First Century Innovation Ecosystem: A twenty-first century innovation ecosystem is a multilevel, multimodal, multinodal, and multiagent system of systems. The constituent systems consist of innovation metanetworks (networks of innovation networks and knowledge clusters) and knowledge metaclusters (clusters of innovation networks and knowledge clusters) as building blocks and organized in a self-referential or chaotic fractal knowledge and innovation architecture,[4] which in turn constitute agglomerations of human, social, intellectual, and financial capital stocks and flows as well as cultural and technological artifacts and modalities, continually coevolving, cospecializing, and cooperating. These innovation networks and knowledge clusters also form, reform, and dissolve within diverse institutional, political, technological, and socioeconomic domains, including government, university, industry, and nongovernmental organizations and involving information and communication technologies, biotechnologies, advanced materials, nanotechnologies, and next-generation energy technologies.

Who is this book series published for? The book series addresses a diversity of audiences in different settings:

1. *Academic communities*: Academic communities worldwide represent a core group of readers. This follows from the theoretical/conceptual interest of the book series to influence academic discourses in the fields of knowledge, also carried by the claim of a certain saturation of academia with the current concepts and the postulate of a window of opportunity for new or at least additional concepts. Thus, it represents a key challenge for the series to exercise a certain impact on discourses in academia. In principle, all academic communities that are interested in knowledge (knowledge and innovation) could be tackled by the book series. The interdisciplinary (transdisciplinary) nature of the book series underscores that the scope of the book series is not limited a priori to a specific basket of disciplines. From a radical viewpoint, one could create the hypothesis that there is no discipline where knowledge is of no importance.
2. *Decision makers—private/academic entrepreneurs and public* (*governmental*, *subgovernmental*) actors: Two different groups of decision makers are being addressed simultaneously: (1) private entrepreneurs (firms, commercial firms,

[4] E.G. Carayannis, *Strategic Management of Technological Learning*, CRC Press, 2000.

academic firms) and academic entrepreneurs (universities), interested in optimizing knowledge management and in developing heterogeneously composed knowledge-based research networks; and (2) public (governmental, subgovernmental) actors that are interested in optimizing and further developing their policies and policy strategies that target knowledge and innovation. One purpose of public *knowledge and innovation policy* is to enhance the performance and competitiveness of advanced economies.

3. *Decision makers in general*: Decision makers are systematically being supplied with crucial information, for how to optimize knowledge-referring and knowledge-enhancing decision-making. The nature of this "crucial information" is conceptual as well as empirical (case-study-based). Empirical information highlights practical examples and points toward practical solutions (perhaps remedies); conceptual information offers the advantage of further driving and further-carrying tools of understanding. Different groups of addressed decision makers could be decision makers in private firms and multinational corporations, responsible for the knowledge portfolio of companies; knowledge and knowledge management consultants; globalization experts, focusing on the internationalization of research and development, science and technology, and innovation; experts in university/business research networks; and political scientists, economists, and business professionals.
4. *Interested global readership*: Finally, the Springer book series addresses a whole global readership, composed of members who are generally interested in knowledge and innovation. The global readership could partially coincide with the communities as described above ("academic communities," "decision makers"), but could also refer to other constituencies and groups.

Elias G. Carayannis

Preface

This book comprises 12 original contributions related to sustainable learning in higher education. These chapters examine the development of competencies to assure that graduates leave fully prepared to face the global marketplace.

In recent years, a dramatic change has taken place in our environment, dominated by major social, economic, and political transformations. The globalization of markets, technological innovation, and overall, the evolution towards a society of highly interconnected, ubiquitous, and interdependent knowledge require a new approach in order to study and understand the complexities and new challenges of today's society. These demands of society imply that the universities must educate their students in the development of competences linked to different sectors and the development of an innovative and sustainable economy. At present, graduates must be prepared to respond successfully to the global challenges of the future. Yesterday's jobs have been replaced by positions that require knowledge management, abstract reasoning, real-time response, ethical behavior, and the ability to provide personal services.

In consequence of all the above, universities worldwide are designing different models based on the acquisition of competencies to plan their students' curriculums so that their graduates fulfill the requirements currently demanded by the labor market. The use of different skill management models in the student curriculum makes it possible to improve the graduates' skill capabilities and facilitates their insertion in the workplace.

These demands of today's society represent a major challenge for both the university and its teaching staff as well as the professor's method of teaching his/her courses. A conceptual and methodological change has taken place, precisely due to the need to achieve a balance between the new social demands and the teaching–learning process. This involves a change in the university organizational culture and requires the commitment of the entire community.

One of the challenges which universities face is to prepare new generations of students who will be capable of selecting, updating, and using knowledge in their specialist fields and in society; capable of learning in different contexts and

modalities throughout the student's professional career; and able to understand the potential with which they continually learn, so that they can adapt their knowledge to new situations.

The chapters we go on to describe look at university as a dynamic source of society; a new challenge in which firms receive graduates who fulfill the competencies demanded by the market. Universities are challenged to train their students to develop the key competencies linked to different productive sectors and cooperate in the development of a sustainable economy. This book presents different cases and observations about the competencies developed in the curriculums of different universities, with the aim to assure that graduates leave fully prepared to face the challenges of the new economy.

Chapter 1—Assessment as Learning and Empowerment: Towards Sustainable Learning in Higher Education

This chapter focuses on what authors refer to as *Assessment as Learning and Empowerment*. This approach to assessment is centered on three key challenges: (a) involving students in the assessment of their own learning; (b) giving feedforward designed to provide information about the results of assessment that can be acted upon proactively; and (c) implementing high-quality assessment tasks. These three challenges further divide into ten core principles which, when operationalized via a series of questions, facilitate the implementation of innovative instruments and tasks to enhance assessment practice for both lecturers and students.

Mindful of the current state of society, inundated by unrestrained technological development, the chapter will consider the need for overcoming the former concept and use of Information and Communication Technologies by analyzing the potential contribution of Technologies for Learning and Knowledge and evaluating the role that Technologies for Empowerment and Participation can have in the area of assessment.

Through the use of technology, the planning and implementation of innovative interventions based on the three challenges mentioned above will lead, in an academic context, to empowerment within the learning process and enable a whole range of strategies and competencies that derive from strategic learning to transfer into extra-academic contexts (personal and professional).

In accordance with the concept of sustainability in higher education, as supported by several authors, this type of learning is characterized by the use of strategies and the development of transferable skills which lead to self-awareness of learning needs, self-regulation of the learning process, autonomous lifelong learning, and self-determination in decision making, based on an ecological and socially responsible approach.

Chapter 2—Is University Students' Self-Assessment Accurate?

The paper's main objective is to assess the self-assessment accuracy of university students. Specifically, the study analyzes the self-assessment of oral communication competence. The study was conducted in a course of the Organization of the Firm Area included in Labor Relations and Human Resources Degree. The literature on self-assessment in higher education has not reached a clear conclusion about its accuracy, detecting a number of methodological problems. To reduce them, authors have taken a number of precautions. Thus, a rubric has been designed and students have been trained to use it, several teachers and peers have been introduced as references, and a segmented analysis has been made according to gender and the student level of competence from their tutor's point of view. Results show that self-assessment accuracy is low. It is also observed that men, regardless of the degree, rate themselves higher than women do. Another finding suggests that the scoring rubric improves the accuracy of self-assessment when the speaker has high oral communication competence but not when this level is low. These results propose a method of developing correction factors, adaptable to every situation, which allows using self-assessment for summative purposes.

Chapter 3—Value Co-creation, Collaborative Learning and Competences in Higher Education

Value co-creation is a key topic today. Little co-creation knowledge, however, has been applied to improving students' skills in the context of university education. To fill this research gap, the main objective of the authors of this chapter is to discuss the dominant achievements of a project of educational innovation associated with learning in marketing. The project was developed jointly by the universities of Seville and Malaga within the framework of the Tech Andalusia Project. Data from a survey of students who participated in the project reveal that their taking part in the project has allowed them to improve the following skills: (a) collaborative teamwork; (b) efficient time use; (c) handling new online resources; and (d) finding new ideas and solutions.

Chapter 4—A Model for Implementing Nonspecific Competencies in Degree Studies, Defined Using a Delphi Study in Spanish Universities

Using the Delphi technique, the authors of this chapter perform an exploratory study to facilitate implementation or advancement of nonspecific competencies. The chapter collates opinions and proposed actions regarding this issue based on curricula of university degree studies introduced in the European Higher Education Area.

The study's primary contribution is to establish an implementation model, consisting of a sequential process in three phases: (a) concept design; (b) organizational design; and (c) launch and monitoring. The tasks involved in the planning, organization and development of the process are intended to facilitate the coordinated and gradual implementation of nonspecific competencies in university degree studies.

The model helps to resolve many problems currently restricting progress in universities' social commitment to comprehensive education of new graduates. Furthermore, the model is focused on university management and teaching staff, and therefore provides solutions related to organization and coordination.

Chapter 5—Linking the Development of Teamwork and Communication Skills in Higher Education

The development of generic skills and competencies in higher education is paramount, according to the new educational philosophy fostered by the Bologna process. These competencies, abilities, and skills include teamwork, oral and written communication, problem solving, analysis, critical evaluation, information literacy, and information analysis. They are developed throughout all courses and subjects, and are usually taught and evaluated independently, and lack any clear structure or coordination. In some cases, generic competencies are acquired gradually, from beginner to advanced level, on an ad hoc basis.

The present study was conducted under the premises that the development of generic competencies in higher education must have a progressive, linear approach, and that the level reached in certain abilities and skills influences the development of other high-level competencies. Specifically, this work explores the relationship between communication skills and the effectiveness of teamwork. Hypotheses were tested among first- and third-year students of the Industrial Organization Engineering degree at the Universitat Politècnica de València. Results show that teamwork effectiveness depends strongly on members' communication skills, and that focusing on teamwork in the first year may be ineffective if communication skills are not developed beforehand.

Chapter 6—First Contact with the Word of Work: The Competence Built in the Teaching Practices

This paper describes a study of teacher trainees undergoing students during teaching practice in preschool education. Its authors analyze competences that teachers believe they build through contact with their professional context. Data come from their portfolios, since they highlight competences built during practice activities and the most interesting aspects to analyze.

The study shows that teaching practice enhances professional competence building, although the building of these competences varies according to the educational action model and the supervision model.

Kindergarten teachers' actions are complex, and they develop by combining different types of knowledge. Teacher–child interactions define the framework of professional competence building.

Teaching practice marks the socialization process that allows future kindergarten teachers to make contact with values, language, and knowledge specific to their profession. This gives them a more realistic view of their working environment.

Chapter 7—Leadership Development Through Experiential Learning in University Studies at Florida Universitària

The development of complex skills such as leadership requires experiential learning. The educational model of Florida Universitària develops social competences through integrated projects undertaken in teams in each academic course. Leadership skills are developed in the fourth year of all university degrees using an experiential approach. Each fourth year student assumes the role of team leader of an integrated first-year project team. They thus develop their leadership skills. The process is accompanied by specialist training in leadership and individual coaching. A multidisciplinary teaching team that monitors the whole process gives this training. During the academic year 2013–2014, 45 students were involved as leaders in this experience.

Chapter 8—Simulation Games and the Development of Competences: Empirical Evidence in Marketing

The use of simulation games in education is a growing tendency in universities. This has been spurred on by their need to renovate their teaching methodologies to adopt them to the European Higher Education Area. These simulators are used in teaching to develop the students' competences and skills related to, for example, encouraging the entrepreneurial spirit, teamwork and competitiveness among peers. This study means to contribute by presenting the results of an experience in teaching innovation founded on the use of the Quantum marketing simulator, which was developed by investigators in the Carlos III University, Madrid. From a questionnaire given to 138 students, the global valuation of the Quantum experience is analyzed, as well as its relationship with motivational aspects and the acquiring of capacities and competences. The results suggest a positive global valuation conditioned by prior motivation and the student's perception of the simulator's impact on the acquiring of competencies and skills.

Chapter 9—Feedback and Self-Regulated Learning: How Feedback Can Contribute to Increase Students' Autonomy as Learners

Feedback is a scaffolding process that provides continuity to student learning. Without it, the assessment in Higher Education would become a firewall that separates the effort from the reward of learning. Without feedback there is no formative assessment and the possibilities to improve student learning are substantially reduced.

Research and experiences in this field allow increasingly accurate feedback mapping, in which it is possible to locate a growing level of detail the aims, focus, agents, kinds, means or moments in which feedback can be offered to students.

In the last decade it has deepened in the theoretical framework that supports feedback, so that a set of principles that guide its development have been identified, new concepts have been introduced, such as "sustainable feedback" or "feedforward," amplifying and diversifying the theoretical basis of the feedback. Similarly, the participation of students in the feedback process has opened new territories to explore, supported by self-assessment and peer-assessment.

Finally, technology is redefining the way in which feedback is conceived and managed. In recent years, new technologic systems are allowing new ways of communication between students and teachers through a synchronous or asynchronous dialogue, which can enhance learning.

The relationship between feedback and self-regulation has brings on the interest about feedback so that we can bring to light that a renaissance of feedback is taking place, especially if we consider nowadays social and academic scenario marked by uncertainty, building-capacity for conflict resolution and lifelong learning skills.

Chapter 10—Measuring Competencies in Higher Education: The Case of Innovation Competence

Within the context of permanent change, innovation has become a vital value for the survival and development of the organizations. Development of this increasingly important value will help students to gain access to the labor market and adapt to their future jobs in a context of these characteristics. Competency describes what training participants should be able to do at the end of such training. The competency is acquired through various learning objectives to be achieved. Innovation competency is closely related to self-assessment and the development of skills and learning methods, ability to work according to the principles of ethics and social responsibility, ability to work in interactive communication situations, ability to create and maintain connections work, networking capacity, ability to cooperate in a multidisciplinary and multicultural environment, ability to communicate and interact in an international environment, etc. In this chapter a method for measuring the innovation competencies in higher education, by introduction of different levels of mastery is developed.

Chapter 11—Three-Dimensionality in Competencies: The Inclusion of Ethics in the Generic Competency of Teamwork and Leadership

The context of the European Higher Education Area requires the alignment of teaching degrees and research projects on offer at university level with social and labor market needs. This chapter provides a sufficient base upon which scoring rubrics on teamwork and leadership can be established and/or expanded. Such rubrics will guide and assess not only what to do but also how must it be done. This approach will be built on both the classical Greek foundation of what constitutes action—*praxis* and *poiesis*—and on two areas of knowledge—management and ethics.

Chapter 12—Student Opinion on the Application of Active Methodologies

The newly established European Higher Education Area has prompted a reformulation of teaching methodologies, placing greater focus on student-centered learning. Integration of theory and practice together with development of academic skills have become important educational objectives.

The purpose of this research is to determine student perceptions of the application of active teaching methodologies, including collaborative learning and case studies for the development of generic skills.

Finally, I would like to thank everyone who has contributed to this publication. Thanks to their effort and dedication, we have been able to provide a valuable and informative guide on an extremely important subject.

Valencia, Spain — Marta Peris-Ortiz
Manchester, UK — José M. Merigó Lindahl

Contents

Chapter 1
Assessment as Learning and Empowerment: Towards Sustainable Learning in Higher Education

Gregorio Rodríguez-Gómez and María Soledad Ibarra-Sáiz

Abstract This chapter introduces the concept of assessment as learning and empowerment. This approach is based on three fundamental challenges: (a) student participation in the assessment of their own learning; (b) feedforward, which focuses on the delivery of information about the results of assessment that can be used in a proactive way; and (c) producing high quality assessment tasks. These three challenges can be subdivided into ten separate principles that, when operationalized by university tutors, enable them to introduce innovative practice or procedures that influence the way both staff and students experience assessment.

Through the use of appropriate technology, innovative proposals based on the three challenges mentioned above can be implemented such that they empower the learning process for students within the academic context. At the same time, this technology and consequent empowerment can help students develop the skills and competencies which lead to strategic learning in extra-academic (personal and professional) contexts as well.

1.1 Introduction

Within the field of assessment there has been a transformation from a paradigm that was dominant throughout the twentieth century, based on the behavioural approach to learning, to an emerging paradigm developed on the basis of constructivism (Shepard, 2000). The emergent paradigm is based on the notion that assessment of student understanding, the processes of feedback from peers and self-assessment are all part of the social processes that underpin the development of intellectual abilities, the construction of knowledge and the formation of students' identities.

Assessment processes within Higher Education have traditionally been characterised by their focus on the practice of merely awarding marks, which provide little,

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if any, help to students in terms of improving their learning process (Ibarra Sáiz & Rodríguez Gómez, 2010). However, there have been a number of advances in this field, with new educational practices being added to the range of tools available to university tutors and students. Among them are concepts such as "authentic assessment", "alternative assessment" and "sustainable assessment".

In line with the suggestion proposed by Boud (2006) that assessment is one of the principle components of educational practice that should be subject to change and innovation, because it determines both how and what students actually study, it is evident there is a clear need to rethink traditional strategies and procedures. Proposals have been made to dismiss systems in which tutors just provide marks and adopt approaches through which both tutors and students develop their assessment skills and, as a result, their professional and teaching skills as well (Rodríguez-Gómez, Ibarra-Sáiz, & Gómez-Ruiz, 2011).

This chapter commences by firstly exploring the principal focus of assessment for learning and empowerment before moving on to consider some of the ways that current and future technological developments might contribute to the field.

1.2 Assessment as Learning and Empowerment

Assessment as learning and empowerment combines elements from both learning-oriented assessment (Carless, Joughin, Liu, & Associates, 2006) and sustainable assessment (Boud, 2000). As with the concept of sustainable assessment in Higher Education, this type of learning is characterised by the use of strategies and the development of transferable skills that lead to a self-awareness of learning needs, self-regulation of the learning process, lifelong autonomous learning and self-determination in decision-making from an ecological and socially responsible perspective.

This approach to assessment comprises a range of challenges, principles, statements and actions. Figure 1.1 provides a definition of each of these four components.

The concept of assessment as learning and empowerment is based on three central challenges (Fig. 1.2). Firstly, it implies the involvement of students in assessing their own learning in a way that is transparent and that encourages dialogue. Secondly it incorporates feedforward, defined as strategies and comments that provide information about the results of assessment in a way that enables students to take a proactive approach to making progress. As both student participation and feed-forward need to be integral to the assessment planning and delivery process this leads to the third challenge, which is the design of high quality assessment tasks. It is vital that assignments to be assessed are demanding, meaningful and authentic. Such high quality assessment tasks will also demand that students engage in reflexive and analytical thought processes.

Innovations that respond to all three of these challenges will, within an academic context, enable students to take charge of their own learning. But, beyond that, students will also become empowered within extra-academic, professional and personal contexts. This means they will be capable of applying across a range of contexts key transferable

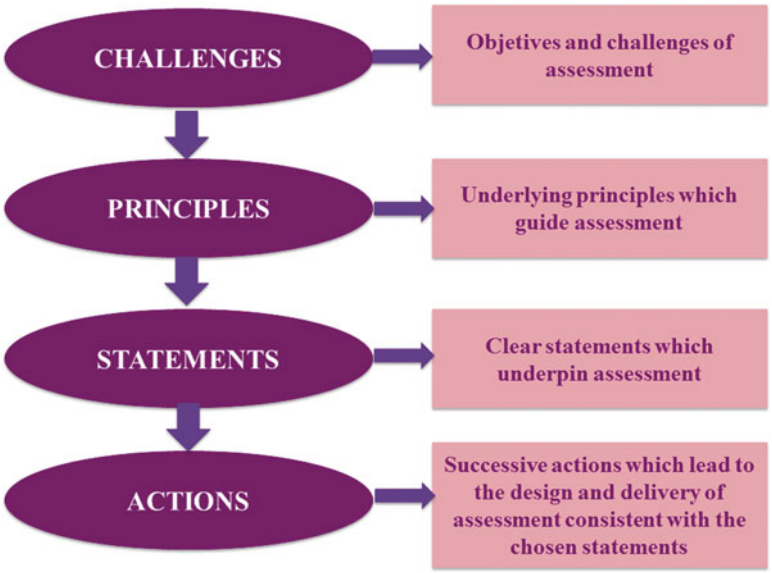

Fig. 1.1 A definition of the components of assessment as learning and empowerment

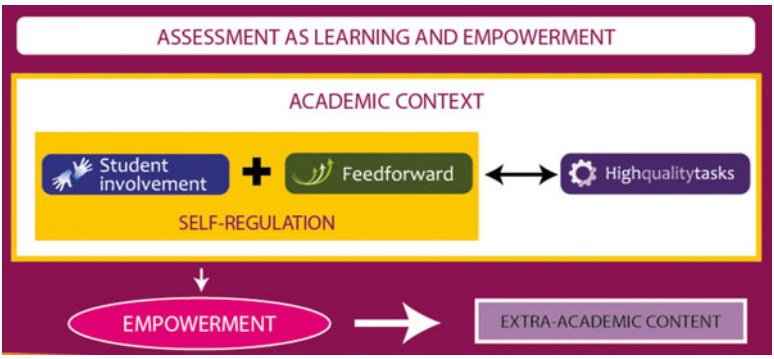

Fig. 1.2 Assessment as learning and empowerment

skills such as data analysis, the application of knowledge, autonomous learning, reasoning, communicating, problem solving, ethical considerations, decision-making, group working or creativity.

As has been proposed by several authors (Boud & Associates, 2010; Boud & Molloy, 2013; Ibarra-Sáiz & Rodríguez-Gómez, 2014; JCSEE, 2002) there are ten basic principles that guide assessment in Higher Education and all of them are incorporated within the concept of assessment as learning and empowerment. They are shown in Table 1.1.

In relation to the three key challenges of assessment as learning these principles correspond to them in the following way (Table 1.2).

Table 1.1 Principles of assessment in Higher Education (Ibarra-Sáiz & Rodríguez-Gómez, 2014)

Principles	Conceptualisation
1. Credibility	Assessment is systematic. It expresses to what extent work produced by students meets the requisite criteria using proven procedures that enable reasoned, effective and valuable judgements to be made about the results of learning and which are based on both internal and external standards.
2. Dialogue	Assessment produces both formal and informal dialogue between the participants which leads to agreement about the criteria, evidence and aspects of the assessment process which, in turn, promotes consensus over the process itself.
3. Improvement	Assessment provides clear and useful information about achievements and challenges in learning, offering opportunities for progress.
4. Participation	Assessment involves all participants, students, peers and tutors in a shared, collaborative and responsible process.
5. Reflexion	Assessment is a learning activity which promotes reflexive, analytical and critical thought through substantial tasks and which enables one's own performance and that of others to be evaluated.
6. Regulation	Assessment develops autonomy and independence, promoting empowerment and initiative in the learning process which can be transferred to extra-academic, professional and social contexts.
7. Challenge	Assessment provides engagement with challenging tasks, providing demanding and motivating assignments which require the use of increasingly high level skills and performance.
8. Sustainability	Assessment encourages learning that is strategic, permanent and for life, offering opportunities to develop skills and abilities useful in a range of contexts and throughout one's life.
9. Transparency	Assessment is carried out against a set of transparent rules, standards and criteria which guide students to achieve the required learning outcomes.
10. Transferability	Assessment is undertaken in a way that is coherent, interrelated and integrated within the course, programme, module or subject matter such that it avoids segmentation and disconnection from learning.

Table 1.2 The challenges of assessment as learning and their related principles of assessment in Higher Education

Challenges	Principles
Participation	• Dialogue
	• Transparency
	• Participation
Feedforward	• Credibility
	• Improvement
	• Regulation
	• Sustainability
High quality tasks	• Challenge
	• Reflexion
	• Transferability

1.3 The Challenges of Assessment as Learning and Empowerment

1.3.1 Participation, Students as Assessors

The importance of participation in the assessment process has been highlighted by several authors, prominent among which are Brown and Glasner (1999), Dochy, Segers, and Sluijsmans (1999), Taras (2010), Rodríguez-Gómez et al. (2011), Gielen, Docky, and Onghena (2011) or Strijbos and Sluijmans (2010), among others.

The value of the active participation of students in the assessment process has been highlighted by the framework of reference and the principles proposed in relation to Higher Education by Nicol (2009) and Nicol, Thomson, and Breslin (2014) consistent with the idea of encouraging students to reflect on their own performance and that of their peers and, consequently, as shown by Vermunt (2013), helping them become independent learners.

This participation, as described in Fig. 1.3, can take place at any of three critical stages in the assessment process. It could take place during planning, when students can be involved in selecting and defining the criteria, choosing the assessment task, marking the work, designing the assessment instrument and the weighting of components in the marking scheme. Likewise, students can be involved during the execution of the assignment and, finally, during the formal evaluation and analysis of the results in relation to the published criteria. They may also participate in peer assessment or engage in negotiation as part of co-assessment.

The challenge to facilitating participation is in encouraging dialogue with and engaging students in the process of assessing their learning in a way which is wholly transparent.

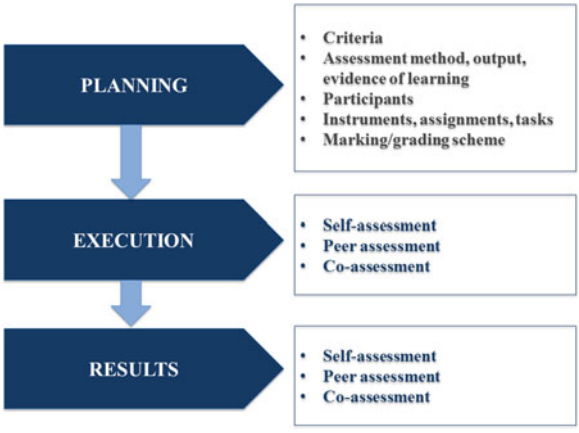

Fig. 1.3 The stages for participation in the assessment process

This challenge is based on a series of principles which are therefore centred on: dialogue, transparency and participation. The aim of engaging students in the assessment process is to:

- Promote dialogue and collaboration concerning the assessment format and instruments. This will entail joint decision-making between tutors and students on the format and instruments used for assessment and the way they are constructed.

  Tutors need to provide their students with the opportunity to engage with the assessment process by suggesting ways their output or performance can be delivered and by proposing precisely which outputs or performances will be assessed or by specifying the requirements for the assignment.

  This participation also implies reaching agreement with the students on what assessment instruments will be used, how the students will design them and the weighting to be given to the outputs or performances when grading them.
- Ensure the use of transparent assessment criteria and standards. Students should be required to select, propose and define the assessment criteria to assess their output or performance using transparent and agreed standards.

  To achieve this, actions might include: negotiating the assessment criteria with students, suggesting assessment criteria that the students then define, getting the students to select and define the assessment criteria, providing students with sample assignments for them to assess using the criteria that have been established and justifying their grading.
- Promote participative assessment formats. Tutors should encourage the development of participative assessment formats such as self-assessment, peer-assessment and co-assessment.

  Students should suggest assessment formats to assess their outputs or performance in relation to their learning, to assess and reflect on their own outputs and performance, to grade and justify their opinion on the quality of their peers' outputs and performance and establish the weighting for the grading of different elements of the output or performance.

1.3.2 Feedforward

During the last decade a wide variety of evidence and contributions have appeared which reinforce the value and impact that the implementation of a dialogic strategy such as feedforward has within the Higher Education context (Boud & Molloy, 2013, Merry, Price, & Taras, 2013).

Higgins, Hartley, and Skelton (2001) insisted on the need to change the emphasis that had been placed on feedback and in future to centre the focus of attention on feedforward. Bloxham and Boyd (2007) also highlight how recent studies place ever greater importance on the concept of feedforward, which focuses on the particular aspects of their work where students should pay greater attention in the future. Knight (2007) also insists on the need to provide both feedback and feedforward,

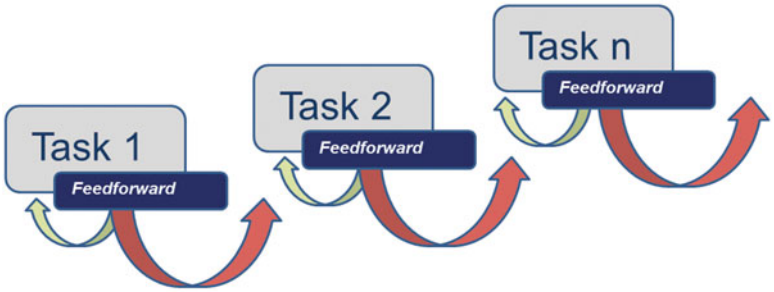

Fig. 1.4 The process of feedforward

concluding that these two activities are jointly integral to the assessment process when considered from the perspective of complex learning. A further example of the increasing use of feedforward as a strategy can be found in Berkeley Evaluation & Assessment Research Assessment (BEAR) System (Wilson & Scalise, 2006: 646) which is based on, among other things, tutors delivering "*feedback, feedforward and follow-up*".

These examples highlight the need for tutors to provide students with information that is not merely retrospective and that offers no opportunity for change or improvement (feedback), but information that is clearly focused on the future (feedforward) in such a way that it allows the students to use it in a very direct way to improve not just their immediate academic performance, but also, in the medium and longer term, their ongoing performance as professionals, consequently promoting lifelong learning.

Figure 1.4 illustrates how feedforward, when given in response to an assignment, provides information that is not only relevant to that particular assignment, suggesting changes to improve the quality of that specific task, but can also help students improve their performance in subsequent similar tasks and challenges.

Feedforward, therefore, can be defined as a calculated strategy which provides students with information and guidance aimed at helping them achieve self-determination in their learning. It acts as a way of reducing the distance which separates the students' response to an assessment task from the reference level (model answer) established for the task in such a way that when they modify their response accordingly they are subsequently able to achieve, or even exceed, the model answer.

In effect this approach constitutes a student led learning strategy. Through it the students, in dialogue with their tutors or other agents, can take the initiative when determining how they will use the information and guidance they receive. They can decide what impact and result the feedforward will have, whether they might then involve other agents (from within the university environment). They can influence the level of detail contained within this advice and guidance as well as the way and means by which they will receive it.

Some guidance is clearly needed to assist tutors in developing the process of feedforward in Higher Education. In response to this need and in order to offer some

strategies, tools and instruments to guide the implementation of feedforward in the assessment and development of skills of university students, various guides have been produced. Some not only examine the design and implementation of effective feedback and feedforward (García-Jiménez, Ibarra-Sáiz, & Rodríguez-Gómez, 2012) but also provide a valuable overview of the prevailing processes of assessment throughout Higher Education (Ibarra-Sáiz, Rodríguez-Gómez, & García-Jiménez, 2012).

As discussed above, the aim of feedforward and feedback is to provide students with information about their progress and their performance in a way that enables them to improve on them. The challenge of achieving this through effective feedforward is based on the principles of credibility, improvement, regulation and sustainability, as expressed in the following statements of intent:

- To help students identify what is a good piece of work. By sharing with students a joint vision of the assessment process and the importance of the information given to them regarding their performance it means they are able to make progress and achieve the desired results.

  Tutors can employ a wide variety of methods to achieve this. For instance; they can distribute examples of good assessment work done by students, get students to appraise their own work or that of their peers without providing criteria and making the identification of the criteria part of the task, assess work using previously established and published criteria then justify the comments and marks awarded whilst engaging in dialogue with the students so they are involved in delivering proactive information about the assessment to their peers.
- Trust in the students' ability to learn for themselves. If students are motivated and feel encouraged by their tutor to take the initiative in the assessment process and improve their own learning they gain self-esteem and the confidence to overcome difficulties and improve their performance.

  This process requires tutors to both acknowledge and articulate the efforts and the strategic thought that students put into their assessments, to reflect with them on how to learn from their mistakes, to appreciate the students' level of self-esteem and their perceptions about their learning, to stimulate debate regarding assessment as an integral part of learning rather than just a grading exercise, and treating them as partners in the creation of a community of practice.
- Encourage students to monitor their learning through self-assessment, peer assessment or co-assessment. Students tend to monitor their own learning more when they receive valuable information about their progress and achievements from their tutor, their peers or from their own self-assessment.

  Tutors can encourage students to participate in the assessment of their own work and that of their peers, ensuring their judgements are valid and understood by the recipient. They can also provide opportunities for students to analyse and reflect on their work in order to identify alternatives, take control of their learning and improve their performance.
- Encourage students to maintain a critical dialogue about their progress. This is achieved through engaging with students and the community of practice they belong to in analysing the results of their learning so that they use the resulting critical dialogue to identify ways to improve their learning at university and beyond, in their personal life and subsequent professional life.

Tutors must aim to engage students by creating an environment in which they can analyse their priorities and the effectiveness of their learning, by generating and evaluating proposals for improvements to the methodology or assessment tasks, by getting them to analyse their skill level based on their results and what will ultimately be required from them in a professional environment.

1.3.3 High Quality Assessment Tasks

In their proposals for an assessment quality framework Gore, Ladwig, Elsworth, and Ellis (2009) highlight three factors that should be present in all assessment tasks and which each comprise a variety of elements (Fig. 1.5). These factors all relate to intellectual rigour and mean that each assessment task should demand the active involvement of the students, require them to engage with high level thinking and oblige them they articulate effectively what they have learned. The value of an assessment task stems from ensuring it is both connected to the students' prior knowledge and has an extra-academic context which implies implementing a wide range of knowledge and cultural perspectives such that the learning is meaningful and appropriate. Finally, students should be supported but also made aware that there is a high level of expectation on them by presenting them with assessment criteria that help them navigate and manage their own learning.

It is also important to consider all of the critical elements that constitute an authentic assessment, which include the following (Ashford-Rowe, Herrington, & Brown, 2014):

- An authentic assessment should be challenging.
- The outcome of an authentic assessment should be in the form of a performance or product (outcome).
- Authentic assessment design should ensure transfer of knowledge.

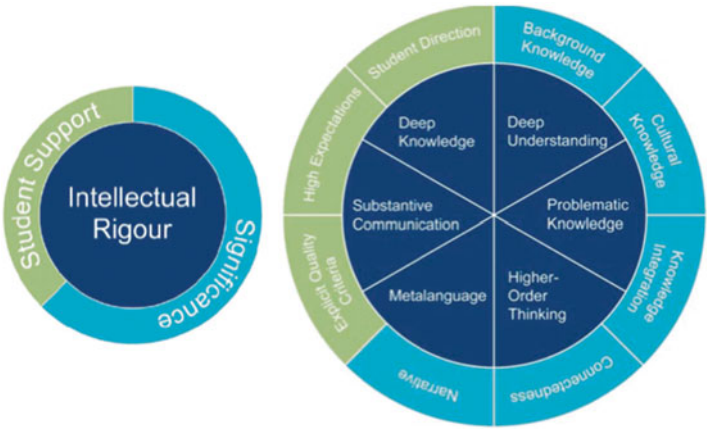

Fig. 1.5 Framework for high quality assessment. *Source*: Gore et al. 2009:6

- Metacognition as a component of authentic assessment.
- The importance of a requirement to ensure accuracy in assessment performance.
- The role of the assessment environment and the tools used to deliver the assessment task.
- The importance of formally designing in an opportunity to discuss and provide feedback.
- The value of collaboration.

It is evident therefore that one of the most crucial aspects of assessment is the design of authentic assessment tasks. The third challenge therefore corresponds to designing high quality assessment tasks based on the notion that assessment supports learning or, in other words, acknowledges assessment as learning.

The challenge here is to design authentic assessment tasks that are demanding and meaningful to students and which require them to engage in high level critical and analytical thought.

The principles that support the design of such assessment are: challenge, reflection and transferability, which are summarised in the following statements:

- Create challenging assessment tasks. This means designing and implementing assessment tasks which demand high expectations from the students, leading to challenges which they need to overcome using a range of strategies.

  These tasks will require students to engage in questioning, researching and communicating, to identify meaningful relationships and establish connections, to take responsibility for their learning, organising and managing their time and other resources. In essence these tasks will require students to take risks and coordinate the process and their actions in order to achieve the required ends.
- Propose assessment tasks that are intellectually demanding. This means setting assessment tasks that require students to demonstrate their learning and a high level of comprehension of concepts, fundamental ideas and high level thinking.

  Intellectual rigour also requires students to be able to identify and articulate the key concepts and ideas of the discipline, to find solutions or alternative perspectives and justify or question a variety of approaches, results or conclusions, analyse and reorganise knowledge and information to address the issue, to demonstrate they can integrate and relate both existing and new knowledge, skills and experiences, making valuable and appropriate connections between them.
- To design realistic and transferable assessment tasks. For this they must be relevant to the student and enable them to make connections between, on one hand, their existing knowledge and on the other, experience and information that might come from other academic experiences or from wider social reality.

  The students should be required to deliver something concrete such as a report, some specific research, an oral presentation or a performance of some kind. What they are asked to deliver for assessment should require them to demonstrate that they understand and can apply theories, concepts and knowledge relating to the discipline but, furthermore, that they can deal with genuine situations and problems that occur within the real world.

1.4 The Function of Technology in Assessment

In his SAMR-Model (Substitution, Augmentation, Modification, Redefinition) Puentedura (2012) proposes a life-cycle or a series of stages by which technology becomes integrated within an activity. In an initial stage (Substitution) technology acts as a direct tool substitute, with no functional change. Secondly, in the Augmentation stage, technology acts as a direct tool substitute, with functional improvement. Thirdly, technology enables significant task redesign (Modification stage). In the final stage, technology allows for the creation of news tasks, previously inconceivable (Redefinition).

The use of technology in the field of assessment follows this same life-cycle and closely follows the four generations of computerized testing suggested by Bunderson, Inouye, and Olsen (1989). In fact a new term has been coined (e-assessment) that in its broadest sense can embrace all technology-enabled assessment activities (JISC, 2007, 2010). In contrast to traditional "paper and pencil" based assessment exercises, the advantages of e-assessment include lower long-term costs, instant feedback to students, greater flexibility with respect to location and timing, greater efficiency, etc. Despite these potential benefits, however, it can be seen that in most cases technology has only been used to reproduce the formats, traditions and practices of assessment already in use. Indeed, in some cases, it has led to the reintroduction of already discredited assessment strategies that, once technology becomes involved, appear to be surrounded by a halo of innovation which ignores their actual pedagogic value. It should not be forgotten that the study by Healy, Berger, Romero, Aberson, and Saw (2002) emphasised that the use of a digital tool per se does not automatically improve student learning. It is critical that proven design strategies are used to ensure that any digital tool is pedagogically effective.

Redecker (2013) analysed the development of trends in e-assessment and suggested that two separate approaches are currently being worked on: the Explicit Testing Paradigm and the Embedded Assessment Paradigm, and that further evolution from Efficient Testing towards Personal Learning (see Fig. 1.6) is needed to bring about true innovation in assessment. This change of focus requires further technological developments and one in particular appears particularly promising, that which is currently referred to as Learning Analytics. This technology "involves the interpretation of a wide range of data produced by and gathered on behalf of students in electronic environments in order to assess progress and tailor education to individual students more effectively. Learning Analytics could allow assessment to be embedded in immersive environments, multiplayer games and computer simulations" (Redecker, 2013: 5).

As Redecker and Johannessen (2013: 91) insisted, "the more pressing task is to make the conceptual shift between traditional and twenty-first century testing and develop (e-) Assessment pedagogies, frameworks, formats and approaches that reflect the core competences needed for life in the twenty-first century, supported by coherent policies for embedding and implementing e-Assessment in daily educational practice".

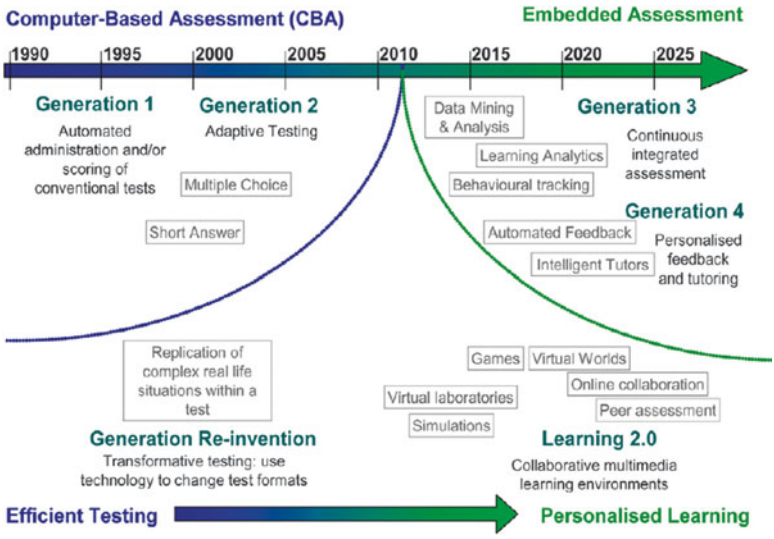

Fig. 1.6 An overview of developments and trends in technology-enhanced assessment. *Source*: Redecker, 2013: 11

So, taking as a starting point the challenges and principles of assessment as learning and empowerment which have been covered above, it is important to consider what is the precise role for technology as a vehicle to facilitate or impede this concept of assessment. To explore this issue the following sections will focus on the use of technology to address three key issues; how to design high quality assessment tasks, how to ensure the participation of students and how to deliver feedforward. They will also cover the requirement for appropriate training to enable tutors and students to implement this type of assessment.

1.4.1 Technology for the Design of High Quality Assessment Tasks

E-assessment began within the context of classroom based teaching, which explains why to a large extent it remained true to its origins, delivering assessment tasks designed to ascertain the acquisition of learning of students who had to demonstrate their knowledge by choosing one from a variety of possible answers relating to theory or facts or, in the best of cases, by responding to questions that require a single answer.

Even though the appearance of the internet during the last decade of the twentieth century has changed the way in which students are now assessed, what has not changed significantly are the kinds of task they are required to perform or the instruments used to assess them. Despite the improvements due to the introduction of

e-assessment, the fundamentals do not appear to have changed: the main type of item used in e-assessment are still the true/false or multi-choice questions and the automated feedback to the students remains in the form of "closed" responses using the model "wrong answer A receives feedback A" and not "open" in a way that guides the student to identify their own mistakes and determine how they might resolve or avoid them.

Over a decade ago Bennett (1998) signalled the need for a new generation of assessment in which the first thing to change would be the type of task and questions it incorporated. In his view the required *generational change* should lead to the integration of assessment tasks and learning together with intelligent tutors, microworlds and simulations; and the whole content should be highly dynamic and adaptable, reflecting the specific interests, strengths and weaknesses of the students.

Advances in ICT in the past decade encourage the belief that it should be possible to construct assessment tasks that go beyond asking students to answer a question by picking from a range of options or delivering automated responses that are closed and standardised. Driven by the potential advances some professionals and researchers are already developing ways to bring real innovation to the design of high quality assessment tasks.

One line of development in particular should be recognised, that which focuses on the use of "sophisticated tasks" in e-assessment. E-assessment based on sophisticated tasks is one which incorporates highly stimulating material, using a variety of media (graphics, sound, video or animation) and which requires students to interact in a variety of ways with all the material (Boyle & Hutchison, 2009).

The challenges involved in designing e-assessment that is at the same level of sophistication as some current teaching practice has caused researchers to suggest radical changes, leading to what some have referred to as "Assessment 2.0". This term was first used by Elliott (2008) to describe tasks which were aligned to the Web 2.0 environment. These tasks were supported by technological tools and gave students the chance to solve authentic and personalised problems (meaningful, contextualised, useful and that required an activity to be completed, a response to be developed or a particular concept to be applied). They therefore promoted significant learning through requiring students to confront situations that mean they have to know how to use a specific tool in order to construct the appropriate response.

The development of assessment strategies using Web 2.0 means a significant advance in that it allows for all those engaged in learning and assessment (students, tutors, professionals) to be connected via social networks, blogs, instant messaging, wikis, multi-user sites, etc. and to harness their interaction within the assessment process. Nevertheless, this progress would only represent an intermediate stage on the path to true innovation in the assessment of learning which would need advances in a direction that would not just connect people—as happens with Web 2.0—but would also provide information to students on what they have to do to move from their current position to their desired position. And that would require a Web 3.0. Such a "semantic Web" would operate using intelligent agents (without human intervention) capable of

identifying information from within the responses made by the students and analyzing it such that the programme could deliver tailor made, personalised feedback.

Advances in the assessment of learning through virtual environments should continue developing to the point where they can reach into other domains such as being able to assess students' performance whilst undertaking complex practical tasks within a professional environment. Currently, assessments of performance within a professional environment are almost exclusively limited to assessment of performance in situ within the workplace. The introduction of a Web 4.0 would enable authentic simulations to be incorporated and, what is more, would permit communication between all the connected intelligences (people and programmes) so that the assessment of the learning and the feedback provided are delivered not by a single tutor or programme but by experts (tutors and professionals) and by peers in collaboration with the programmes that use their in-built intelligence to analyse the students' progress.

1.4.2 Technology for Participation

As has been analysed above, the participation of the students can be achieved through a variety of assessment strategies such as self-assessment, peer assessment or co-assessment and technology should facilitate these strategies. But, does that actually happen in reality? An analysis of the most widely used LMS within universities, such as BlackBoard or Moodle, shows that the options for assessment they provide are, for the most part, difficult to implement and contain a design process that is so complex that, in fact, very few university tutors actually employ them.

Some specific technological tools have, however, been developed in recent years in an attempt to resolve the issues surrounding participative assessment, such as Re:View, by the University of Technology, Sydney (UTS); AROPA in the case of the University of Auckland or CPR by the University of California, Los Angeles (UCLA).

Another significant web-based product currently available is EvalCOMIX (http://evalcomix.uca.es) which has been developed to facilitate the design of assessment and enable two main activities to be carried out. Firstly, the design and management of complex assessment tools such as checklists, grading scales, semantic differentials or rubrics (Fig. 1.7) with comments and observations. Secondly, integrated within an e-learning environment such as MoodleTM, it allows these assessment tools to be used for self-, peer and tutor assessment (review and/or grade) and give immediate feedback (Fig. 1.8).

The stimulus and opportunity created by social networks and the development of new technologies which facilitate interaction and participation mean that currently some authors (Reig, 2013) are suggesting that former concepts and the use of Information and Communication Technologies (ICTs) should be discarded and replaced by new concepts such as "technologies for learning and knowledge" (TLK) and "technologies for participation and empowerment" (TPE).

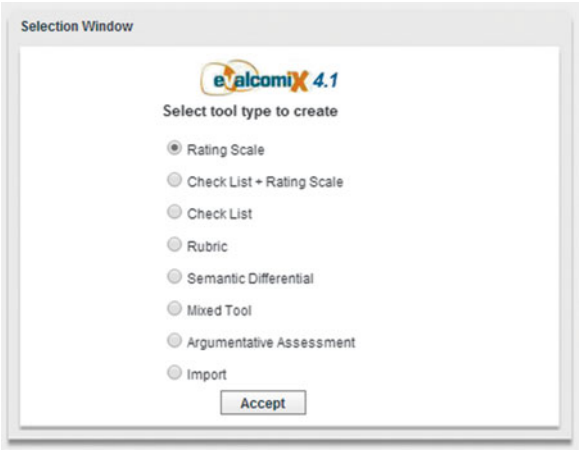

Fig. 1.7 EvalCOMIX™ interface to design and manage assessment tools

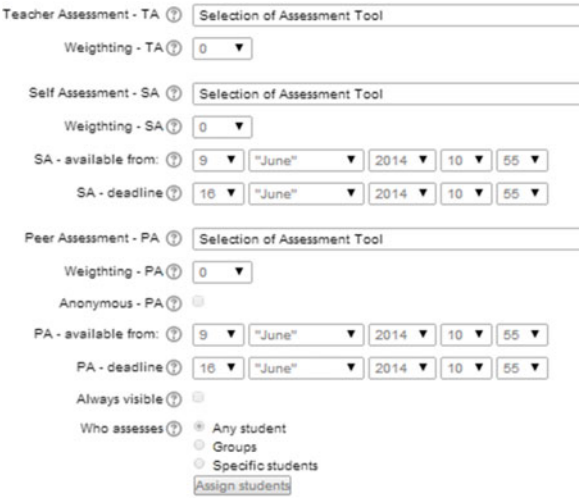

Fig. 1.8 EvalCOMIX™ interface to design self-, peer and tutor assessment

1.4.3 Technologies for Feedforward

As Williams, Brown, and Benson (2012) have indicated, "recent rapid advances in learning technologies do not change the fundamental nature of feedback in learning and assessment, but they do markedly increase the ways in which students may receive comment about their performance, and give feedback to others."

Currently there are a number of technologies available which offer clear opportunities to deliver feedforward, such as PebblePad or Mahara for e-portfolios, as well as videoconferencing or wikis and blogs. To a large extent, EvalCOMIX is a technology that offers all of this, such that students and tutors can analyse and appraise the work done by all other students and even deliver immediate feedforward (Fig. 1.9).

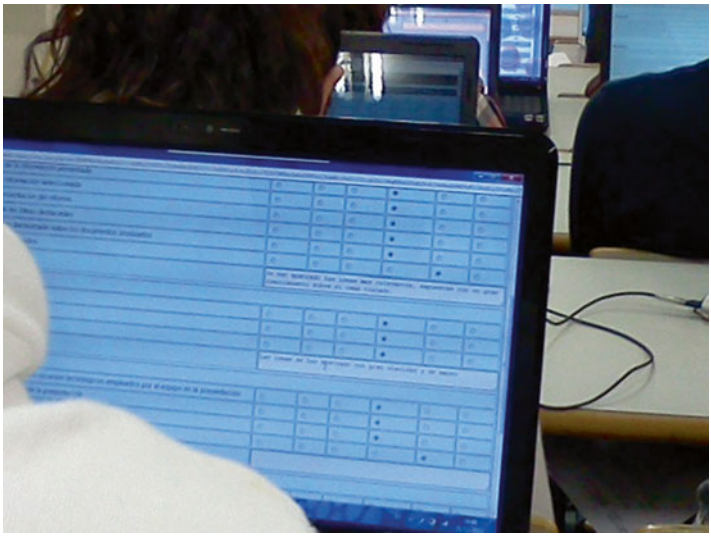

Fig. 1.9 Students assess oral presentations and give instant feedback using EvalCOMIX

In the medium term it is important to consider Learning Analytics, the development of which will enable the "interpretation of a wide range of data produced by and gathered on behalf of students in order to assess academic progress, predict future performance, and spot potential issues" (Johnson, Adams, & Cummins, 2012: 22). Although it is currently only in the early stages of development universities are already beginning to develop projects in this area. They recognise that this technology has the potential to significantly increase opportunities to improve students' strategic learning by giving tutors and students instant access to the totality of the information available about an assignment or activity.

1.4.4 Technology for Assessment Literacy

On the issue of the importance of incorporating technology into education Mishra and Koehler (2006) highlight in their TPACK model (Fig. 1.10) the need for tutors to have three types of knowledge: what they know about the subject they are delivering (Content Knowledge), what they know about the most effective teaching methodology to deliver their subject (Pedagogical Knowledge) and what they know about technology (Technology Knowledge).

By Pedagogical Knowledge, Mishra y Koehler essentially means knowledge about teaching and teaching methodologies. But from the perspective of assessment it is apparent that it is not just tutors who should know about it but that the students should have the same knowledge as well. On this issue Price, Rust,

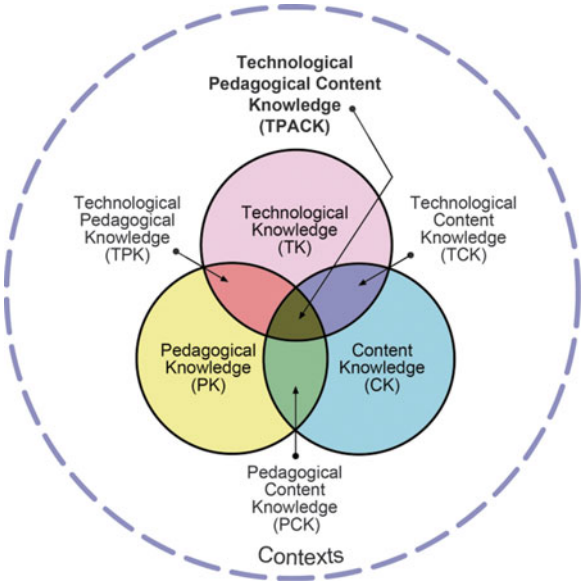

Fig. 1.10 TPACK Framework (Reproduced by permission of the publisher, © 2012 by tpack.org)

O'Donovan, Handley, and Bryant (2012: 10–11) believe that true assessment literacy incorporates:

- an appreciation of assessment's relationship to learning;
- a conceptual understanding of assessment (i.e. an understanding of the basic principles of valid assessment and feedback practice, including the terminology used);
- understanding of the nature, meaning and level of assessment criteria and standards;
- skills in self- and peer assessment;
- familiarity with technical approaches to assessment (i.e. familiarity with pertinent assessment and feedback skills, techniques, and methods, including their purpose and efficacy); and
- possession of the intellectual ability to select and apply appropriate approaches and techniques to assessed tasks (not only does one have the requisite skills, but one is also able to judge which skill to use when, and for which task).

In order to implement assessment as learning it is essential for tutors and students to be fully competent in assessment and, to achieve this, both students and tutors must have access to specific training programmes that develop the required assessment skills. As well as delivering the required skills and knowledge about the tools used in assessment, the technology itself will almost certainly play a key role in this area of training in the near future.

Developments in this area may well come initially from pedagogic design programmes with a generic application, such as Phoebe (http://www.phoebe.ox.ac.uk/), or from more specific programmes that support the design of assessment processes

(http://dipeval.uca.es) or even from tools that enable reflexion on the process of innovation in assessment (http://dinno.evalfor.net/).

Beyond that, game-based learning could come to play a key role in formative processes. In relation to the training of students in assessment, the DevalS Project uses serious simulation games (http://eva.evalfor.net) to introduce students to the basic principles and skills of assessment.

Finally, it is interesting to note the experiences of a group of European and Latin American universities that, through the international DevalSimWeb Project (http://devalsimweb.eu) have developed a training programme for tutors using technology as the central element.

1.5 Conclusions

The skills and competencies required in the twenty-first century are continually evolving and so education is still required to focus on developing core transferable skills, among which lifelong learning is considered fundamental.

In this context e-assessment must ultimately develop from being a model based solely on the assessment of knowledge revealed by the learner into a form of holistic, authentic and fully integrated assessment (Redecker, 2013). Assessment as learning and empowerment establishes a new reference point for assessment in Higher Education that is consistent with the context of change, but its full implementation will require a change of mentality on the part of university students and tutors.

Technology will doubtless play a central role in the way that the challenges and principles of assessment as learning are operationalised. The ongoing development of technologies such as applications (apps), tablets, game-based learning, learning analytics, gesture-based computing or the internet of things will have a significant impact on learning-focused organizations over the next 5 years (Johnson et al., 2012) but, whatever happens, it must be remembered that it is the challenges and principles of assessment as learning and empowerment as described above that must dictate the future direction of assessment practice throughout Higher Education.

The question that universities must now respond to is not how technology should be incorporated into educational practice but rather what kind of technology should be developed and stimulated so that in all our Higher Education institutions students are faced with high quality assessment tasks, participate in their assessment and receive feedback in a manner which, ultimately helps them learn how to learn.

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Chapter 2
Is University Students' Self-Assessment Accurate?

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Abstract The paper's main objective is to evaluate the self-assessment accuracy of university students. Specifically, the study analyzes the self-assessment of oral communication skills. It was carried out in a Firm Labor Organization course included in the Labor Relations and Human Resources Degree. The literature on self-assessment in Higher Education does not provide clear evidence about its accuracy, as a number of methodological problems have been detected. To reduce them, we have taken a number of precautions. Thus, a rubric was designed, and students were trained to use it. Several teachers and peers were introduced as referents, and a segmented analysis was conducted based on gender and the students' level of competence from the teachers' point of view. Results show that self-assessment accuracy is low. Moreover, regardless of the degree, men's self-assessments are higher than women's. Moreover, the findings suggest that the scoring rubric improves self-assessment accuracy when the speaker has good oral communication skills, but not when these skills are poor. These results lead us to propose the development of correction factors that can be adapted to any situation, thus allowing self-assessment to be used for summative purposes.

2.1 Introduction

In any profession that follows the principles of autonomy and self-regulation, people have to be aware of the need to assess their own work and engage in continuous learning throughout their careers (Boud, 1989; Regehr, Hodges, Tiberius, & Lofchy, 1996).

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Thus, Boud (1989) suggests that one of the responsibilities of educators is to teach students to operate as professionals would. In other words, they should be capable of giving and receiving feedback and assessing their own work and that of others, which in turn would increase their professional competence. This argument supports the growing interest shown by university teachers in stimulating student participation in the learning process.

However, the literature does not provide conclusive results about people's ability to assess themselves (e.g., Campbell, Mothersbaugh, Brammer, & Taylor, 2001; De Grez, Valcke, & Roozen, 2012; Langan et al., 2008; Patri, 2002; Ward, Gruppen, & Regehr, 2002). In addition, as Stefani (1994) and Ward et al. (2002) point out, studies on self-assessment have been far from rigorous, basically due to the different criteria used by the assessors (students and teachers).

An accurate self-assessment would contribute to developing the student's critical view of his/her own work. Therefore, the present study aims to analyze the self-assessment accuracy of university students, compared to other assessors of their performance, such as peers or teachers. The study evaluates the oral communication competence, which is one of the most difficult to measure (Bolívar-Cruz et al., 2013). The methodology followed is designed to resolve several of the problems shown in the literature on self-assessment accuracy, making it possible to use this type of assessment for both formative and summative purposes.

After this introduction, the following section presents the theoretical basis for student self-assessment and its accuracy, and it addresses questions related to self-assessment accuracy. After that, we present the methodological design that guided the investigation. Next, the results of the empirical study are analyzed. Finally, we present a summary of the main results and the conclusions reached, as well as future lines of research.

2.2 The Student's Self-Assessment and Its Accuracy

This paper addresses the study of university students' self-assessment accuracy. After defining self-assessment, its main advantages will be presented, and the reasons for its low accuracy level will be analyzed.

According to Boud and Falchikov (1989), self-assessment refers to the student's commitment to judging his/her own learning, especially the achievements and results obtained.

Incorporating the student into his/her own assessment offers several advantages (Campbell et al., 2001; Dochy, Segers, & Sluijsmans, 1999; Falchikov, 2005; Gessa-Perera, 2011; Marín-García, 2009; Regehr et al., 1996; Topping, 2003), with the following being especially noteworthy: (a) it contributes to developing valuable skills for the job market, such as having a critical view of their own work; (b) it increases students' involvement in their learning; and (c) it frees the teacher to spend time on tasks with greater educational value. Specifically, in developing the ability to make oral presentations, De Grez et al. (2012) indicate that self-assessment produces improvements in grades, in perceived learning, in confidence about making

better presentations, and in the development of assessment skills. These benefits justify the use of self-assessment (Boud, 1989; Boud & Falchikov, 1989; Taras, 2010), even when it is not as accurate as it could be.

In spite of these advantages, the incorporation of self-assessment into educational practice is limited (Boud & Falchikov, 1989), especially for summative grading purposes (Stefani, 1994). One of the reasons for this low implementation is the lack of accuracy shown by students when taking on the role of assessors of their own work.

The literature analyzing self-assessment is scant. Moreover, the results are not solid and even show contradictions. Thus, studies like those by Dochy et al. (1999) and Al-Fallay (2004) present favorable empirical results about the use of self-assessment, while others, such as those by Campbell et al. (2001), De Grez et al. (2012), Langan et al. (2008), Patri (2002), Regehr et al. (1996) and Ward et al. (2002), find results that are contrary to its use.

Methodological and psychological problems are also cited to justify the lack of consensus about self-assessment and its accuracy in Higher Education. The first problem is that the activities assessed have quite different characteristics (e.g., essays, group work, oral presentations, practical laboratory sessions), and so it is not surprising that the results do not coincide (Marín-García, 2009). Specifically in the case of oral presentations, few studies were found, which allows us to assume that it is important to perform an in-depth examination of this activity (De Grez et al., 2012; Lew, Alwis, & Schmidt, 2010; Marín-García, 2009).

Regarding the methodological problems, Ward et al. (2002) indicate that the accuracy of self-assessment has been verified through correlations analysis between students' scores and scores from an external source (teachers or peers). This approach presents various problems: (a) teachers' assessments are usually the standard for comparing students' assessments, which is, at the least, questionable (Falchikov & Boud, 1989; Topping, 2009), especially in the area of communication skills, where it is more difficult to find valid comparison patterns among expert raters (De Grez et al., 2012).

Likewise, the assumption is made that people who grade themselves act as a coherent group, which is also questionable because it would mean that all students use the same criteria and the same assessment scale (Hanrahan & Isaacs, 2001; Ward et al., 2002).

Another methodological problem related to the correlations approach is the consideration that all students act in the same way when they have the opportunity to assess their own performance. A few outliers can make the correlation index much lower than what would be expected; therefore, group heterogeneity would have to be taken into account (Ward et al., 2002).

Another aspect to consider is the influence of differences between assessors. Among these differences, an aspect that has received considerable attention is the assessor's gender and its influence on assessment quality (Archer, 1992; Falchikov & Magin, 1997). Although there are gender-based differences in self-assessment (Beyer, 1990), which seem to be related to women's lower perception of self-efficacy and confidence in their own performance (Pallier, 2003), the studies carried out in the educational setting do not provide definitive results on this topic (Boud & Falchikov, 1989). If this question is analyzed in relation to oral presentation skills, the results are not conclusive either. For example, Langan et al. (2005, 2008) detect

a significant effect of the assessor's gender, while Sellnow and Treinen (2004) do not. Meanwhile, De Grez et al. (2012) do not find a significant relationship between gender and self- and teacher assessment comparisons, although they did find one between peer and self-assessment.

Finally, the repercussions of self-assessment for the student can reduce its accuracy. Thus, Tejeiro et al. (2012) indicate that when the self-assessment can affect the grade, students' and teachers' scores do not correlate. This basically occurs for two reasons: (a) students' desire to raise their grades (Lew et al., 2010); and (b) the added pressure of assessing themselves, as Taras (2010) pointed out when indicating that poor students worry more than good ones when assessing themselves.

Based on these problems, it seems important to take a series of steps to improve self-assessment accuracy. Thus, more reliable and valid standards should be used to compare self-assessments, such as the introduction of peer assessment or forming committees of teachers as a control mechanism (Ward et al., 2002). In this sense, various studies (Campbell et al., 2001; De Grez et al., 2012; Langan et al., 2008) conclude that peer assessment is more precise than self-assessment. It is curious to observe that these studies support students' capacity for correct assessment when they have to judge the performance of others, but they cast doubt on students' ability or intention to apply this same level of rigor to their own performance.

Another way to improve accuracy is to employ assessment formats that are easy to use, reliable and with high content validity. Thus, the use of rubrics is a form of assessment that makes it possible to rate the quality of students' contributions and performance levels in different areas, specifying, before doing the activity, the factors or variables that will be analyzed and the requirements for each (Andrade & Du, 2005; García-Ros, 2011; Jonsson & Svingby, 2007). Rubrics, therefore, can reduce assessment subjectivity and produce greater agreement among the scores. Likewise, it is necessary to provide adequate student training in the use of these rubrics and facilitate opportunities for self-assessment (Marín-García, 2009) throughout the degree programs.

The final precaution is related to the existence of differences in the raters' assessment behavior. This problem can be addressed by segmenting the group of students according to their performance on the activity, for example, following the teacher's criteria, in order to observe the phenomena of self-indulgence in the worst students and self-demanding behaviors in the best.

2.3 Methodological Design

As mentioned above, the purpose of this study is to rate the self-assessment accuracy of university students. Thus, it aims to verify whether the self-assessment of oral communication skills, in a summative assessment context, is sufficiently accurate compared to other sources of assessment, once a series of methodological

Table 2.1 Reliability of the rubric

	Cronbach's alpha
Teachers	0.8296
Peers	0.8704
Self-assessment	0.7965

precautions have been incorporated into the process. Thus, we propose three specific objectives:

- Find out whether it is possible to obtain a high level of self-assessment accuracy through the use of rubrics.
- Verify whether self-assessment accuracy is related to the speaker's gender.
- Analyze whether there are differentiated patterns of behavior when students are segmented according to their teachers' ratings of their presentations.

The study was carried out in Firm Labor Organization, an obligatory course taught in the Degree of Labor Relations and Human Resources (hereinafter, LRHR), which is worth six credits. The participants in the study were 92 students who assessed their classmates and themselves while performing a test consisting of making an oral presentation in teams of two people. In addition, each of the presentations was assessed by two teachers, the one responsible for the subject and another unrelated to it, both with considerable experience in assessing oral presentations.

In order to unify the assessment criteria, the students were given a rubric elaborated by teachers with experience in rating oral presentations in the university context. This rubric consisted of ten assessment criteria that included the main dimensions of the skills analyzed. In turn, each criterion was rated on a three-level scale (1—deficient, 2—acceptable, 3—excellent), and a detailed description was provided of the necessary requisites for each level. Before the presentations were made, all of the assessors had access to the rubric, they were carefully told about its functioning, and any doubts were clarified. In order to increase the students' degree of involvement, the grade received on the oral presentation was linked to the final grade in the course (i.e., summative assessment).

After collecting the assessments of the presentations, the rubric's reliability was rated through inter-rater agreement (García-Ros, 2011), considering three groups of raters: teachers, self-assessment and peers. This consistency was measured by applying Cronbach's alpha to the rubric, obtaining the results presented in Table 2.1. As the table shows, there is good internal consistency in the three groups; therefore, the rubric is considered reliable (Cortina, 1993).

In order to fulfill the proposed objectives, the global score for each speaker was obtained from the sum of the scores given by the assessors on each criterion on the rubric. Thus, variables are generated for the global score given by the teachers, the global score given by the peers and the self-assessment score. When there is more than one assessor (teachers and peers), the average of the score awarded by each rater is used, that is, the teachers' mean and the peers' mean. To facilitate comparison, the averages calculated were rounded to the first integer, given that the self-assessment can only produce integers.

The first specific objective of this study was to determine whether the assessments can be considered accurate. Therefore, the level of agreement among the scores of the three assessors, teachers, peers and self-assessment, was analyzed graphically. Moreover, we presented the main descriptive statistics, along with their statistical significance, measured through tests for equality of means.

The second objective was to analyze the self-assessment accuracy with regard to gender. To do so, the sample was segmented based on the gender of the speaker in the cases where the difference between the self-assessment and the teacher's assessment was statistically significant. Histograms of frequency were used, as well as the basic descriptive statistics, to later try to identify a linear relationship between the grades through the simple linear correlation coefficient. If this relationship was not detected, the possible independence among the variables was analyzed by applying the Spearman coefficient.

Finally, the identification of behavioral patterns by groups of students (third specific objective) was carried out through graphic analysis, segmenting the sample based on the scores the students received from their teachers.

2.4 Analysis and Discussion of the Results

Figure 2.1 shows an initial examination of the level of agreement among the three collectives involved in assessing the oral presentations. It can be observed that the teacher assessment coincides more with the peer assessment than with the self-assessment. In fact, as would be expected, the self-assessment is higher than the other two in most cases. Another noteworthy result is that the teachers' scores are quite similar the peers' scores, although the latter present less variation and, therefore, discriminate less, as shown in the studies by Kwan and Leung (1996), Magin and Helmore (2001) and Marín-García (2009). Thus, we can establish that the use of the rubric seems to bring the peer and teacher assessments closer to each other than to the self-assessment.

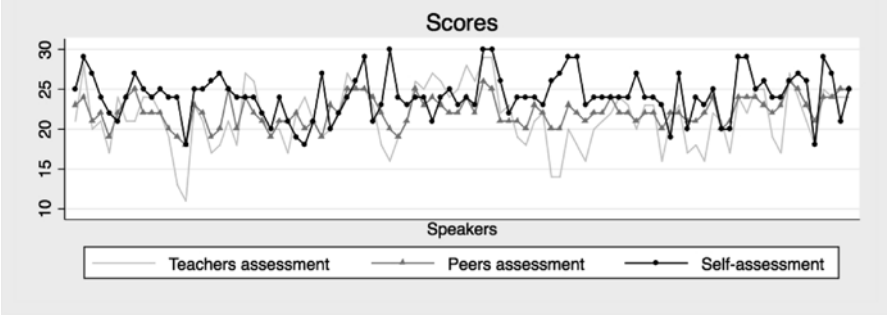

Fig. 2.1 Scores given to the speakers by type of assessor

Table 2.2 Descriptive statistics of the global score on the presentations

Number of presentations		92
Min.–max.	Teachers	11–29
	Peers	18–26
	Self-assessment	18–30
Mean	Teachers	21.49
	Peers	22.18
	Self-assessment	24.29
Standard deviation	Teachers	3.78
	Peers	1.83
	Self-assessment	3.10

To improve the accuracy of this analysis, we carried out a descriptive statistical analysis. The results can be seen in Table 2.2. The table shows that the range between the minimum and maximum scores of the teachers is superior to the range of the peers, while the range corresponding to self-assessment is always located above the minimum and maximum of the other assessors. Therefore, while peers seem to give more intermediate scores, and teachers use a broader range of scores, the students give themselves higher grades. Moreover, and examining the level of inter-rater agreement, it can be seen that there are no statistically significant differences between the assessment means of teachers and peers, while the differences between either of these two and self-assessment are statistically significant. Therefore, once again, teachers and peers score similarly, while self-assessment offers divergent values.

In order to discover the influence of some personal variables on students' assessments, in our case gender, it is necessary to segment the sample based on whether the speaker is a man or a woman (second specific objective). Figure 2.2 shows the histogram of frequencies of the global score awarded by each of the assessors, based on the gender of the speaker.

A general tendency can be observed in which the distribution is displaced toward the right as we change the assessor (teacher, peers, self-assessment), for both sexes, although this tendency seems to become stronger when self-assessment is performed by men. In general, peers give higher scores to the communicative competence of the speakers than the teachers do, regardless of the gender of the speaker. In addition, the self-assessment of this skill is higher than the peers' perception, and this difference seems to be greater in men than in women.

Although the results seem clear, it is necessary to find out whether these gender-based differences can be considered valid. Therefore, contrasts of differences in means are conducted, and the tendency of the scores by assessor group is analyzed (see Table 2.3). First, examining only the coefficients of the differences, it can be observed that the direction of the teachers' and peers' scores usually coincides. Thus, both groups give higher scores to women than to men. However, when the significance is analyzed, the peer ratings do not show significant differences based on gender. Even so, differentiating the speaker by gender is relevant, as it shows that men's self-assessment is systematically higher than women's, with the differences

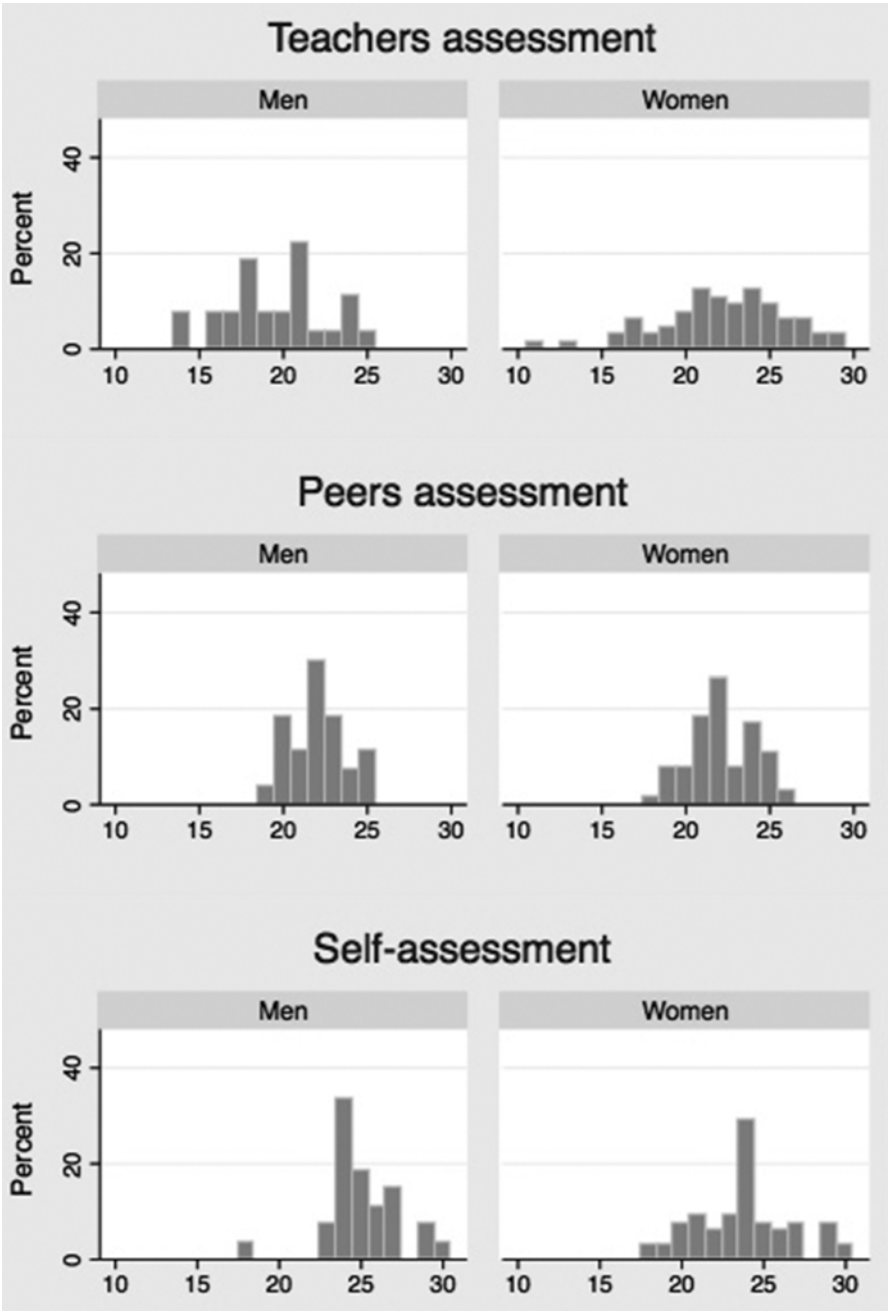

Fig. 2.2 Histogram of frequencies for the global score based on the gender of the speaker and the type of assessor

Table 2.3 Descriptive statistics of the global scores on the presentations and the speaker's gender

		Men	Women
Number of presentations		27	65
Min.–max.	Teachers	14–25	11–29
	Peers	19–25	18–26
	Self-assessment	18–30	18–30
Mean	Teachers	19.46***	22.25***
	Peers	22.07	22.23
	Self-assessment	25.55***	23.84***
Standard Deviation	Teachers	3.13	3.74
	Peers	1.66	1.91
	Self-assessment	2.61	3.16

***Differences in mean by speapker's gender statistically significant at 0.01 level

Table 2.4 Linear correlation between assessment sources by gender

	Men			Women		
	Teachers	Peers	Self-	Teachers	Peers	Self-
Teachers	1			1		
Peers	0.7184***	1		0.7781***	1	
Self-assessment	0.0305	0.0949	1	0.4306***	0.4710***	1

*** Linear correlation statistically significant al 0.01 level

being significant. Thus, self-assessment shows opposite results to the opinions of teachers and peers.

Based on the data in Table 2.3, a certain correlation between the peer and teacher assessments can be intuited, but not between these scores and the self-assessment. To quantify each relationship, the correlation is analyzed, and the results appear in Table 2.4.

The table shows a high linear correlation between peer and teacher ratings (71 % for men and 78 % for women). Moreover, the linear correlation between self-assessment and the other assessors is significant in the case of women, although the coefficient is low in comparison with those already mentioned (43 % correlation with teachers and 47 % with peers).

As a high correlation was not detected between self-assessment and peer and teacher ratings, even though they all saw the same presentation and used the same rubric, we considered the possibility that the relationship might not be linear. Therefore, Spearman ranges were calculated, but without finding any change in the results. These results led us to conclude that the use of the rubric seems to have brought the scores of teachers and peers closer to each other, but there was less convergence between their opinions and the self-assessments, especially when the oral presentations were made by male speakers.

As the third specific objective, we proposed that self-assessment would behave in a differentiated way in students assessed by teachers as having better or worse skills.

The analysis was performed by dividing the speakers based on gender, given that the teacher ratings had been statistically significant. The grouping of the students in one collective or the other (with better/worse level of competence) was determined through the construction of confidence intervals for the set of individuals and the gender of the student. Thus, the students who were outside the interval, constructed as a mean score plus/minus a standard deviation for their reference group, would be the best/worst. Figure 2.3 presents the score given by each of the three rating sources to each of the speakers in the collectives identified in this way.

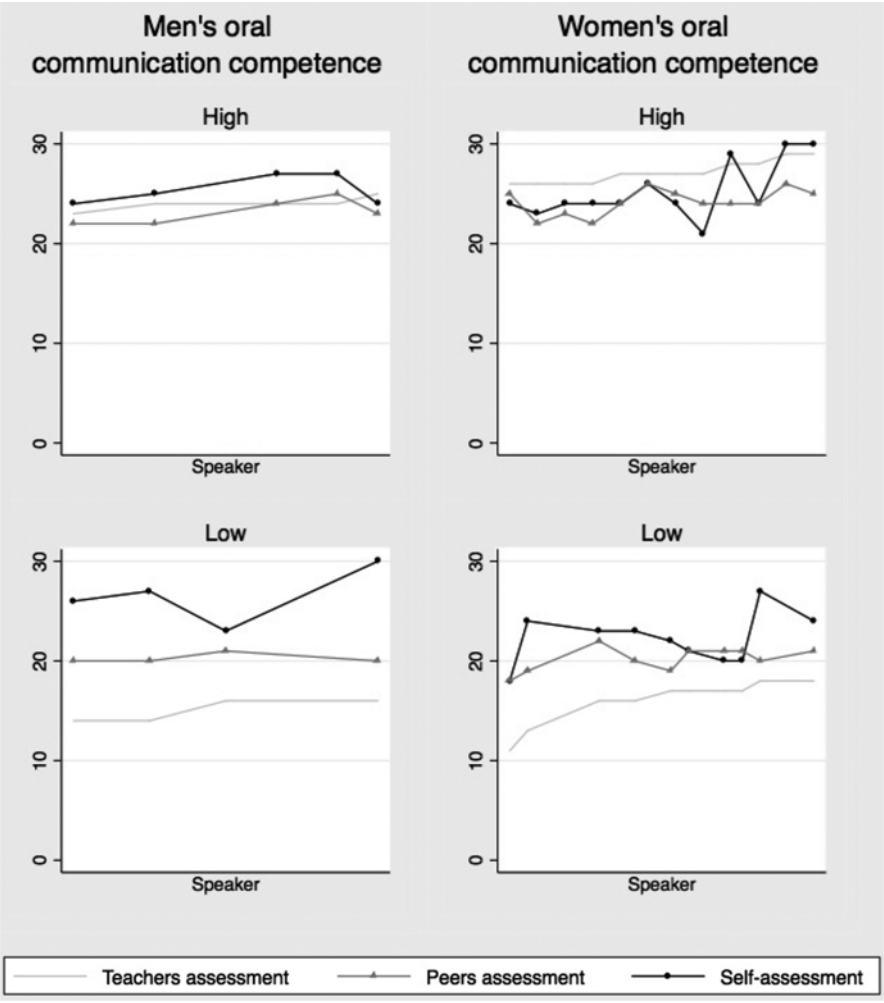

Fig. 2.3 Score given by the assessors to the speakers with high/low oral communication competence and gender

On the presentations by the students with low communication competence, without distinguishing the gender, there is greater disparity in the assessments of the three sources than on the presentations by the students with high competence, as the latter show a consensus among the scores. Therefore, the rubric seems to unify criteria when the speaker shows a high level of oral communication skills, but not when the speaker lacks or has low levels of these skills.

In any case, teacher and peer behaviors seem to follow the same pattern, as the results show that teachers are stricter than peers when assessing presentations by students with low communication skills, while on presentations by students with high communication competence, teachers are more benevolent than peers. Likewise, there is a clear pattern in the self-assessment of the presentations made by students with low competence, as their self-assessment is systematically higher than the ratings by the other two assessment sources. This difference is even more pronounced in men than in women. However, men with high communication competence continue to self-assess their presentations with higher scores than the other assessors, while the women tend to underrate themselves.

2.5 Conclusions and Future Research

The development of the self-assessment capacity is attracting a lot of attention in the academic world, given the importance of the student's involvement in the learning process, not only to improve his/her academic results, but also because this skill contributes to the student's professional development. However, the research carried out on self-assessment accuracy does not provide conclusive results, and it presents a lack of methodological rigor (Stefani, 1994; Ward et al., 2002). The present study has analyzed self-assessment accuracy in the university, after taking a series of methodological precautions recommended in the literature. Thus, university students' ability to rate their oral communication competence was measured, using as peer and teacher assessments as referents. This study proposed three specific objectives: (1) to find out whether the use of a rubric makes it possible to obtain a high level of agreement among the different types of assessors; (2) to verify whether self-assessment accuracy is related to the speaker's gender; and (3) to examine the existence of different types of behavior in students' self-assessment, segmenting them according to the best or worst grades given by the teachers.

A series of conclusions can be drawn from the analysis of the results. On the one hand, although the use of a rubric allows teachers and peers to assess in a similar way, the same effect does not occur when self-assessment is incorporated. This result has been found in the previous literature (e.g. Kwan & Leung, 1996). Therefore, the conclusion can be drawn that the use of the rubric provides a high level of accuracy in the case of peers and teachers, but not in the case of self-assessment. Various arguments can explain this result. First, the effect of self-assessment on the grade can influence its outcome, producing higher scores than other assessment sources and reducing the rubric's effect. Moreover, the lack of a

self-assessment habit, not involving the students in identifying the criteria, and the absence of teacher-student negotiation about the criteria to be assessed could explain the results. Finally, the differences between teacher and self-assessments may be due to the teachers' greater experience in judging oral presentations (De Grez et al., 2012). However, it should be emphasized that the students assessed their classmates with sufficient accuracy when they acted as peers. Therefore, we can say that students can be good assessors of others, but, at least according to our data, they are not good at assessing themselves.

Regarding differences among students, the results show that self-assessment accuracy is related to the assessor's sex. Although the teacher and peer ratings were oriented in the same direction (both collectives think women present better communication skills), the self-assessment behavior is not as homogeneous. In general, men give themselves higher scores than women do. Furthermore, there is no significant relationship between men's self-assessment and teacher and peer assessment, while there is in the case of women, although the levels reached are much lower than those found between teachers and peers. This interesting result requires a study that focuses more on determining the causes for this behavior by the male speakers, who systematically rate themselves higher than the other two collectives do.

On the other hand, and given our baseline idea that not all students are going to behave in the same way when assessing themselves, we were able to show the existence of various types of behavior when dividing the sample according to the teachers' scores. The results indicate that the rubric unifies the ratings when speakers with high oral communication skills are assessed, but not in the case of low ones. In students with low communication skills, the self-assessment is systematically higher than the ratings by peers and teachers. This difference is even more pronounced in men than in women. When analyzing students with a high communication level, the results are noteworthy: the men give themselves higher scores than those awarded by peers and teachers, while, with the same references, the women tend to underrate themselves.

These results lead us to consider the possibility of proposing a correction factor. This correction factor seems necessary for using self-assessment within the summative assessment process. Thus, the differences between the self-assessments of the best and worst rated students could be reduced, as well as those stemming from the speaker's gender and not justified by the quality of the work.

In spite of the findings, incorporating self-assessment and, above all, peer assessment, provides positive opportunities (Boud, 2007; De Grez et al., 2012; Langan et al., 2005). As Dochy et al. (1999) argue, different forms of assessment have to be integrated into the study plans, linking them to learning quality through consequential validity (Boud, 2007), given that assessment can affect learning and other educational aspects. Self-assessment can be quite effective in preparing students to integrate various aspects of their learning, demonstrate their achievements, and explore implications for their later training. Therefore, the usefulness of self-assessments would lie in their dimension of formative assessment, that is, as a way to improve skills and capabilities (Birenbaum & Dochy, 1996), in addition to their capacity to energize the class and make the learning process more dynamic.

In order to guide self-assessment experiences in the framework of university teaching, several lines of action are proposed. First, to improve self-assessment accuracy, it would be necessary to: (1) increase students' training in self-assessment; (2) increase the number of self-assessment experiences, as they facilitate improvements in students' capacity to evaluate themselves (Birenbaum & Dochy, 1996; Boud & Falchikov, 1989); (3) involve the students in designing assessment scales (Falchikov, 2005), given that this process increases their commitment to the system; and (4) warn students about the possibility of applying correction factors, to the extent that their self-assessment differs greatly from the assessment of the referents.

Second, and to continue this line of study, it would be desirable to increase the number of degrees studied in order to draw conclusions common to all of them, given possible differences in demographic composition and learning styles (Cela-Ranilla & Gisbert Cervera, 2013). One relevant question is whether using a rubric can minimize the differences produced by the context.

Third, it would be necessary to analyze whether the results are maintained when self-assessment is not used for summative purposes. By eliminating the pressure to obtain a good grade, we might assume that students who have shown that they can assess others would also be able to accurately assess their own work.

Finally, although we examined the influence of gender on self-assessment accuracy, we did not explore other personal differences among students that could explain the divergence between self-assessments and teacher and peer assessments, and they should be addressed in future studies.

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Chapter 3
Value Co-creation, Collaborative Learning and Competences in Higher Education

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Abstract Value co-creation is a current topic in the field of marketing. However, little knowledge has been applied to the context of university education to improve students' skills. Setting out from this research gap, this research's main objective is to provide the dominant achievements of a project of educational innovation associated with the learning of marketing and developed between the universities of Seville (U.S.) and Málaga (UMA) in the framework of the Andalucía TECH Proyect. 331 students took part, addressing development work in mixed groups through the Open-source learning platform in the Moodle environment. Regarding generic skills related to the European Higher Education Area, the surveys of students who have participated in the project reveal that their taking part in the project has allowed them to mainly improve the following skills: (a) collaborative teamwork; (b) efficient time use; (c) handling new online resources; (d) finding new ideas and solutions. They also showed a high satisfaction with the resources available, the improvement of their competences and, globally, their participation in the value co-creation process.

3.1 Introduction

In recent years, the concept of value co-creation has attracted the interest of researchers in different fields of study, particularly that of marketing (Yi & Gong, 2013). This has been associated with the new paradigm of Service-Dominant (SD) logic.

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This emphasizes not the consumer's decision-making process—linked to the choice and purchase of products and services—but rather the consumption experience itself. This can be shared with the organization for the creation of value (Vargo & Lusch, 2004). In this context, the core concept of SD logic is that the customer is always a value co-creator. As active participants and collaborative partners in relational exchanges, customers co-create value with the firm through their involvement in the entire service–value chain.

Co-creation is based on the opportunities of value creation via an interactive process with both customers and employees, suppliers, etc. (stakeholders) to make them participants in the definition of their interactions with the firm. To co-create involves the development of a process of cooperation between the firm and the stakeholders. The aim of this is to create unique experiences which contribute mutual value (Xie, Bagozzi, & Troye, 2008). It therefore involves a new way of approaching businesses and breaks with the traditional paradigm in which the product is completely designed within the firm and offered to the customer. In the co-creation approach, the customers are the ones who, along with the firm, define the product to be made or the service to be provided (Fang, Palmatier, & Evans, 2008).

These new proposals have spread to different fields of study, such as service provision in the health area (McColl-Kennedy, Vargo, Dagger, Sweeney, & van Kasteren, 2012; Merz, Czerwinski, & Merz, 2013), the provision of electronic services (Zhang, Luo, & Li, 2012), the development of new products (Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010), etc. However, it is not a concept which has been applied to the area of innovative education. This means that there is an important research gap in this regard. The general aim of this present research is to fill this gap. Specifically, we have set out from an educational innovation project in the Andalucía TECH area in which the Universities of Seville and Malaga have taken part. The co-creation of a virtual platform for the permanent interaction and collaboration between teachers and students in different marketing subjects in these universities has brought about the improvement of the students' competences. This is a priority in the European Higher Education Area (EHEA).

The current work has the following structure. First, we define the theoretical framework. Here we speak about the students' competences in the EHEA, the Andalucía TECH project and the most relevant aspects of the value co-creation process. Second, we explain the educational innovation project that has been developed. This means finding out how co-creation between students of marketing in the area of educational innovation can improve the students' competences. Finally, we present the study's results as well as its conclusions and most relevant contributions.

3.2 Theoretical Background

3.2.1 Students' Competences in the EHEA

The EHEA is an area of educational innovation begun in 1999 with the Bologna Process. This wishes to harmonize the different educational systems of the European Union and supply an efficient exchange between students, as well as endowing the

process of change undertaken by these European Universities with an unprecedented dimension and agility. The main aims of the EHEA are to be the principal protagonist of the learning process, permanently influencing the improvements of its competences. It is a question of a change of the teaching approach, passing from "what the teacher teaches" to "what the student learns": the students' competences are the epicenter around which the higher education system revolves.

In this context, the Spanish Ministry of Education and Science defines competences as a combination of knowledge, skills (intellectual, manual, social etc.), attitudes and values which will train a person with a degree to fully cope with problem solving or intervention in a matter in a specific academic, professional or social context. This involves conceiving the students' competences from an integrated perspective, taking into account what a person is able or competent to carry out, and their degree of preparation, sufficiency and/or responsibility for certain tasks (González, 2008).

The competences of EHEA students are classified in a transversal manner and linked to the specific design of each degree. These must explain the results of the learning of a subject. In the current research, we center on the transversal competences of the students which can be instrumental, interpersonal and systemic (Table 3.1).

Table 3.1 Transversal competences in the EHEA

Instrumental competences
Capability of analysis and synthesis
Efficient use of time via organization and planning
Oral and written communication
Communication in a foreign language
Ability to use new online resources and information and communication technologies—ICTs—in the study and professional area
Information management
Ability to find new ideas and solutions, facilitating problem solving and decision-making
Interpersonal competences
Critical and self-critical ability
Teamwork, including the ability to integrate and communicate with experts in other areas and in different contexts
Recognition and respect of diversity and multiculturalism
Interpersonal skills
Ethical commitment
Systemic competences
Autonomous learning
Adaptation to new situations
Creativity
Leadership
Initiative and entrepreneurial spirit
Openness to lifelong learning
Commitment to professional identity, development and ethics
Processes management with quality indicators

3.2.2 Andalucía TECH Project

Andalucía TECH is the name of the project launched jointly by the University of Seville and the University of Malaga. It seeks to attract talent and integrate it into Anadalusia with a view to forming an ecosystem of knowledge and innovation generation—committed to the society—which enables the raising of the level of excellence of teaching and research activities. Special attention is paid to the technological areas of production, information and communications, as well as biotechnology. In October 2010 the project was selected by the Ministry of Education as a Campus of Intellectual Excellence (CIE), and counted on the support of two technological parks (Cartuja 93—Seville- and PTA—Malaga-), as well as the Regional Government (Junta de Andalucía) and different national and international firms.

The Andalucía TECH CIE is an ambitious and innovative project. From its inception, it was conceived from the opportunities which arose out of the merger between positioning and the capacities and strengths of the different agents and entities which make up the Science, Technology and Firm System. Its "mission" is to attract, integrate and develop talent, enabling the raising of the level of excellence of teaching and research activities via a sustainable, open and universal scientific-technological Campus model. Its "vision" is to become an international reference for the Knowledge Society—a central aspect of the EHEA. The development of teaching innovation projects based on value co-creation in which interuniversity talent and knowledge is shared contribute to this.

3.2.3 Value Co-creation in the EHEA

As students are a part of the University during their Degree, Post-Graduate and PhD studies, they can be conceived as being customers (Edo, Puig, & Zornoza, 1999). These students or "customers" are the epicenter of the EHEA. The aim is to improve their competences and facilitate their access to the labor market. In this context, if the value co-creation processes involve an interaction between the firm—in our case, the University—and the customers—in our case, the students—to design offers which create value for them, it seems clear that value co-creation is perfectly applicable to the university context (Gherghina, Nicolae, & Mocanu, 2010). Moreover, if we take into account that the students and their competences are one of the central pillars of the EHEA, the question that we are left with is how co-creation can add value—in the form of improving competences—among university students. To do so, it is necessary to bear in mind that the key to co-creation is to have a platform where the commitment between the parties can take place. This platform will include interfaces, processes and, most importantly, people—in our case, teachers and students—who will allow the value created to be shared by everyone. Four key principles are involved:

1. *Transparency*: it is very important to ensure that the interactions in the platform are transparent to all the participants.
2. *Accessibility*: it is necessary to check that all the participants have an appropriate level of access, not only to access the content of the platform and use it, but also to modify it and expand it.
3. *Commitment*: involves ensuring the wish to dialogue and the contribution of all the project's members.
4. *Flexibility*: means to use the contributions of the participants and their interactions in the platform to improve the platform's content and the experience of the participants themselves.

Next, taking into account the essential principles which must be guaranteed in any value co-creation process, we will detail the educational innovation project developed to improve the marketing competences and learning of the students of the Universities of Seville and Malaga.

3.3 Value Co-creation Project and Collaborative Learning in Marketing

3.3.1 The Project's Initial Phase

With the idea of taking advantage of the framework offered by Andalucía TECH associated with the use of new technologies and to improve the transversal competences of the students in marketing, the Value co-creation project and Collaborative Learning in Marketing was started in May 2013. This is a competitive, biannual project designed by the Ministry of Education and Science in which the Universities and Seville and Malaga take part. The project's central idea is to co-create a virtual platform between the teachers of both universities and the students who participate in the project. The idea of this is to have a space where knowledge can be shared, the development of work groups can be facilitated, continuous evaluation tests can be carried out, etc. In brief: to add value to the teaching in marketing. To do so, in this initial phase of the project, the students of Business Management, Market Research, Tourist Marketing and Business Distribution (all marketing subjects in the Degree in Business Administration and Management, the Degree in Marketing and Market Research or the Degree in Tourism in both universities) were offered the possibility of taking part. What the project consists of was explained to all the students, always maintaining the maximum transparency. A total of 331 students agreed to participate. Their distribution is shown in Table 3.2.

A platform was initially created through Moodle. Via access (email and National Identity Card or Passport), all the teachers and students of the Universities of Seville and Malaga taking part in the project could express "how the Platform to be created should be and what resources it should contain", with the aim of improving the students' transversal competences. In this way, accessibility and transparency—two

Table 3.2 Students associated with the project per University (Academic Year 2013–2014)

	University of Seville	University of Malaga
Business management	43	38
Market research	51	47
Business distribution	46	35
Tourist marketing	34	37
Total	174	157

key aspects of value co-creation—were guaranteed. From the virtual brainstorming through the platform, the main resources pointed out were:

- *Databases* which allow the participants to create, maintain and seek information in a records repository.
- *Chat* which permits the participants to synchronically discuss by texting in real time.
- *Forum* which lets the participants have asynchronous discussions and can be used to solve a case, debate a project, discuss or solve problems, etc.
- *Task* which allows a professor to evaluate the students' learning via creating a task to be carried out and then revised, valued and qualified.
- *Blogger* is a webpage where one or more people chronologically publish texts or papers. The author always conserves the freedom to leave published what is believed to be pertinent and the readers themselves tend to actively participate through their comments. It is very useful to publish one's own ideas and opinions about different topics.
- *Wiki* which permits the participants to collaboratively add and edit a collection of webpages. A record is kept of the previous versions of each wiki page, thus allowing the changes made by each participant to be consulted.

3.3.2 The Development Phase of the Project

Students and professors both reached the conclusion that, as the contents of each subject are different, as are the evaluation requirements, etc., the platform was to be structured into sub-platforms. In this way, each subject had an independent virtual space. This was done taking into account the commitment of adapting to the needs of the students of marketing of the Universities of Seville and Malaga and the flexibility that any value co-creation project involves. On the other hand, keeping in mind that the project also has to be able to improve the students' transversal competences, it was especially designed for the development of continuous evaluation systems. Work group participation and development was essential in them and it was recommended to make up groups in such a way that each of them had 50 % of students from each University. Thus, given the greater complexity of developing the work groups in person, the platform's virtual usability was guaranteed. The next step was

to define the time periods in which the students were going to be able to use the platform in order to improve their competences. These time periods coincided with the semester to which the subject belonged (Academic Year 2013–2014) in such a way that during it each student could make use of the resources available, upload and download contents, contribute to the development of group works, take part in the forum, solve the questions proposed by the professors of each subject, etc.

3.3.3 Results of the Project: Value Co-creation and Competences

In the final phase of the project 331 students were asked to value on a 5-point Likert scale (1.—No improvement…5.—Great improvement) how they perceived that their transversal competences had improved with participating and being involved in the project as well as their satisfaction (1.—Very low…5.—Very high) with the versatility of the resources available and with the project in general (Table 3.3). As can be seen in Table 3.3, the students of marketing of the Universities of Seville and Malaga involved in the process in general perceive that their transversal competences have improved with their participation in the value co-creation project developed together with the professors. Specifically, the competences where a greater improvement was noted are those associated with teamwork, including the ability to integrate and communicate with experts of other areas and in different contexts, the competences linked to the efficient use of time via organization and planning, the ability to handle new online resources and the use of ICTs in the study area and professional context, as well as the ability to find new ideas and solutions, facilitating problem solving and decision-making. The students also showed high levels of satisfaction related to both the resources available and the improvement of their competences, indicating a high level of global satisfaction with their participation in the value co-creation project.

3.4 Conclusions

Though value co-creation has not been applied to the university area until now, this work shows that value co-creation is an extraordinary tool at the service of teaching innovation. It can create value added via an interactive process between professors and students, making them participants of the defining and achieving of their interactions n the university area. This means a break with the traditional paradigm in which professors and students are placed in different areas. However, in the context of value co-creation, students interact with professors, have the ability and the flexibility to adapt the content to their aims, to incorporate the materials that interest them, etc. It is a question of sharing the same space; in this case expressed via a virtual platform where the four basic principles of value co-creation are guaranteed:

Table 3.3 Level of improvement of the transversal competences of the students in marketing with the Value co-creation project

Competences	Average
Instrumental competences	
Capability of analysis and synthesis	4.26
Efficient use of time via organization and planning	4.63
Oral and written communication	3.82
Communication in a foreign language	3.71
Ability to use new online resources and ICTs in the study and professional area	4.59
Information management	4.33
Ability to find new ideas and solutions, facilitating problem solving and decision-making	4.47
Interpersonal competences	
Critical and self-critical ability	3.95
Teamwork, including the capacity to integrate and communicate with experts in other areas and in different contexts	4.82
Recognition and respect of diversity and multiculturalism	3.38
Interpersonal skills	4.15
Ethical commitment	3.32
Systemic competences	
Autonomous learning	3.86
Adaptation to new situations	4.03
Creativity	4.23
Leadership	4.01
Initiative and entrepreneurial spirit	4.08
Openness to lifelong learning	3.94
Commitment to professional identity, development and ethics	3.73
Processes management with quality indicators	3.31
Satisfaction	
Satisfaction with the resources available	4.89
Satisfaction associated with the improvement of competences	4.76
Global satisfaction with the value co-creation project	4.91

transparency, accessibility, commitment and flexibility. This facilitates the achieving of their aims for both the professors and the students. For the professors, it facilitates the learning process, as at all times the professors and the students are interactively involved in the process. This means the development of active and participatory teaching methods, increasing the success of knowledge generation.

For the students, one of their great aims is associated with the improvement of transversal competences. These can create value in their access to the labor market. This present work shows that value co-creation can influence the improvement of the students' instrumental, interpersonal and systemic competences. Specifically, value co-creation will help to improve the competences linked to teamwork, the efficient use of time, the handling of new online resources and the use of ICTs in the

study and professional area, as well as the ability to find new ideas and solutions, thus facilitating problem solving and decision-making. All of this will have a favorable impact on the students' satisfaction with the learning process, the resources available and the improvement perceived in their competences, hence influencing their global levels of satisfaction with the development of value co-creation projects in the area of teaching innovation.

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Chapter 4
A Model for Implementing Non-specific Competencies (NSCs) in Degree Studies, Defined Using a Delphi Study in Spanish Universities

Gloria Aparicio, Maite Ruiz-Roqueñi, and Elena Catalán

Abstract This work discusses the difficulties currently being faced by Spanish universities in adapting their education system to the development of the competency-based curriculum introduced by the EHEA, especially with regard to the introduction of non-specific competencies (NSCs).

Using the Delphi technique, we performed an exploratory study to collate opinions and proposed actions to facilitate implementation or advancement of these competencies in university degree studies. The panel of experts consisted of university lecturers with different profiles identified in Spanish public universities.

The study's primary contribution is to establish an implementation model, consisting of a sequential process in three phases: (a) concept design; (b) organisational design; (c) launch and monitoring. The tasks involved in the planning, organization and development of the process are intended to facilitate the coordinated and gradual implementation of NSCs—by all teaching staff involved–in university degree studies.

The utility of the model lies in the fact is that it resolves many of the problems currently restricting progress in the universities' social commitment to the comprehensive education of new graduates, and does so within the area of action of university management and teaching staff, providing solutions related to organisation and coordination.

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4.1 Introduction

Since the signing of the Bologna Declaration in 1999, the Spanish university system has been in a process of convergence towards the higher education framework established for the European Higher Education Area (EHEA).

This change has involved a considerable number of new features for Spanish universities and many papers and studies have been published on different issues related to adaptation, particularly the move to a competency-based curriculum (Alonso, Fernández, & Nyssen, 2008; Alsina, J. (coord.), 2011; Ausín et al., 2009; De Miguel, 2005, 2006; González & Arquero, 2014; Portilla, Varona, & Otegi, 2012; Yáñiz, 2006; Zabalza, 2003).

Accepting that university teaching staff need to perform teaching work based on competency development and despite some resistance to the change (Margalef, 2014), in this work we take a proactive attitude and focus on how to organise the introduction of competencies, taking into account coordination issues (González & Arquero, 2014) caused essentially by non-specific competencies, in such a way that they can be gradually introduced into degree courses. In light of the limitations and constraints in a number of areas which create a complex working context in Spanish universities, with this study we offer a framework that will facilitate the process from an organisational perspective.

The article is therefore structured into three principal sections and the conclusions. Firstly, as a preliminary and essential step for understanding the importance of the object of study, we will analyse the nature of NSCs in degree courses, since most of the problems that arise during implementation derive, essentially, from the essential nature of the competencies. Secondly, we shall explain the methodological approach we used for our empirical work—a study using Delphi methodology with experts from a diverse set of Spanish universities. The third part contains the results of the study, establishing from a holistic perspective the issues associated with the development of NSCs in degree studies and guidelines for preparing the implementation model defined by the study. Finally, we present the conclusions of the study.

4.2 The Nature of the NSCs

There is currently no unanimous agreement on the meaning of the concept of competency. There is an almost unlimited range of views on the notion. Nonetheless, the complexity and the very flexibility of the term have led to multiple interpretations that allow the concept it to be applied in very different contexts (De Haro, 2004).

The term "competency" is attributed to McClelland (1973) in his studies of motivational issues related to professional success. In the university area the research group in the Tuning project (2003) addressed various lines of action for adapting Spanish courses to the European framework of higher education, which prioritised *knowing how to be* and *knowing how to do* over *knowing how to know*. As a result,

a difference was established between *specific competencies*, those that provide the knowledge and techniques pertaining to a specific professional area and *generic competencies*, which allow graduates to achieve higher levels of employability and citizenship. In both cases, they were considered to involve a mastery of a discipline of knowledge and, therefore, viewed within the traditional framework of the university teacher's responsibilities (Barnett, 2001).

Arising out of this approach, many authors have sought to classify, categorise and define the nature of competencies to create a conceptual framework that will help university teachers make the transition from academic-type methodological suppositions to more dynamic ones which they can use to address the teaching/learning process within the new regulatory framework, consistent with professional requirements (Freire, Teijeiro, & Pais, 2011; Corominas et al., 2006; Mora, 2003).

Such competencies are also known as *basic competencies* (Rull & Cambra, 2007), *cross-competencies*, in reference to the direction taken in implementing them by courses and subjects in the degree studies (Díaz, 2006), *cardinal competencies* (Alles, 2002; Oliveros, 2006) and *core competencies*, to emphasise their essential role in the individual's professional advancement. In this study, in order to unify the terminology employed, we have used the term NSC (*non-specific competency*).

According to Rull and Cambra (2007), NSCs can be grouped into categories depending on whether they relate *to the individual* (self-learning competency or "learning how to learn", personal initiative, autonomy and entrepreneurial spirit); *to society* (social and citizen competency) or *to systematic* knowledge and skills (linguistic competency, competency in foreign languages, scientific, mathematical, technological competency, competency in information management and ICT and cultural and artistic competency).

Whatever term we use, NSCs operate within a much more ambiguous framework of assignment of responsibilities than simply academic competencies, because their development at university is viewed as the continuation of a process begun at earlier educational levels (Pérez, 2007) and one which will continue to develop throughout their lives, thus establishing a degree of continuity between the academic and labour world (Rodríguez, 2006).

This lack of definition in assigning responsibilities for NSCs at the different stages of an individual's educational cycle is further exacerbated by the position given to them in the curricula of degree courses. It is necessary to plan gradual implementation throughout the students' university curriculum, being mindful of the gradual and accumulative nature of their development in the academic context and each centre must make its own proposals based on the specific teaching circumstances and the course(s) taught.

The way the university's work is divided up and organised does not favour rapid adaptation to the demands of new working methods, since each university has its own structures and forms of development. As Bauman (1997) said at the start of this entire adaptation process, the most difficult thing [for universities] to cope with adequately is "*the* '*metachange*'; *the change in the fashion in which the situation is changing*" and having seen the direction taken so far by the adaptation process, we agree with the remarks of the Universidad de Barcelona's group on interdisciplinary

coordination and competency-based assessment that: "*surprisingly we have begun to design curricula oriented towards development* [of the competencies] *and to apply evaluation procedures without sufficient prior debate to clarify the concepts involved and to analyse the most suitable models for managing the learning processes associated with the development of competencies*" (Alsina, 2011).

For all of these reasons, there is a danger that only lip-service will be paid to competency-based education, which is present in the planning and design formats, but has little chance of transforming the core of educational action—how students are taught and how they learn—thus fulfilling the predictions of authors who worked on the subject in early phases of the reform (Bolívar, 2008). Although university curricula are complemented with on-the-job training (Tejada, 2012) with the possibilities it holds out for acquiring professional competencies, in accordance with the philosophy of the degree curricula, it has proved very limiting to restrict their development to this phase of the student's education.

Aware of the importance of the issue and the need to incorporate new forms of organisation into universities, we have made a study using the Delphi method, in order to pool the experience of several Spanish universities and establish a number of guidelines or recommendations that will help the universities in the various stages of this task, with collaboration from active agents who can influence the process.

4.3 Delphi Study

The Delphi method is particularly well-suited to a study such as this, in that it favours the compilation of information with a high input of qualitative contents, thus enabling in-depth reasoning of the issues to be studied (Okoli & Pawlowski, 2004). It also allows for geographical dispersion and heterogeneity in the profiles of participants, as was the case with our panel of experts.

The panel of experts was selected on the basis of two criteria, the depth and plurality of their knowledge and their motivation to collaborate in the survey. The aim, as stated by Bolger and Wright (2011), was to select real rather than "social" experts, i.e., those with no special skill, but who are deemed "experts" because of their social condition. Following these authors' recommendations, in the process of selecting participants, we took into consideration each one's motivation and heterogeneity, as this would improve feedback, and thus the results of the process.

Using these criteria, we identified two types of experts; in some cases, a single individual matched both profiles, thus enriching the contribution they could offer:

- "Academics" who have dealt with the issues from a scientific and conceptual perspective, in specialised publications.
- "Professionals" or in general individuals at different levels with responsibility in organising the process of implementing NSCs in their university, school or degree-course.

Table 4.1 Design and details of the Delphi study process

Rounds	First	Second
Objective	Identification of problems, organisational processes and specific recommendations for implementing NSCs.	Discussion and validation of the joint results identified.
Number of participants	20	20
Problems identified	37 problems identified, linked to the institutional framework; teaching staff; students and the social and economic framework.	Validation of the list of problems by 95 % of the experts.
Organisational processes identified	1 model comprising 3 phases, a result of aggregating the recommendations partially provided by the panel of experts.	Validation by 90 % of experts.
Specific recommendations for implementing NSCs	Specific and practical proposals for implementing the NSCs established in the model.	Validation by 90 % of the experts.
Feedback to experts		Qualitative information, grouping individual responses and offering a joint perspective of the answers received.
Validation of average results		92 %

Source: Authors

The experts were identified using snowball sampling to achieve the ideal number of participants, based on the recommendations of Okoli and Pawlowski (2004) who advise a group of 10–18 experts. Our panel was comprised of 20 experts based on the established profiles, from 16 universities throughout Spain of different sizes and ages, forming a diverse sample group within the current Spanish university world.

The Delphi study was performed by e-mail in two successive rounds between January and February 2014. The number of rounds was determined by the experts' validation, in the second round, of the research group's systemisation of the information gathered in the first round (Linstone & Turoff, 2011). This process is shown in Table 4.1.

The first round was carried out in the last fortnight of January, 2014, when we sent a letter of introduction with a detailed explanation of the purpose of the study.

The questionnaire for this first round specifically addressed the following issues:

- *Q1. Discussion of problems that hinder or prevent practical implementation of non-specific competencies in degree studies.*
- *Q2. Discussion of organisational guidelines and processes that will facilitate coordinated and gradual implementation of non-specific competencies.*
- *Q3. Recommendations on practical aspects for implementing NSCs, regarding the ideal profile of the person responsible for teaching NSCs, the type of subject in which they should be developed, the ideal number of competencies to be*

addressed per subject, the weight given to these competencies in the final grade for the subject and the degree, and whether it would be advisable for this score to be given separately in the students' academic record.

General recommendations in closed questions are difficult to respond to, and an open space was provided with the questions in the third block to allow experts to give a brief explanation of their reasons for each reply. As well as providing qualitative information on the questions asked, this explanation helped improve the interpretation of the previous questions. For this reason they have been included in the explanation of the phases and tasks of the model.

The open responses were coded through a review of independent peer review (Krathwohl, 1998) by a third person who was tasked with comparing and highlighting any differences.

Analysis of the first question showed a high level of agreement among experts, who identified the same problems in implementing NSCs, albeit with different terminology. In contrast, the answers to the second question, on organisational processes for implementing NSCs, proved heterogeneous, making analysis more complex. Most of the panellists clearly identified implementation models comprising different phases that had to take place sequentially. However, there was no agreement on either the number or sequence of the stages to be included. The research team therefore had to compile and sort all the stages identified by the experts sequentially, to create a single organisational model based on the various contributions, given the similarity and consistency of the models proposed. Finally, the answers to the final questions were coded on the basis of the questions asked, using a frequency count and the reasons given by each participant for their answers were reported in aggregate form.

The second round, which took place during the second fortnight of February 2014, consisted of sending the aggregated answers from the first round to the experts for their validation and for them to add their thoughts on the report.

The second questionnaire consisted, firstly, of a list of problems identified by all the experts. The panel was asked whether they agreed with the coding made and whether their answers had been correctly interpreted and collated. They were also invited to discuss the results obtained and to add, if they thought fit, any additional problems not originally discussed. This question generated few remarks, suggestions and contributions from the participants. Ninety-five percent of the experts validated the problems identified in developing NSCs and 15 % added some remark or qualification regarding the match between their answers and those in the study. No expert added any additional problem, considering that they had been included in the proposed list.

Our second question related to the NSC implementation model. In this case, the experts were invited to validate the process in overall terms or discuss it partially, questioning the order in which the implementation phases were established, the suitability of the totality of the stages or the need to incorporate any further stages and to make any other remarks they considered necessary on the proposed model.

In general, the remarks received completed the information contained in the summary model, helping to clarify and endorse it. In this phase, the model was

validated by 90 % of the participating experts. Finally, the answers given in the last questions were again coded on the basis of the questions asked using a frequency count. There was little variation in the answers given in the first round, with a stability rate of 90 %.

Given that the replies received in this second round included almost no additional remarks and those that were included mostly consisted of clarifications and qualifications that helped ratify the results presented, the Delphi study was concluded in this second round with an average validation rate of 92 %.

4.4 Results of the Delphi Study

The results of the study are shown below in two main sections.

4.4.1 Problems in Developing NSCs in Spanish Universities

The list of issues identified by the panel of experts as limiting or constraining implementation of NSCs in Spanish universities is broad and diverse. It affects both the organisations themselves and groups whose actions are related and synergic, but whose areas of action and interests may on occasions come into conflict with the universities'. We are referring to the institution, teachers, students and the social and economic framework in which the university education is provided. A summary of the list of problems identified by the experts, organised into categories, is given below:

4.4.1.1 Problems Related to the Institution

The prevailing teaching methodology in Spanish university culture is oriented towards knowledge transmission, which explains the lack of experience in developing competencies. Added to this, a strong cultural inertia creates a resistance to changing the educational paradigm. In short, teachers have not taken on board the need for change and do not assume this responsibility, showing resistance to a change in the organisational paradigm, using academic freedom as their justification.

The public universities have shown insufficient impetus and leadership, both from the institution itself and in the individual university centres.

In conjunction, all of these issues have led to a clear lack of institutional support (due to lack of resources, a desire to avoid confrontation with teaching staff, etc.) to any advance in the process of change.

The institutional area is promoting progressive implementation, but because NSCs are being developed at different paces, the process has generated discontent among defenders and opponents alike.

The decentralisation of the university system limits the possibilities for effective control, and because professional performance in the public university is structured horizontally, it has proven difficult to distribute responsibilities.

The structure intended to guarantee the courses, represented by the coordination systems, has ultimately proved formalist and inoperative due to a lack of incentives and legitimation for the work of the coordinator. In short, the role is frequently only accepted on paper.

The university curricula were designed by committees with no involvement from grassroots teachers. Although there are many NSCs in the programmes, there is a lack of any accurate definition which might allow teachers to integrate them into their teaching work. Nor has any in-depth work been done to design a curriculum structured to advance NSCs with their grading levels, which might serve as a guide or framework for the teacher within the framework of the course.

There is no interest in outsourcing training in NSCs within the curricula, as this would involve relinquishing the staff's teaching credits.

4.4.1.2 Problems Related to University Teaching Staff

Teachers tend to relativize the importance of NSCs in university education, in the belief that they should be acquired at other educational levels or will be learned with maturity and through professional experience. Priority is given to subject-specific competencies and NSCs are considered to deflect time and effort away from these specific ones.

The academic vision of university teaching staff is focused on educational rather than employability-related goals.

They have little methodological training for developing NSCs because it is not a prerequisite for university teaching, and training in active methodologies is still not in general practice in Spanish universities. Moreover, the generation gap is an important handicap when it comes to the methodology used in some NSCs (e.g. ICT).

Teachers have no motivation to undertake the additional teaching work involved with developing NSCs, because of their dual situation as teachers and researchers. Insufficient recognition of teaching merits reduces motivation, because for all types of promotion incentives, priority is given to the 6-year research period.

4.4.1.3 Problems Related to University Students

Students do not demand training in NSCs in the university because they still do not see their importance in their education. Moreover, they tend to give precedence to opportunistic behaviour in achieving results ("memorising versus learning") and feel overwhelmed by the large number of additional assignments and tests involved in continuous assessment.

They sense the teachers' inexperience and diversity of approach and feel they are being used as a test bench.

4.4.1.4 Problems Related to the Socio-economic Framework

A lack of economic, physical and technical resources impacts the possibilities of adapting classrooms originally designed for lectures and the provision of the necessary media (ICT). Budgetary restrictions also limit the provision of teacher training in active methodologies or complementary training courses in NSCs for all students. This situation is further complicated by continued class overcrowding in many courses

Other basic problems include: the heterogeneity of university access levels in NSCs, making it difficult to unite the design and pace of classroom work; the absence or scarcity of complementary public NSC offers, which could alleviate the deficiencies of the least advanced students; the difficulty in offering an education that is tailored to the resources and capacities of each student, a necessary feature of some NSCs; the disconnect between the university and the business community in designing implementation of NSCs with a sense of continuity; and insufficient external social monitoring of the university's work.

4.4.1.5 Conclusions on the Problems Identified

Our analysis of the problems identified shows that most of the issues detected among students appear to emanate from the way in which NSCs are being taught. The action of teachers in turn appears to be the result of a lack of institutional support, defects in training and a lack of motivation. This domino effect among the various agents involved in the process has a multiplier effect, reinforcing and exacerbating the problems.

For all of these reasons, we believe that there is also a positive side to the difficulties detected; actions at individual university level could help remove the stumbling blocks to the teachers' work, in turn resulting in a better perception and use of the teaching/learning process by students.

4.5 NSC Implementation Model

Most experts identified processes of NSC implementation which, although not exactly identical, did contain a series of common features and phases. This allowed us to design an implementation model that combined the various guidelines and recommendations. This was the model finally validated by the experts (see Fig. 4.1).

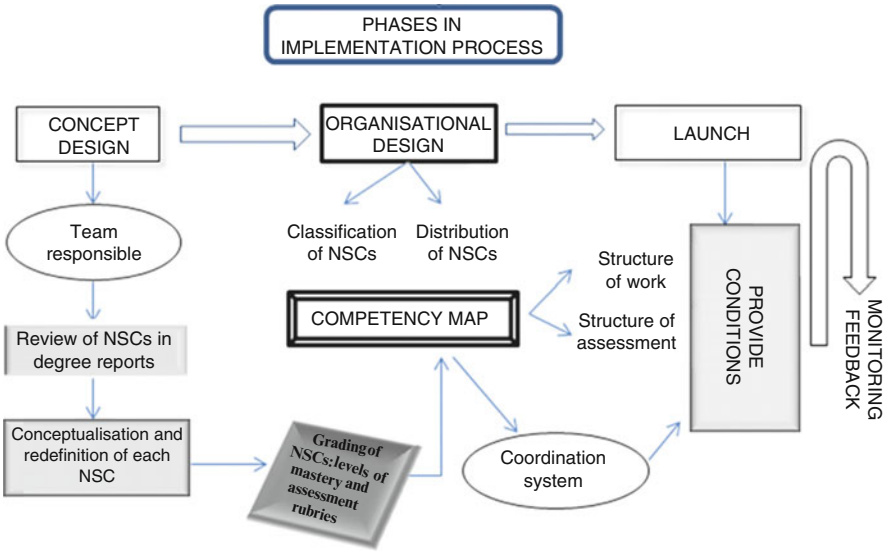

Fig. 4.1 Phases and tasks of the NSC implementation model

4.5.1 Phase I: Concept Design

The panel believed that in order to ensure success, it was necessary to start by designating a team of people to would lead the process, who enjoyed the respect of other teaching staff and sufficient academic authority among their colleagues. At the same time, it is essential that this team has institutional, regulatory and operational backing.

Following appointment of the team, the NSCs should be reviewed, since although the degree reports (documents structuring the content of the degree studies) prepared by each university and ratified by the Spanish National Agency for Quality Assessment and Accreditation, ANECA, refer to and list these competencies, it is frequently necessary to redefine them. This task should be performed within the framework of the ratified degree reports, but should seek to make them more operative. This will require prior clarification of the concept behind each NSC, where each teacher knows and understands exactly its precise meaning, in order to establish a common and working base, with agreement from everyone involved in developing it.

Given that the competencies involve different levels of mastery, it is also necessary to specify the progressive levels of implementation during the period of the degree. It is also necessary to set out possible learning results with evidence for each level, to serve as indicators of whether or not a given level has been attained (assessment rubrics).

4.5.2 Phase II: Organisational Design

The NSCs must be developed and achieved in crosscut form across the degree studies. However, because they are not specific to any one area of knowledge, they are not directly linked or assigned to any subject on the course curricula, nor to any specific type of teacher. There is therefore a need for an *a posteriori* adaptation of the universities' curricula, which should be complemented with a *competency map* clearly showing who is responsible for working on and/or assessing each NSC depending on its grade level.

The experts also agreed that in order to begin distributing the competencies, it is necessary to take into account the nature or type of NSC, as it may involve different teaching and assessment approaches. The classification distinguishes between two groups:

- NSCs more traditionally associated with the methodology of the teaching/learning process of a university academic discipline, albeit they may be reinforced with active teaching methodologies. (i.e. analysis, critique, etc.).
- NSCs that require the introduction of active methodologies in the university teaching/learning process (i.e. teamwork, verbal communication, etc.).

Design of the competency map, leads to the creation of the structure of each degree based on the subjects and/or teachers responsible for developing and/or assessing the NSCs according to their grading levels. This mapping process makes the process of teaching NSCs transparent for students, and lays the foundations for the organisational structure so that the teachers can situate their performance within a framework of general action because they know what NSCs are being addressed by other teachers/subjects and at what levels.

Based on the panel's answers, we identified three possible systems for allocating responsibilities for development and evaluation of NSCs, with different levels of involvement in coordination by subjects, modules and degrees:

- Distribution of NSCs with their corresponding grading levels among the degree subjects.
- Distribution of NSCs among teachers at the centre so that each one can specialise in this NSC, as is the case with the specific competencies.
- Linking of NSCs to the students' curricular development, managed by the students themselves and certified by the teachers as part of their tutoring work (requires that each student has the same tutor throughout the degree).

With regard to the assessment process, which other studies (Ion & Cano, 2012) have identified as a critical aspect in implementing the competency-based curriculum, the Delphi experts did not consider it necessary to work on and/or assess the NSCs in all subjects in every degree. However, they did consider that it should be the teaching staff from each university who should be responsible for teaching NSCs. They recommended that each teacher should be assigned responsibility for a maximum of two NSCs and identified two possible alternative forms of assessment:

either based on compliance with the level of mastery of the NSCs—as validated by teachers, with feedback in the form of guidelines on improvement, with no specific separate grade; or by grading the NSCs using a score that would count for part of the grade in one or several subjects.

The experts considered that a suitable specific weighting in development and/or grading of each NSC within the general context of the course, might lie within a range of 10–20 % for one subject and 10–30 % for the overall framework of the degree.

Some experts recommended having independent grading of NSCs that could be listed as a separate qualification in the students' academic record.

4.5.3 Phase III: Launch and Monitoring

The launch and/or development of the process depend to a very large degree on the teachers involved in each centre, as they are the principal agents and guarantors of its execution. In view of the general, overall problems identified, the experts consider it necessary to provide, within the framework of action of the universities and especially in the areas of responsibility of their management teams, the necessary conditions to facilitate implementation of the system through awareness-raising actions, training, motivation and the provision of whatever physical, technical and infrastructure resources are possible.

In the same area, the experts discussed the need to design and establish an effective system of vertical and horizontal coordination that will guarantee consistency, monitoring and feedback of the process to allow for improvements to be made; the model must be dynamic, so that once implemented a system of permanent review and improvement can be established.

4.6 Conclusions

This exploratory study represents an advance in our current understanding of aspects linked to the practical, joint, coordinated and gradual application of non-specific competencies (NSCs) in universities.

The study is intended to be useful for the management and teaching staff involved at each university, facilitating progress in fulfilment of their social commitment to comprehensive education of graduates.

In order to introduce NSCs into degree courses, it is essential to know and identify the problems that may affect their development. The results of the study identify a series of specific problems that impact implementation, resulting both from specific idiosyncrasies in Spanish universities and from the social and economic context of their action. Knowledge of these overall issues will make it easier to understand them and allow solutions to be devised from different areas of action by generating a framework to facilitate the process. Although the current crisis has resulted in a lack of resources, it is necessary to open up to new perspectives that

allow the principal problems to be resolved with efficient solutions. It is not within the remit of this study to explore solutions to all the problems encountered, since they lie outside the scope or area of action of the universities and their principal actors, the university teachers. Nonetheless, based on the problems identified, it is possible to make an individualised reflection on the specific problems of each university in order to prioritise the actions to be undertaken in resolving these problems.

The study, based on the opinions of the panel of experts, has allowed us to identify a model which, through the systemisation of phases and tasks, will enable and facilitate coordinated and gradual implementation of NSCs in degree studies. Although no previous guide existed on the best way of designing, organising, launching and monitoring the process, it is noteworthy that the approaches to the processes implemented by the different Spanish universities coincide to a significant degree. One may therefore infer that the model identified could serve both as a guide for universities at a more incipient phase of NSC development and others that are reconsidering their organisational model or want to continue with already advanced phases and tasks.

The principal benefit of the model is that the procedure defined helps universities—through consensus between the majority of teaching staff—to configure a formal structure in which all teachers involved in the development and/assessment of the NSCs can do so within an organised and coordinated framework.

Finally, we may conclude that in the face of the general issues identified, there is a need for change in the proactive perspective of teachers and heads of management teams in universities. Such change will strengthen and facilitate their participation in implementing the NSCs in the degree courses and contrasts with the unyielding perspective that all progress is impossible given the scale of the problems identified in general, overall terms in the study. The implementation model identified will therefore contribute, through its sequential development, to alleviating and resolving some of these problems. And in this regard it demonstrates the positive progress towards improving university education that can be achieved through the combined efforts of all the agents involved.

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Chapter 5
Linking the Development of Teamwork and Communication Skills in Higher Education

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Abstract The development of generic skills and competencies in higher education is paramount, according to the new educational philosophy fostered by the Bologna process. These competencies, abilities and skills include teamwork, oral and written communication, problem solving, analysis, critical evaluation, information literacy, and information analysis. They are developed throughout all courses and subjects, and are usually taught and evaluated independently, and lack any clear structure or coordination. In some cases, generic competencies are acquired gradually, from beginner to advanced level, on an *ad hoc* basis.

The present study was conducted under the premises that the development of generic competencies in higher education must have a progressive, linear approach, and that the level reached in certain abilities and skills influences the development of other high-level competencies. Specifically, this work explores the relationship between communication skills and the effectiveness of teamwork. The study was carried out among first- and third-year students of the Industrial Organization Engineering degree at the Universitat Politècnica de València. Results show that teamwork effectiveness depends strongly on members' communication skills, and that focusing on teamwork in the first year may be ineffective if communication skills are not developed beforehand.

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5.1 Introduction

Today's world is characterized by constant change, globalization, and exponential growth of information and knowledge creation. Challenges posed by such change have been extensively studied, and there is consensus that a new revolution has heralded the arrival of the knowledge society era. The term knowledge society was coined by Peter Drucker in 1969 (UNESCO, 2005). In the 1990s, this term was popularized by authors such as Mansell and Wehn (1998) and Stehr (1994). The concept of the learning society emerged concurrently. According to this concept, individuals need to improve continuously, update their knowledge, and even acquire new competencies throughout their professional lives.

According to Esteve (2003), the link between the learning society and knowledge society has prompted reflection on the role of education in a broader context. Learning is a lifelong process, and professionals must be able to refresh their knowledge, select what is appropriate for a specific context, and learn to adapt to new situations. This philosophy has led to an appraisal of the role of university learning in the knowledge society, which, for several reasons, is defined by its complexity and diversity. First, knowledge is increasingly widespread. Second, knowledge has a tendency towards fragmentation and specialization. Third, the rate of knowledge production is getting faster, and hence obsolescence is also growing. All this has caused major changes in educational models (Fernández-March, 2006).

This new educational model requires the development of a professional profile of active, autonomous, strategic, thoughtful, cooperative and responsible individuals. The Bologna declaration emerged against this backdrop. Signed in 1999, the Bologna declaration, which marked the beginning of the Bologna process, is a European reform aimed at creating the European Higher Education Area (EHEA). The Bologna process has several ambitious objectives, which include facilitating student, graduate and higher education staff mobility, and offering broad access to high-quality higher education. It is based on democratic principles and academic freedom. But the EHEA must also prepare students for their professional careers and for life as active citizens in democratic societies, and must support their personal development. This implies the development of learning methodologies focused on students as active participants. Students should no longer be passive audience members or mere listeners in the classroom. They should be protagonists, with lecturers playing the role of facilitators or guides of the learning process. This *active learning* embodies several methodologies, but common to all of them is a focus that encompasses knowledge, skills and attitudes (KSA) (Bonwell & Eison, 1991).

The view that education must supply students with generic sills and competencies for their professional lives is supported by evidence from studies on generic competencies required of graduates. Scholars have concluded that employers are placing increasing emphasis on personal attributes rather than technical skills (Hodges & Burchell, 2003; Weisz, 1999). The EHEA demands active involvement of students. It therefore promotes methodologies that facilitate independent learning and the development of competencies related to professional practice. The set of competencies, skills, abilities and attitudes is large and varied. For instance, problem-solving skills, oral communication and self-motivation are three skills

considered by Maes, Weldy, and Icenogle (1997) to be the most relevant characteristics that employers expect of graduates. Stasz (1997) cited teamwork and communications skills as other attributes sought by employers.

In recent years, the importance of teamwork, from both employers' and learners' perspectives, has gained momentum. Collaborative learning has emerged as the most important factor for effective learning (Barnett, 2004). It is not surprising, then, that a myriad of innovative experiences and studies dealing with the development of teamwork have appeared in the last decade, although with inconsistent results (Trujillo & Ariza, 2006). Nonetheless, faculty must be careful when designing course curricula and must ensure that competencies demanded of graduates are fulfilled.

The growing importance of teamwork in organizations responds to an increasingly competitive, ever-changing environment. Firms must confront turbulence and complexity with ever more sophisticated products, services and manufacturing processes. This complexity calls for interdisciplinary working groups whose members have good professional profiles. Accordingly, companies seek graduates that boast not only solid knowledge in a specific field, but also the capacity to collaborate and combine this knowledge with other employees in demanding and stressful circumstances. Therefore, teamwork appears as a generic learning objective in nearly all degrees and syllabuses in European Universities, and it should be developed throughout the entire education process across all subjects (González & Wagenaar, 2003). But these competencies and skills are not independent. For instance, teamwork is related to the following competencies: interpersonal communication, planning and organizing ability, critical thinking, time management and self-learning (Barberá, Estellés, Dema, & Devece, 2011).

Of all these competencies, communication skills are especially relevant for several reasons. First, teamwork and communication skills relate to the capabilities of people management and interpersonal skills. Active participation in team meetings helps to define team goals and procedures, and is essential for problem-solving. For team meetings to function correctly, every member of the team must possess individual communication skills. Working in a team means joining with other group members to share ideas and knowledge to achieve a common goal. Besides, the pressure to achieve objectives produces tense situations that require empathy and an understanding of needs and feelings of other group members for the team to be successful. Any team member must know how to evaluate the impact of their comments on others' ideas and opinions. To be considerate and respectful of other people's opinions requires listening skills too. Waiting one's turn and not forcing others to act against their will, for instance, are behaviours that affect how well the group functions and the quality of the group working environment. The foundation for teamwork is hence built on communication skills and interaction with others; the ability to listening actively; taking turns; sharing, exchanging and synthesizing ideas; thinking and expressing thoughts and feelings; and supporting and accepting ideas. A second, more complex level of teamwork skills includes the ability to take group decisions, plan cooperatively and organize.

All relationships between competencies required of students exert an influence on syllabus design and methodology. Generic competencies must be developed sequentially, beginning with the most simple and independent skills, and culminating in more complex competencies. Students must be aware that the most complex competencies such as teamwork are built on a foundation of other skills and abilities. Establishing a plan for the development of these competencies and skills requires an

understanding of their mutual effects. For instance, under the cooperative learning approach, faculty must carefully design the learning experience. Decisions must be made about variables such as team goals, size and structure, task duration, and so forth, so as not only to build knowledge, but also to develop the generic competencies effectively and coherently. All subjects and courses must be coordinated if there is dependence among competencies.

The objective of this research was to assess the relationship between communication skills and teamwork competencies. Understanding the extent and effects of this relationship is fundamental to the planning of skill and competency development in the syllabus of any degree. To achieve the stated research aim, we first discuss dimensions and characteristics of communication skills and teamwork competencies. This gives rise to the selection of measurement scales for the evaluation of these competencies. Second, this chapter presents results of stepwise regression models applied to data from first- and third-year Industrial Organization Engineering students at the Universitat Politècnica de València. Finally, we set forth results and conclusions.

5.2 Theory Background

Teamwork is an essential element of any successful organization in a highly competitive industry. Teams, considered as units, are becoming the main way of working within organizations. They can generate more profit to organizations than a solitary worker (Rousseau, Aube, & Savoie, 2006). This fact is well documented, and professionals and scholars have studied the subject extensively from a range of perspectives. Educational institutions have a responsibility to teach students to work effectively in teams because organizational performance depends on group synergies rather than individual contributions. But teamwork is also a key competency; a prerequisite for university students who need to think analytically and systematically to manage time and meetings between team members, and participate in decision-making and management of goals and projects. This paradox is a cause of stress and frustration for the students.

Salas, Dickens, Converse, and Tannenbaum (1992) defined a team as a "distinguishable set of two or more people who interact dynamically, interdependently, and adaptively towards a common and valued goal/object/mission who have each been assigned specific roles or functions to perform". Teams are formed by individuals who share the following characteristics. They (1) have common goals; (2) have a collective identity; (3) are interdependent in terms of their assigned tasks; (4) have distinctive roles within the team; and (5) are part of a larger organizational context that influences their work and that they in turn can influence (Morgeson, Lindoerfer, & Loring, 2010). The concept of teamwork as a competency is relatively new. Several authors have defined the term. For Cannon-Bowers, Tannenbaum, Salas, and Volpe (1995), teamwork competencies include knowledge, principles and concepts of the tasks and operation of an effective team, the set of skills and behaviours needed to perform tasks effectively whilst respecting attitudes of each team member. Researches have recognized the complexity of teamwork and have reported that teamwork competencies are multidimensional.

There are several criteria to classify these competencies, but a pragmatic approach is to organize them into two groups: individual skills and abilities needed for effective teamwork. For instance, Leggat (2007) divided teamwork competencies into four dimensions: knowledge, skills, motives and traits. Knowledge is an important aspect in teamwork and cannot be confined to technical knowledge. Several authors have reported that the basis for knowledge is formed by knowledge about team process development, self-awareness, organizational roles of team members and knowledge of management (Devine, 2002). The skills dimension includes leadership, ability to influence, decision making, conflict management, data analysis, negotiation, planning, time management, monitoring and evaluation, and different forms of communication (e.g., oral and written communication). The dimension of motives takes into account personal motivations to work with the team. These include support of the team's goals, striving for high performance, striving for recognition, commitment to the profession and quality outcome, commitment with collaborative work and commitment to interdisciplinary processes. Finally, the construct of traits covers personality, self-confidence, teamwork experience, stress tolerance, respect for others, cooperative attitude and assertive behaviour. Other classifications for teamwork competencies have a greater influence from psychology (Weaver et al., 2010). Humphrey, Karam, and Morgeson (2010) divided teamwork abilities into three dimensions: Affective, cognitive and behavioural. The cognitive dimension includes learning and innovation. The affective dimension comprises satisfaction with the team, viability, cohesion and identification with the team. The behavioural dimension captures concepts of quality and quantity of work, and achievement of objectives.

In order to instil teamwork competencies in students, a complex series of human interactions must take place. In team meetings, goals and objectives are set, trust and conflict arise, and problem solving and decision making are crucial. Leadership is necessary, as is control and the establishment of procedures. To build a team, it is necessary to have an understanding of individual and group psychology. This understanding should form prior to team creation. Furthermore, it cannot be assumed that, by simply engaging people in activities that force them to work together, individual teamwork skills will develop spontaneously. Previous training is necessary for team members to adopt attitudes of a good team member. Such attitudes include appreciation of the value of team decisions and a positive regard for teamwork, respect for all team members and openness to feedback.

Another important set of skills for team members is communication skills. Communication skills can be grouped into written and oral communication. Oral communication is most relevant in teamwork meetings. Crucially, teamwork success depends heavily on circumstances and contingencies, and focusing this research on teamwork meetings simplified the study considerably. Oral communication is the ability to talk to others to give and exchange information and ideas. Mastery of oral communication involves effective communication of ideas, knowledge and feelings in conversations and group activities (oral presentations and class activities). Mastery of this competency means clear and effective communication, structuring of discourse, adapting to different audiences, simultaneously using verbal and nonverbal language, proper use of tone and rhythm, use of pauses, use of and media

support (Barberá et al., 2011). Interpersonal skills overlap considerably with communication skills in their broadest sense. The close relationship between communication skills and teamwork skills is clear, but the extent and importance of the effect of these individual skills on the success of teamwork meetings is unknown.

5.3 Method and Results

5.3.1 Data Collection

We tested the relationship between individual communication skills and team meeting effectiveness using survey data. The survey questionnaire was developed based on existing literature. Three scales were included in the questionnaire: a communication skills scale, an individual teamwork skills scale, and a team meeting effectiveness scale. Ratings were based on responses to a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). In May 2014, 160 students received the questionnaire. Students were from three groups (two from the first year and one from the third year) and were enrolled in the Industrial Organization Engineering degree course at the Universitat Politècnica de València. An ANOVA test was carried out to examine differences between first- and third-year students. No significant differences were found. The Universitat Politècnica de València (UPV) is a public University that offers 27 Bachelor's degrees. It is currently immersed in a process of adaptation to the requirements of the European Higher Education Area (EHEA). The UPV has more than 36,000 students, 2,800 members of teaching and research staff and 2,400 administrative staff.

5.3.2 Measurement Scales

Researchers have recognized the need to develop theory-based, psychometrically sound, practically useful indicators of teamwork. A key article in this area is that of Baker and Salas (1992), which has led to the creation of a myriad of practical assessment tools to measure teamwork. This is perfectly justified because employers consider teamwork skills a basic competency for workers.

In this study, to measuring teamwork competencies (individual competencies), we used the Griffith Graduate Attributes Teamwork Skills Toolkit (Crebert et al., 2011) (see Table 5.1). This measurement instrument draws on existing literature and current practice in universities around the world. It includes numerous references and links to useful web resources. It has been validated and fits the specific necessities of this study. In addition, the Griffith Toolkit offers a scale for measuring the effectiveness of teamwork meetings (Table 5.2.).

There are several popular instruments to assess communication skills. For this study, we sought a scale that captured interpersonal skills for opinion interchange

Table 5.1 Exploratory factor analysis of the communication skills scale

	Components			
Items	1	2	3	4
I use my tone of voice to reinforce what I am trying to say.	**.719**	–.123	.084	–.149
I don't hear everything a person is saying, because I am thinking about what I want to say. (R)	–.225	.144	.242	**.684**
When talking to someone, I try to maintain eye contact.	**.495**	.220	.240	–.039
I use body language to help reinforce what I want to say.	**.615**	.183	.051	.046
I try to watch other people's body language to help me understand what they are trying to say.	.081	**.563**	.416	.136
When I am listening to someone, I try to understand what they are feeling.	.318	**.612**	.161	–.023
I try to see the other person's point of view.	.037	**.834**	–.074	–.033
To help a person understand me, I change the way I speak based on how the other person is talking to me.	.236	.020	**.726**	.057
I organize thoughts in my head before speaking.	–.045	.110	**.733**	–.038
I rephrase what another person said, to make sure that I understood them.	.145	–.111	–.162	**.833**
I find ways to redirect the conversation when people rattle on and on.	**.683**	.133	–.060	.060

and discussion, not just written or pure oral communication. The scale developed by Barkmand and Machtmes (available online) meets these needs, and was chosen for this reason.

5.3.3 Results

We first checked the dimensionality and validity of the scales. Exploratory Factor Analysis (EFA) using SPSS was employed to do so. Table 5.1 shows results for the communication skills scale. The EFA with varimax rotation yielded four main components. The first component is called *reinforced communication*. It has four items (see Table 5.1) related to tone of voice, eye contact, body language and conversation control. The second component, *empathy*, consists of three items related to understanding other people's ideas and feelings. The third component is *adaptability*, and it has two items related to capacity to modify speech. Finally, with two items related with attention, the fourth component is called *focused communication*. For all dimensions, Cronbach's alpha was higher than 0.7.

Results of exploratory factor analysis in Table 5.2 show that the individual teamwork skills scale has a single component. Its reliability is higher than 0.7. Table 5.3 also shows the EFA for the team meeting effectiveness scale. No problems were found with its reliability and dimensionality.

Table 5.4 shows the means, standard deviations and correlations of variables under study. These variables were calculated as the average of the factor items. The

Table 5.2 Exploratory factor analysis of the individual teamwork skills scale

Items	Component
Listening: I listen to my team's ideas and use their ideas to help get new ones (piggy-backing).	.597
Questioning: I ask questions of my team to help them figure out what to do and to extend their thinking.	.601
Persuading: I exchange ideas, defend my ideas and try to explain my thinking to my team.	.660
Helping: I help my team by offering my assistance.	.775
Sharing: I share with my team. I make sure I share my ideas and thinking. I share the jobs.	.690
Participating: I contribute to the team assignment. I am actively involved with the work.	.667

Table 5.3 Exploratory factor analysis of the team meeting effectiveness scale

Items	Component
Team members understand and agree on goals and objectives	.768
There is a high degree of trust among members and conflict is dealt with openly and worked through	.782
There are effective procedures to guide team functioning; team members support these procedures and regulate themselves	.740
Communications between members are open and participative	.720
The team has well-established and agreed-on approaches to problem solving and decision making	.854
The group often evaluates its functioning and processes	.564

communication skills scale was split into four dimensions: *reinforced communication*, *focused communication*, *empathy* and *adaptability*.

Model 2 introduces the individual teamwork skills scale into the regression. This caused a drop in the significance of the communication skills dimensions. This may be because the individual teamwork skills scale had a high correlation with the communications skills scale (see Table 5.4). The individual teamwork skills scale explained nearly 34 % of the variance of the team meeting effectiveness, and was highly significant.

To assess the relationship between variables, a stepwise regression was carried out with *team meeting effectiveness* as the dependent variable (see Table 5.5). Model 1 shows that team meeting effectiveness depends on all four dimensions of the communication skills scale. The weight (Beta) of the four communication skills dimensions on team meeting effectiveness were lower than 0.3. The most important dimension was *empathy*. All communication skills dimensions were significant, and empathy emerged as the most important dimension ($p = .008$). Explained variance (R^2) of the dependent variable of Model 1 was 0.17, so individual communication skills explained 17 % of variance in the success of teamwork meetings.

Table 5.4 Means, standard deviations and correlations of variables under study

	Variables	Mean	S.D.	Correlations				
				1	2	3	4	5
CSD	1. Reinforced Communication	4.95	.84					
	2. Focused Communication	3.47	1.11	−.064				
	3. Empathy	4.08	.96	.296**	.071			
	4. Adaptability	4.74	1.20	.188*	.045	.301**		
	5. Individual teamwork skills	4.57	.76	.366**	.112	.412**	.414**	
	6. Team meeting effectiveness	4.92	.99	.306**	.131	.355**	.256**	.568**

N = 160
CSD = communication skills dimensions
* significant at 95 %; ** significant at 99 %

5.4 Conclusions

Teamwork is a key competency and one of the most prized in organizations. Accordingly, employers usually evaluate teamwork in selection processes. Teamwork's importance is also reflected in most educational institutions' syllabuses. The use of active learning strategies such as cooperative learning is common practice in new degrees adapted to the Bologna process within the EHEA. Cooperative learning is the concept of teamwork applied within a practical educational setting. Cooperative learning is therefore supposed to provide a highly relevant and effective model for higher education institutions to teach and develop teamwork skills for future workforces (Asyali, Saatcioglu, & Cerit, 2006). Nevertheless, teamwork is a complex multidimensional competency, and its development throughout a degree must be planned carefully. This planning needs to account for complementary skills and abilities of more complex competencies. This study focused on the relationship between teamwork and communication. Because teamwork has a considerable social component, communication skills play a considerable role in team meetings. Basic features of teamwork such as goal setting, problem solving, conflict resolution, and the like cannot be attained without well-trained individual communication skills.

Findings show that communication skills, broadly defined, constitute a determinant factor for successful teamwork meetings. Moreover, communication skills are highly correlated with individual teamwork skills. Individual teamwork skills are basics skills for successful teamwork meetings. The R^2 of Model 2 (Table 5.5) reveals the importance of students' having received training in these competencies before engaging in teamwork projects. Despite the implications of this finding, students are exposed to collaborative learning and teamwork from their first year. This can be a frustrating experience if students lack basic communication skills and some individual teamwork skills. Designers of syllabuses in educational institutions must act in accordance with this finding. They should prepare a program for first-year students to develop their communication skills and to receive at least some

Table 5.5 Stepwise regression with team meeting effectiveness as the dependent variable

		Model 1		Model 2	
	Independent variables	Beta	p	Beta	p
CSD	Reinforced communication	.16	.06	.05	.55
	Focused communication	.15	.05	.11	.13
	Empathy	.23	.008	.11	.17
	Adaptability	.17	.04	.03	.67
	Individual teamwork skills			.50	.000
	Adjusted R^2	.17		.34	
	F	8.26		15.44	
	Signif. F change	.000		.000	

CSD = communication skills dimensions

basic training in teamwork. Our findings provide evidence against the assumption that the best way to develop teamwork skills is learning-by-doing, suggesting that this policy is inefficient.

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Chapter 6
First Contact with the Word of Work: The Competence Built in the Teaching Practices

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Abstract This document describes a study, performed with students during the teaching practice in the course of preschool education. It analyses the competences that they believe to have built through the contact with the professional context. Data is acquired from their portfolios, since they protrude the competences built during the practice activities and the most interesting aspects to analyse. The study puts in evidence that teaching practice enhances professional competences construction, although the outlines of this construction vary according to the educational action model and the supervision model.

It is clear that the action of the kindergarten teacher is complex and that they develop within the confluence of knowledge of different nature. The centrality of the teacher-child interactions sets up as the defining frame of professional competences construction.

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Teaching practice is the moment of socialization that allows future kindergarten teachers contact with the values, language and body of the profession specific knowledge, facilitating a more realistic view over the world of work.

6.1 Theoretical Background

Professional skills of kindergarten teachers were, for many years, lacking scientific and pedagogical acknowledgment, leading to minor representation of the profession. Regarding this, Roldão (2002) states that

> the social representation about the knowledge required in this level of schooling was largely associated to monitoring and control of children, intermingled with caring concerns and parafamiliar support, traditionally not associated with relevant scientific and pedagogical skills (p. 37).

The remarkable increment of social demand, associated to the recognition that early childhood education is crucial for the development of children, as well as the building of professional identity, require the re-profiling of these professionals in the context of teaching, resulting in a new paradigm of training associated with the personal and professional development (Oliveira-Formosinho, 2002; Roldão, 2002). Some studies (Mesquita-Pires, 2007; Oliveira-Formosinho, 2002) show that the knowledge of how kindergarten teachers think help identifying their training needs and finding formative strategies to support their professional development.

The Specific Profile of Kindergarten Teachers (Dec-Lei n° 241/2001 de 30 de Agosto) highlights a deep interconnection between education and care in view of the vulnerability among children of these ages. Fitting the training needs of kindergarten teachers "constitutes a requirement that we can not resign because childhood is a period with large emotional, intellectual, socio-relational and intercultural impact on the accomplishment process of humanization of the person" (p. 159). In this respect Roldão (2002) refers that

> Actually what we know today about the emergence and development of cognitive processes and about the importance of early childhood experiences on the learning process led us to the recognition that solid scientific and cultural training as well as solid pedagogical knowledge, are sides of the same coin: the teaching professionalism in any levels on which it exerts. The same deep level of scientific knowledge is necessary both to help understand the emergence of reading and to teach linguistics in secondary: know how to make students recognized and make sense of these dimensions of knowledge (p. 38).

Kindergarten teachers have a professional role similar, in many ways, to teachers from other sectors of education. However, considering the age of the children, the contexts in which they work and the strategies they adopt in their professional activity, specific professional knowledge is required (Oliveira-Formosinho, 2000). As Katz regard (2000), professionalism refers to the growth in specificity, rationality and effectiveness of the knowledge, as well as to the skills, feelings and dispositions to learn about professional practice.

Kindergarten teachers training relies on the logic of the recognition of early childhood, encouraging educational activity to promote equal opportunities, respect for individuality and the right of every child to a global development of their skills (Afonso, 2002).

Undergraduate courses pedagogical and scientific organization show that this profession is supported by scientific and technical knowledge, requiring specialized training at a high level. In this sense it is recommended that the curricula of kindergarten teachers training should be organized considering the: horizontal and vertical integration of the curriculum; reduction of weekly working hours, value of investigative and reflective study; adequacy and relevance of the selected program content; articulation of components of the curriculum, particularly in pedagogical practice, which must be incorporated in the logic of training instead of being understood as a mere space of "contact" or "application".

Regarding this, Formosinho (2002) states that the process of *universitarization* of teacher training in preschool education has led to a process of *academization*, resulting in a theoretical teaching/learning process, away from the concerns of practitioners. In contrast, the adoption of a more professional logic of kindergarten teacher's training should result in unequivocal benefits. Practical training should be based on solid theories about early childhood participation, leading future kindergarten teachers in the (re)contextualization of their socio-pedagogical work, improving quality in early childhood education and their professional development.

The practice supports the dialogue between action-reflection and personal/professional development which constitutes the intersection of the individual and collective identities, thus emphasizing an ecological dimension of the subjects As the author refers, it is expected that practices support the ecological transition to professional life. Therefore, *praxis* is conceived as enabler of the ecological transition from the context of higher education to the context of the profession, through the institution where they perform their practices (Oliveira-Formosinho, 2000).

The understanding of the mental process of teachers, which we pursue in this work through a qualitative and interpretative approach, requires the definition of benchmarks to evaluate the competences built and those to be built in the future, which should result, ultimately, in the guidance of training options. In this study we used the guideline of Perrenoud (2000) and the Specific Profile of Kindergarten Teachers (Dec-Lei n° 241/2001 de 30 de Agosto).

The framework proposed by Perrenoud (2000) intends to apprehend the "movement of the profession", gathering the competences in ten dimensions: (1) managing student learning progression; (2) dealing with student heterogeneity; (3) developing student commitment to working and learning; (4) working in teams; (5) participating in school curriculum and organization development; (6) taking part in the school administration; (7) promoting parent and community commitment to school; (8) using new technologies in their daily practice; (9) tackling professional duties and ethical dilemmas; (10) managing their own professional development. These dimensions should not be seen in terms of narrow behavioural skills, but more in terms of dispositions. Kindergarten teacher actions should be regarded as a holistic concept, i.e. a gestalt of qualities rather than as a discrete set of measurable behaviour, to be developed independently from each other.

The Specific Profile of Kindergarten Teachers (Dec-Lei n° 241/2001 de 30 de Agosto) also outlines the following dimensions: (1) design and development of the curriculum—organization of the educational environment; observation, planning and assessment to children learning experiences; educational interaction; (2) curriculum integration—of expressions, languages and communication, social studies, personal and social development.

With this benchmarks in mind, we advanced to the data analysis, collected in order to understand the perceptions of students about the skills required for professional practice and how they built it during the practice.

6.2 Methodology

The methodology follows a qualitative interpretative approach to gather the idiosyncrasies of each participant and to understand all the factors involved in the skills building during the context of the practice. Data is mainly retrieved from the record of the reflections and considerations each student maintains. These *portfolios* provide the material and associated description that allow us to globally understand the process each teacher builds. Considering that praxis should generate knowledge through interaction and reflexivity, portfolios constitute an instrument that gives a global view of the educational process.

6.2.1 Question of Research

This study focuses on the relevance of the Practicum in the development of professional skills. In this sense we formulated the following research question: what professional competences students of early childhood education build during the Practicum?

Throughout the investigation we seek to identify the competences outlined by the trainees and the importance they attribute to it in their *portfolios*. Moreover, the written reflections and considerations we can also apprehend the image they have about the profession of kindergarten teachers. Concerning the later, they describe the specificities of their professional knowledge, the skills they think it is necessary for this professionals, and what they consider the society think about the relevance of this professional activity. Trainees also identify the adequacy and vulnerabilities of the training process for the construction of the competences they need.

6.2.2 Participants and Research Technics

The research conducted in this work analysed the perceptions of ten trainees regarding their practical experience, through the reflections and written documentation included in their *portfolio*. The choice of the ten participants was random, out of 40

students. We favour their availability, the diversity of institutions where they made the Practicum as well as the quality of their written productions. Students involved in this study performed the practicum in public kindergartens (four trainees), private kindergarten of social solidarity from secular nature (four trainees) and private kindergarten of social solidarity of religious nature (a trainee).

The analysis of portfolios guided the researchers to a holistic understanding (motivations, justifications, feelings, expectations and formative consequences) of the learning experience performed by trainees. As an example, in a portfolio of a trainee, we could read the following:

> our journey, our reflection, our assurance of uncertainty, want and need us to let them grow as we feel that our existence as human beings takes on new meanings. And at the end, little by little, as time goes by, when we already have the broad road in our horizon, we are growing in many ways and we will remember this self-reflection to question our new perspectives. We call its proper noun—portfolio—and it is simply assumed as our always, whatever the digits of the calendar and the labyrinths of our future existence (Pereira, 2004).

This statement refers that creating a portfolio involves reflection and self-criticism. Trainees endeavour to provide a complete view of themselves and their actions. In this sense, the portfolio is very different from a mere collection of some work produced by them. However, it should also present an opportunity for interaction between the trainee and the supervisor about the work performed. The portfolio is an instrument of dialogue between teachers/supervisors and trainees that is not produced at the end of a period for evaluative purposes but that is continuously (re)produced and shared, enabling trainees to broaden viewpoints on praxis and leading them through decision making (Sá-Chaves, 1998).

In this study we used some documents of the trainees portfolios and, through a heuristic and interpretative reading, we defined a category system to tackle the study objectives. We went through a deductive process, based on the guidelines of Perrenoud (2000) and on the Specific Profile of Kindergarten Teachers (Dec-Lei n° 241/2001 de 30 de Agosto), complemented by induction resulting from the portfolio documents. We validated our findings by constant analysis under the theoretical background.

6.3 Discussion and Main Findings

The teacher training process includes several moments when students have contact with the professional reality. During the course, they have moments of observation (first moment), cooperation (second moment) and autonomous planification and intervention (third moment). As they progress, they build their idea about the professional skills and knowledge, leading them to building their concept about the role of kindergarten teachers. They start the practicum with a predefined concept about what the kindergarten teacher role is. These perceptions are important in this study because they define the starting point of the training. Sometimes this represent a shock with what they find in the context. But it provides an opportunity for them to construct a more realistic view of the profession. These

perceptions emerge from the comments they write in their *portfolios*, together with the competences they think they build during the practicum.

The training process puts them in a professional environment, in a kindergarten with its own specificities and a university teacher and an experienced kindergarten teacher from the institution supervise them. This training process influences the competence acquisition because there are different models, different institution policies and different ways of conceiving the action with the children. Moreover, they often identify some inadequacy between the theoretical knowledge and the practical one. This is also important in our study, allowing us to identify the frailties of the training process leading to a reflection regarding some aspects to improve.

6.3.1 Perceptions About the Professional Role of Kindergarten Teachers

The analysis of the conceptions students have regarding the aspects allow us to understand the aspects they consider important in the role of the kindergarten teacher, the specificities and the social status of the profession.

a) Professional specificity
The professional specificity, according to the trainees, result from the children' age which demand a careful balance between the pedagogical and interactional dimensions. This aspect is confirmed by the Oliveira-Formosinho (2000) perspective, which states that the professional role of kindergarten teacher is developed in a strong interaction between the caring and teaching/learning process because of the vulnerability of children in this age.

(i) "I think that [from 3 to 6 years old] is a crucial stage of children development, determinant for the success of the following stages (…) it is an additional responsibility we have and it cannot be forgotten by any of the teachers of the subsequent study cycles".

This trainee refers to an additional social and professional responsibility, considering the impact that relational and wellbeing aspects have for children development. Oliveira-Formosinho (2000) states that the responsibility intrinsic to the role highlight the necessary teacher professionalization of kindergarten teachers, since childhood have strong impact in the human being growth.

An additional factor for professional specificity is the inexistence of formal curriculum, requiring the kindergarten teacher to be a curriculum designer and manager. This drives them to research towards an holistic approach of curricular domains.

(ii) "We don't have a formal curriculum and I'm glad (…) we have ourselves to think about subjects connection"

This schooling level is not compulsory under the law, another important differentiation factor with other levels:

(iii) "[Childhood education] is not compulsory in the educational system. For parents this is only a commodity, a place where they leave their children, because they are not evaluated in the end. The teacher is only there to guard them".

The learning that happens in this process is frequently undervalued, contributing to a lower appreciation of the kindergarten teacher work.

b) Professional profile of kindergarten teacher
In broad terms, trainees consider the multi-disciplinary scope of the kindergarten teachers' action. Their knowledge and functions are considered multi-dimensional, crossing different domains in the personal, professional and self-development competences. They consider that the kindergarten teacher should have strong scientific knowledge, but also the commitment with pedagogical strategies that makes clear that knowledge to children.

(i) "The kindergarten teacher has the responsibility to use the scientific knowledge in different domains"
(ii) "Our main objective it to know how to deal with them, how to teach them and how to be with them"

Trainees consider important the interactional dimension, valuing the emotional skills, the comprehension and the individualized focus to the child as a mean to provide wellbeing to them. They also refer the ethical-deontological dimension to guide their professional commitment, which demands sensibility and awareness that should be developed in the professional context.

(iii) "To be a kindergarten teacher is not easy. It requires knowing each child so that a good and strong relationship can be maintained, and his individuality be respected".

Although identifying the importance of the ethical attitude, they do not consider it as a competence built during the practicum (see below). We believe that during the training process it would be important to discuss and reflect about this subject, favoring the construction of ethical view about the dilemmas, professional, parents and children rights and duties, as well as deontological attitudes.

c) Social status of the profession
In this category the trainees mentioned their conception about the social status of the kindergarten teachers' profession. They think that the profession is undervalued because society associates their role to mere care functions, and not requiring solid scientific knowledge and complex skills.

(i) "I think that even professionals of this area (…) are not aware of the importance this stage [of human life] has and to the importance that kindergarten teachers have (…). The idea of caring still remain";
(ii) "[People] don't care about what we really do to educate children";
(iii) "My colleagues from other scientific areas don't have the notion [of what being a kindergarten teacher mean]. A friend of mine even say 'I don't know why you're always so busy. You have nothing to do besides going there and play with children'".

They also consider that even the professional designation contributes to this underappreciation. This differentiation does not value this occupation under the global teacher professionality. Moreover, the feminization of the profession, derived from the maternal functions associated to it, is another undervaluing factor. Recently, the number of male teachers has been increasing, bringing more openness and social equity to the education process. However, one of the trainees (male) thinks that there are additional difficulties for men, because of social stereotypes about the male activity with children. Society does not see, in the same way, the interactions men/children and women/children.

(i) "Experience with [male] kindergarten teachers (…) in a small village show that parents don't feel comfortable and, in the first week of school they remain staring at the window to see what is happening in the classroom";
(ii) "It's easer to criticize a male kindergarten teacher that a female one".

Overall, there is an underappreciation of the profession by the society. It is associated to caring functions, considered scientifically less demanding and with mild difficulty. This view does not value the pedagogical competences necessary to the development and learning process of children. This supports the perspective of Roldão (2002) concerning the social meaning of this profession.

6.3.2 Competences Built During the Practicum

From the heuristic interpretation performed, six categories emerged, describing the trainees' representations about the professional knowledge that they consider having built during the practicum. Globally, they follow the ones described by Perrenoud (2000) and in the Specific Profile of Kindergarten Teachers (Dec-Lei n° 241/2001 de 30 de Agosto). However, to build a better scope we broaden the benchmarks, resulting in less, more focused, categories. Each category is illustrated with the voice of students that better describe it:

a) Dealing with student heterogeneity and managing the student learning progression;
Some trainees refer the importance of paying attention to the individual learning needs and interests of each child. This leads the kindergarten teacher to the necessity of adequate the preschool curriculum to the specificities of each group of children.

(i) "I try to adequate the attention and time with each child (…) I always try to respond to their emotional needs because they are all different".
(ii) "Since the Class Curricular Project is specific of a group, the learning experiences must respond to their specific needs and interests".

b) Developing rich and diversified learning experiences
The importance trainees give to this category is remarkable, valuing (i) the ludic strategies in the learning process; (ii) the creation of an enabling environment;

(iii) the holistic pre-school curriculum approach; (iv) the collaborative work as a mean for educational citizenship improvement; (v) the child research and problem solving promotion.

(i) "There are several methods to foster such learning experiences. Ludic and role-playing games, and work with art are fundamental in this process";
(ii) "The space organization is more successful if it is divided in several work areas to allow children to make their own choices. I believe that the working areas should be changed time by time to enable the improvement of the teaching learning environment";
(iii) "In the organization of the learning environment, we tried to provide to children rich and diversified learning experiences";
(iv) "We encouraged child-to-child interaction to solve puzzles and other challenges (…) there was experience and knowledge sharing and mutual aid among them";
(v) "Solving problems and make their own decisions enable children to face the daily problems and that's how we can educate auto confident, auto controlled and autonomous persons".

c) Flexible, sequential and holistic planning
Trainees also refer that along the training they gradually build the necessary skills to implement a flexible, sequential and holistic plan. In this sense, they refer that, in this process, it is important: (i) to consider the interests of children; (ii) to focus on them the educational activity; (iii) to gradually adjust the learning process; (iv) to act on the unpredictability; (v) to consider a multidisciplinary approach (vi) to understand the planning as a guideline for action and not as a rigid and mandatory instrument.

(i) "We sought to understand what are the children' needs, readjust the space and daily routine so that they feel pleasure in their experiences. We had the intentionality of promoting meaningful learning";
(ii) "I tried to use a learning by discovery, seeking to create conditions so that children might form new and different knowledge";
(iii) "In the preparation [of plans] I searched the continuity and sequence of learning in multiple domains";
(iv) "Not always what is planned will happen, we have to count on the unexpected";
(v) "I feel increasingly comfortable to select themes with multi-disciplinary objectives";
(vi) "I learned that we should not be tied to the plan. That is only a guideline. It is important for us to perceive the needs of children at certain moments".

d) Promoting parent and educational community commitment with school
In this dimension the trainees reported the relevance of (i) promoting parental involvement; (ii) working with other institutions; (iii) creating projects in partnership that enable children to a closer contact with social reality.

(i) "The *magusto* (traditional celebrations in the S. Martin' day where people eat roasted chestnuts) included the participation of the community, including parents, other family members or friends";
(ii) "We think it is appropriate to establish meetings with children and different people, in this case adults with disabilities";
(iii) "The book fair was a very interesting organization because it favoured the integration of children of our kindergarten with other' and with several community members";

e) Educational interactions and emotional security environments
Trainees also referred that they tried, during the Practicum, to developed "educational interactions in an atmosphere of emotional security". They expressed that this was a difficult skill to achieve but they tried to promote (i) the children's wellbeing; (ii) their autonomy; (iii) the adequacy of the adult language to the needs of the group; (iv) the respect and appreciation for the actions of children, and (v) the ability to engage emotionally with them.

(i) "We are aware that this wellbeing and safety also depends on the educational environment in which the children must feel welcome and listened, helping them to create self-esteem and desire for learning."
(ii) "We organize the educational environment to provide a free exploration of materials. In this sense we establish negotiations with children, with regard to the number of children in each area. These allowing them for make independent decisions."
(iii) "In the learning experiences I tried to use a proper, straightforward language appropriate to the age of children";
(iv) "We have tried to organize the materials inside and outside of the classroom and place the children's works in placards (…) this is also important for the child's development as it increases their self-esteem and makes them feel that the their work is valued";
(v) "I got involved in everything I did, with children and with adults. I created a very strong emotional connection with all".

f) Educational intentionality
It is also expressed by the trainees the "educational intentionality" as a necessary ability and disposition for pedagogical action where the following skills are inscribed: (i) observation of children and contexts; (ii) projects' design and development; (iii) strategies' redefinition to improve better learning experiences; and (iv) link between theory and practice.

(i) "I tried to focus the observation on children in order to understand their actions and plan activities appropriated to their needs";
(ii) "It was from this time that the PC (curriculum designed by the kindergarten teacher) started to emerge (…) I felt a radically positive change in the way I interpreted and managed the teaching/learning process";
(iii) "The evaluation and reflection about the projects are necessary for subsequent reformulations the learning experiences";

(iv) "I became aware that the educational intentionality goes through different stages interconnected that are happening and deepening, such as: observe, plan, act, evaluate and communicate".

In this research, it became clear that these six categories are relevant to the students during the teaching practice. Dealing with student heterogeneity and managing the student learning progression is fundamental to realize the individual characteristics of children and foster the proximity between them towards better interaction and knowledge building. Rich and diversified learning experiences contribute to higher motivation and curiosity, paving the way for reflection associated with the intentionality of learning. Flexible, sequential and holistic planning permits to follow unforeseen paths towards knowledge. Moreover, the commitment of parent and educational community with the school and the learning process further enable children a closer contact with a social reality. Security and education are closely related, since each will contribute to the other in a cycle of learning and doing. Finally, the education process should be necessarily intentional, linking the knowledge to its applicability in practice.

These categories allow the supervisor to build, together with the student, a stronger and more meaningful practice. They gain more structure and are more comfortable in the first contact with the work environment and they also provide children with more tools and better conditions to learn.

6.3.3 Training Process

The training process intends to give kindergarten teacher to competences, knowledge and dispositions to face the professional reality. This process connects scientific knowledge and practical experience through reflection, research and integration of pedagogical strategies. This first contact allows future kindergarten teachers to build the professional meanings and the competences required for the teaching/learning process.

When facing the practice, students find situations that make them feel the strengths and weaknesses of the training model. The most remarkable weakness they point is the reduced practicum time both in length (not matching the children's school year) and in duration (total of hours). It is not sufficient for them to get the understanding the whole reality of the process, only a fraction of it.

Trainees refer that their teachers do not understand the specific nature of the professional role of kindergarten teachers, leading to a weak connection between what they teach and the needs students have in practice. This is further accentuated by the perception teachers have of the low complexity of the profession.

The practicum is developed in institutions with different management policies, beliefs and practices. In this study, two kinds of approaches emerge. On one hand, a traditional, adult centric, valuing the propaedeutic of reading, writing and mathematics, and, on the other hand, a participatory approach, child centred, valuing the development of interactions, critical attitude, and meaningful learning experiences.

In this context, some trainees value the traditional perspective of the role of kindergarten teachers that exacerbates a more academic dimension of preschool education. They feel that a training model able of providing a benchmark to apply during the practice with children is necessary to work in these contexts.

(i) "Our action starts from the theoretical knowledge to its use in practice. Acting is built gradually with the experience, something that grows within us".
(ii) "In the institution where I'm doing the practicum they use an approach very academic and adult centric. Children are limited to follow the instructions of the teachers and I don't like to do it that way"

In other institutions, trainees where able to experience a participatory approach, where the practice was conceived as a laboratory for experimenting, reflecting, thinking and redefining action strategies, as a mean to mix theory and practice to reconstruct their own professional competences.

(i) "In the first year we deal exclusively with theory (…) and moving gradually towards practice. I think we should follow an opposite direction, starting with the practice to foster reflection and theoretical research";
(ii) "I try to be aware to both the theoretical and the practical dimensions. With practical, I understand not only the design of the plan but also to a series of human factors that drive the development and action of children (…). Still, I don't disregard theory, since provide an intimate comfort that allows us to deal with unexpected situations. Theory and practice alone are not enough. We also need an ethical dimension to deal with some situations".

The training process strongly depends on the context of where they experience the practicum and on the articulation of theory and practice in the higher education institution. It also depends on the creation of moments of intentional and cooperative reflection provided by the training context. The practicum is not always a good experience, since trainees feel the coercion of the institution experts. Because of that they assume the replication of the practice they observe, which may lead them to unreflected and unintentional practices.

6.4 Conclusions

Overall, the trainees recognize that they have built professional competences during their training. The outlines of this construction vary widely depending on the practices and models of supervision undertaken by supervisors.

The multiplicity of competences evidenced in portfolios led us to consider that trainees recognize that the action of a kindergarten teacher is complex and developed in the confluence of theoretical, practical and the beliefs about children and education. It is also explicit in the portfolios the centrality of teacher-child interactions. This appears as the foundation for building other professional competences, emphasizing the appreciation of child competence and appeal to their involvement as an active being in the learning process.

The trainees are conscientious about the competences that they built and those they still need to build throughout their professional development. They seem to be very conscious about what is essential in their learning as future kindergarten teachers. However many of the reflections seem not able to overcome the rhetorical dimension, since some of them show a mismatch between what the concepts and actions really mean. Our reflections led us to consider that the necessary construction professional quality throughout the training depends on sustained intervention models about participatory practices. Only then we can grasp the complexity of pedagogical dimensions that are developed on the action of kindergarten teachers and enhance the construction professional competences with quality.

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Chapter 7
Leadership Development Through Experiential Learning in University Studies at Florida Universitària

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Abstract The development of complex skills such as leadership requires experiential learning. The educational model at Florida Universitària develops social competences through Interdisciplinary Projects undertaken in teams during each academic course. The leadership skill is developed in the fourth year in all of its university degree courses using an experiential approach. Each fourth year student assumes the role of team leader of an Interdisciplinary Project team of first year students. In this way the fourth year student develops leadership through experience. This process is accompanied by specialised training in leadership, individual coaching and by a multidisciplinary teaching team which monitors the whole process. During the academic year 2013–2014, 45 students were involved in this experience as leaders.

7.1 Introduction

The Bologna Declaration[1] was accepted in 1999 as an agreement between 29 European countries and as a pledge to reform the structures of higher education systems in a convergent manner. The Bologna process has introduced a large number of changes in the past decade, particularly in universities. Among them it has promoted a deep reflection on the teaching and learning process directed towards enhancing the student experience and to deliver the right skills for employment.

The Europe 2020 strategy aims to turn Europe into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. In this strategy education and skills become a core strategic asset for

[1] The Bologna Declaration of 19 June 1999 is a Joint declaration of the European Ministers of Education.

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growth, and emphasis is placed on higher education and research as the route to greater skills and higher levels of innovation. The communication on Rethinking Education (COM/2012/0669) adopted by the European Commission in 2012, mainly focuses on adapting education to workplace needs: delivering the right skills for employment, providing new ways of teaching and learning, and new approaches to funding and partnerships.

The labour market is constantly evolving. Skills, competences and qualifications that people need change over time. Modern, knowledge-based economies require people with more developed and relevant skills. Transversal skills such as the ability to think critically, take the initiative, solve problems and work collaboratively prepare individuals for today's varied and unpredictable career paths. The development of transversal skills across the curricula implies using innovative and student-centred pedagogical approaches.

To respond to these challenges, Florida Universitària as a higher education institution has developed a curricular approach with the aim of preparing students for their future professional life. Apart from the technical skills involved in each university degree, emphasis is put on the acquisition of transversal competences and so-called 'soft skills'.

Florida Universitària is a private institution affiliated to the Polytechnic University of Valencia (Spain) for Engineering Programmes, and to the University of Valencia for Education, Business Administration, Information and Communication Technologies (ICT) and Tourism Programmes. Florida Universitària belongs to Florida Centre de Formació SCV, an education cooperative active at all levels of education ranging from kindergarten through secondary education, Vocational Education and Training (VET), and university education, to senior learning. It has around 3,500 students and 250 employees. Florida is located in the Valencia region and has more than 35 years of experience as a dynamic and innovative institution that is aware of the needs of businesses and society.

The educational model of Florida Universitaria is integrated into the European Higher Education Area (EHEA), and seeks to train versatile, innovative and competent graduates capable of adapting to a constantly changing reality/environment. In order to achieve this it encourages active and cooperative learning, developing the technical and social skills required by future professionals (Aznar et al., 2012):

- Teamwork and cooperation
- Initiative, innovation and creativity
- Communication
- Conflict Resolution
- Leadership and Team Management
- Lifelong Learning
- Commitment and ethical responsibility
- Project Management
- Basic skills in ICT and foreign languages.

These skills are developed in all the degree courses according to the schedule shown in Fig. 7.1.

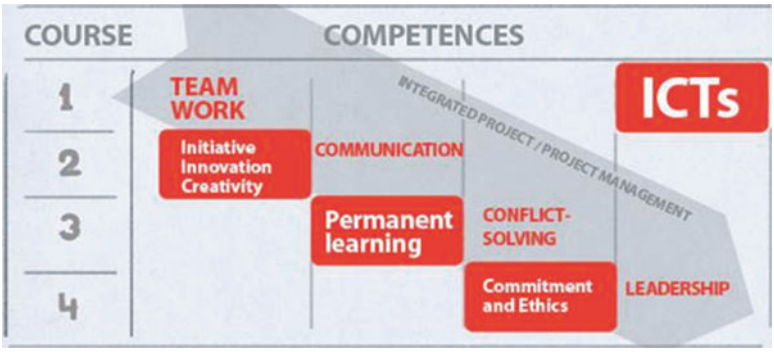

Fig. 7.1 Skills timing in university degrees

As shown in the figure, the interdisciplinary project is the central and vehicular element for developing the above-mentioned skills during the students' training process. These projects are undertaken by students working in teams to solve real problems (learning by doing). They integrate all the degree subjects of each academic course with the objective of generating an all-encompassing academic product by means of Project-Based and Problem-Based Learning pedagogies.

In our methodology, team-work competence plays a key role and it is developed progressively to build self-managing working teams. The leadership skill is developed in the fourth year using an experiential approach. Each fourth year student assumes the role of team leader in an Interdisciplinary Project team of first year students.

During the academic year 2013–2014, 45 students were involved in this experience as leaders. The process was accompanied by specialised training in leadership, individual coaching and by a multidisciplinary teaching team which monitored the whole process. The theoretical background, the process, the results and the main conclusions of this successful experience are described below.

7.2 Theoretical Background

> Higher education must adapt its structures and teaching methods to new requirements. There is a need to change from a paradigm focused on teaching and the transmission of knowledge, to one focused on learning and the development of transferable skills to different contexts in time and space (UNESCO, 1998).

The development of leadership skills—abilities that are difficult to develop in an organizational environment—requires more than practical training and involves, therefore, an integrated and holistic understanding of our actions and not a simple breakdown of the skill into behaviours or indicators of competence. Experiential education is positioning itself at the forefront of social constructivist pedagogies

that lead to leadership focused on the talents of people. David A. Kolb (1984), the author of Experiential Learning Theory, states that "Learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience". According to Kolb, learning is a four-stage cycle divided into two aspects: how to know (concrete experience or abstract conceptualization) and the way knowledge is transformed or understood (reflective observation or active experimentation). For Kolb, concrete and immediate experiences are the basis for observation and reflection. These observations are assimilated into a 'theory' from which new ways to act can be deduced. These implications or hypotheses serve later as a guide for future actions and the creation of new experiences. This is what happens in the process of training our student leaders. The new knowledge, skills and attitudes of these leaders are attained through four forms of experiential learning or four types of ability: concrete experiences, reflective observation, abstract conceptualization and active experimentation.

We chose to base our leadership programme on the Experiential Learning Theory because ideas/knowledge are not fixed and immutable elements of thought but are formed (constructed) and re-formed (re-constructed) through the experience of leadership.

To summarize, experiential learning of leadership is conceived as:

- A process, but not in terms of results.
- An on-going process based on experience.
- A process that requires the resolution of conflicts between opposing dialectical modes of adaptation (learning by its very nature is full of tension).
- A holistic process of adaptation to the world.
- Involves transactions between the person and his team.
- A process of knowledge creation that originates from a transaction between social and personal knowledge.

In the words of Schön (1988): "The idea of reflective practice leads to a vision of professionals as agents of a reflective conversation of society with its situation, agents engaged in cooperative research within the structure of an institutionalized conflict".

This reflective practice has been carried out in our leadership experience, since through problem solving we help train future reflective professionals, promoting continuous criticism, and the revision of values and ethical principles. By this means, the reflective conversation that students, as future professionals, establish with the situation of being leaders, Schön explains as an alternative understanding of the practice which cannot remain outside the process. In addition, reflective practice helps to develop in those leaders the ability to think, to know, to put into question prior knowledge, and to actively participate in the search for solutions to problematical situations. Together with his group, the leader must be willing to "assume mistakes, accept confusion and reflect critically on their previously unexamined assumptions" (Schön, 1992).

7.3 Methodology

7.3.1 Experience Design

The leadership programme at Florida Universitaria is directed towards strengthening personal autonomy and collective participation, helping to humanize interpersonal and social relations through dialogue and the construction of collective agreements in a dynamic and people-centred way. It contributes to the overall training of students and provides tools to promote their personal growth and collective performance, expanding their field of vision, management and action in diverse scenarios. It also promotes critical and constructive abilities that enable students to accept transformation of the group environment, suggest alternative solutions and lead the process of change for the benefit of the team.

Leadership is a practically oriented and voluntary educational experience for fourth year students undertaking degrees at Florida Universitaria. Those that participate apply their knowledge to improve the quality of life of first year students in the Interdisciplinary Project teams. Leadership becomes a community service and also provides the benefit of contributing to a team and assisting it. The fourth year students lead the others in the use of the skills that they themselves have learned during the course of their 3 year degree training, which makes the experience even more educational.

The main objective of the programme is to encourage students to become entrepreneurs and leaders able to influence their environment in a positive way. In the leadership experience, we consider skill development essential since it promotes the acquisition of eight core competences: emotional intelligence, communication, interpersonal relations, teamwork, problem solving, planning and organization, professional ethics and team management. In addition, students identify and assess their strengths and leadership opportunities, as well as understanding and applying essential skills and techniques in order to integrate new knowledge at both personal and professional levels.

The students' experience transforms the abstract concepts learned in class and in training seminars into reality. The values and skills acquired will help them to face challenges in their professional future. In this regard, students also participate in supplementary training seminars for 3 months. As we will see in the results section, students consider that the leadership programme has been one of their best experiences since it has improved their social competences in problem solving and expanded their experience of life.

This programme promotes the development of skills through workshops, workplace associated experiences, and leadership through experiences and the creation of a learning community. Finally, another element which enriches the leadership training of our students is that they can undertake their leadership experience with students studying either the same or different degree courses.

ROLE	PROFILE	FUNCTIONS
Leader	4th year students who voluntarily express the wish to live the experience. They have to pass a selection process	To train and motivate 1st year students to carry out the project.
Trainer	Expert teacher in the development of group dynamics, and personal and interpersonal leadership.	To train and empower students to perform their tasks.
Coach	4th year teaching staff.	To accompany and advise 4th year students regarding the performance of their tasks and evaluation of their work.
Coordinator	Faculty staff that coordinate 1st year groups in which the leaders will undertake their tasks.	To monitor the teams in the classroom with leadership participation

Fig. 7.2 Role description of the multidisciplinary team

7.3.1.1 The Multidisciplinary Team

To carry out the leadership programme, Florida Universitaria has created a multidisciplinary team with the following roles (Fig. 7.2).

For the creation and professional development of this team we have taken into account the requirements and characteristics of the research methodology since, based on practice, we have become aware of a very particular 'topography': there have been 'plateaus', visible to everyone, formed by problems that can easily be solved using the contents and skills learned; we have also found 'wetlands', confusing and disturbing situations that are in general are more interesting for the team. The multidisciplinary leadership team has faced complex, unique and unstable situations in which uncertainties and conflicts of values arise.

As discussed below, we have taken into account the contributions of critical pedagogy, research in action and problem solving in both our leadership training proposal and the creation of the multidisciplinary team. It should also be borne in mind that there is continuous training of the team in the learning environment. All these considerations make it possible to undertake projects and experiences that facilitate changes in student relationships and also develop innovative approaches in the classroom.

Firstly, from the point of view of technical rationality, professionals are trained to solve problems as if the latter were real, but they are not trained to formulate them. This perspective does not take into account the process in which we define "decision to be made, ends to be achieved, and means which may be chosen" (Schön, 1992).

The ability to contextualize a problem is a competence that a professional exhibits in practical situations that are unique, uncertain and conflicting, when he/she has carried out processes of reflection on action. Schön acknowledges an underlying constructivist conception of reality, and that competent professionals develop their own mode of action: "our perceptions, appreciations, and beliefs are rooted in worlds of our own making that we come to accept as reality" (Schön, 1992).

In our rapidly changing modern society, a strong distrust has arisen of the professionals who only know how to solve problems by applying theories and techniques,

as they are generally ineffective in the new conflictive situations that occur. Hence our interest in training leaders for change, to fill the gap between professional knowledge and the emerging needs for professional leadership.

For these reasons, our multidisciplinary team is formed of professionals with years of teaching experience and who have also had many cases of students who failed to learn with an effective leadership method. Focussing on the means to be successful with such students, we changed our initial strategies, trying alternative techniques and counting on the cooperation of an expert coach. Since each year brings different challenges, we share and attend training courses on coaching and leadership in order to be aware of new theoretical approaches to teaching.

In this sense, as teachers and researchers in the development of leadership competence, we support the following statement of Donald Schön: "Reflective practice allows trainers to build knowledge through practical problem solving. This involves the construction of a kind of knowledge from actions to make decisions using strategies and methodologies to innovate" (Schön, 1988).

Schön's proposal is directed to what is known today as 'permanent training' or constant updating via professional courses. The professional team at Florida Universitaria is committed to constant renewal which encourages the formulation of our own repertoires of competences and skills based on continuity. Ultimately, the value of the leadership programme will be reflected in the quality of teaching, in the daily practice of the teacher, and more specifically in the training of future professionals.

Donald Schön's proposal has much to do with the ideas of Wilfred Carr and Stephen Kemmis, which stem from the critical theory. These ideas are related to the teacher being able to undertake a pedagogical proposal based on his/her daily experience with students, an action research that is far removed from that which is stipulated by theoretical researchers. In addition, Kemmis and McTaggart (1988) note that "action research is a self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out". Finally, Carr and Kemmis argue that the action research model is a self-reflective spiral of loops comprising planning, action, observation, and reflection and re-planning as a basis for the solution of educational problems.

For the arguments outlined above, the multidisciplinary team is committed to the proposal of Wilfred Carr and Stephen Kemmis in relying on the intelligence of the teacher who faces the reality of his/her task as 'teacher' on a daily basis. A reality in which, on most occasions, leadership theory falls short. Leadership education cannot be imparted in a laboratory where all variables can be controlled. On the contrary, as active participants in the process, we are conscious of the existence of external variables that cannot be manipulated.

Finally, we wish to emphasize that throughout our work we have been aware that we live and operate in a field of action in which emotions are an essential part of the dialectical interplay between the teacher-leader roles of an individual, or as we like to call it today, the process of teaching and learning.

7.3.2 Process and Development of the Experience

Following on from the description of the team and its roles and functions, we describe how the experience has been undertaken in the academic course 2013–2014, and which is based on that of the previous year (Gómez et al, 2013).

The process begins with the recruitment of students finishing their third year and who in the following year (fourth year) will be in a position to lead first year teams. To do this, we conducted an information day with the following objectives:

- To explain a leadership style in line with the educational model developed throughout the students university education.
- To make students aware of the importance of acquiring leadership competency for their future career.
- To inform about the leadership development experience and listen to the opinions of students who enjoyed that opportunity the previous year.
- To establish a meeting to explain the project and resolve initial doubts.

Subsequently, the selection process for those students interested in the programme takes place. The requirements and criteria for students to be considered for participation in the leadership team are: to write a short document describing their motivation for participating in the experience; to have successfully completed all first year subjects; to have a favourable recommendation from the third year project coordinator. Whilst not obligatory, it is also considered advantageous to have assumed a role of responsibility in the development of the Interdisciplinary Project in previous years.

In the academic year 2013–2014, 45 students were selected to participate in the leadership experience. Each of them had previously led a team of first year students studying degrees in Early Childhood Education, Primary Education, Mechanical Engineering, Electrical Engineering and Industrial Automation, Business Administration, Tourism, and Finance and Accounting. As mentioned above, the fourth year students selected to participate in the experience led teams that were not necessarily studying the same degree course as the leader.

The requirements to exercise the role of team leader are:

- Attend leadership seminars given by a trainer, where the resolution of doubts is encouraged and team leaders share their experiences.
- Participate actively in follow-up meetings with the project coordinator of the first year group to which the leader's team belongs.
- Participate in monitoring both the progress of the team members and their final evaluation.
- Reflect and carry out a leader self-assessment by keeping track of his/her own work, his/her improvements in performance as a leader, and dealing with the results and development of the team.

In developing the leadership experience, leaders of the Interdisciplinary Project teams should:

- Make rational proposals for task planning.
- Organize activities independently and in a coordinated manner.

- Motivate and engage the team in achieving goals.
- Ensure the review of processes and outcomes, assessing what to maintain and what needs to be improved.
- Engage in conflict resolution.
- Facilitate contact with the teaching faculty to resolve any doubts the team may have.

The stages in the development of the Interdisciplinary Project and the leader functions associated with each of them are:

7.3.2.1 Interdisciplinary Project Planning

- Configuration of teams with the help of the first year project coordinator. The team leaders meet and collaborate in setting up the teams ensuring the maximum diversity of profiles in all of them.
- Oversee the planning of the work with team members to ensure that:
  - Tasks are established and scheduled.
  - The search for information is distributed.
  - The results are reviewed.
  - Oral and written materials are prepared.
  - Team meetings and progress are recorded.
  - Communication between teachers and students is encouraged to resolve doubts.
- To manage, along with the team members, the completion of the planning report in which is included the tasks, timing, distribution of workload, team data and performance standards.

7.3.2.2 Monitoring of the Teams

- Preparation of meetings, previously clarifying what is to be done (report-discuss-decide).
- Convene those meetings necessary to monitor the project, coordinating agendas based on the different deadlines to be achieved.
- Conduct meetings according to the agenda, managing the duration of the meeting and leading the team in formulating agreements or tasks.
- Collaborate with the team and train it for drafting the minutes of the meetings and also the management of tasks and agreements determined during the semester.
- Distribute roles in meetings.
- Manage incidents arising from working as a team and communicate them to the coordinator.
- Conduct fortnightly review of the development of the team and project results with the coordinator.

7.3.2.3 Evaluation

- Keep a record of the work process of the team being led, using observation and monitoring documents.
- Record in a weekly learning diary (blog) the experience of being a leader.
- Ensure the quality of the documents that are delivered: the planning report, presentations and poster.
- Undertake with the coordinator a final assessment of the teamwork competence of each of the team's members.
- Participate in the evaluation of the first year team's Interdisciplinary Project as a member of a tribunal composed of faculty members.

7.3.3 Results

As we have discussed in the previous sections, the Theory of Experiential Learning conceives the leadership experience as a constant reformulation process that requires permanent feedback from the multidisciplinary team to identify both its strengths and the areas that are in need of improvement. The assessment made by those individuals involved in the leadership experience is presented below, and it constitutes a valuable source from which to redesign the experience.

7.3.3.1 Assessment of the Experience by the Student Leaders

Participating fourth year students assess the experience through an evaluation questionnaire that takes into account the following points: objectives, methodology, the assessment instruments used and the relationship and care provided by the organization. An analysis of the responses to the questionnaires yielded the following datum: 75 % of students strongly agreed that the leadership experience enhanced their training and permitted them to develop skills useful for their professional future in regard to the management and leadership of teams.

For the assessment of the methodological aspects, the results are similar. In this case it is noted that students want more space and time for meetings with the teams they lead and the coordinator of first year in order to unify criteria and proposals for better functioning of the Interdisciplinary Project. Conducting these surveys allows us to review the process that year after year is improved as a result of the participation of the individuals involved.

As regards the evaluation, in 70 % of cases student-leaders acknowledge that they know the criteria by which their leadership will be assessed, 79 % state they received constant feedback from the coach and 98 % agree that their role has improved their team's performance. These figures indicate a high degree of involvement in the teaching-learning process conducted by first year groups and their awareness of their own involvement in it.

In the final question, which attempts to measure the degree of satisfaction with the learning achieved in the experience, 98 % of students responded affirmatively. This quantitative result corroborates the different qualitative evaluations performed by students throughout the leadership programme. One constant has been the positive assessment of the training sessions and the Interdisciplinary Project as a whole. Notably, during their participation in the experience, students come to realize that they have acquired skills throughout the degree course as a consequence of the overall experience of their projects which are directed towards the integration and coherence of the different subjects of the curriculum.

To illustrate the above we offer some impressions from the tracked blogs of the leaders. We would like to emphasize that the role of leadership was exercised in teams the members of which could be from very different degree courses thus illustrating the interdisciplinary vocation pursued by the experience:

> […] I would emphasize that this experience has helped me to open up to people, to communicate more and also to express my ideas and feelings paying more attention to way I express myself so as not to hurt anyone. ....I have always tried to be assertive and empathetic. […] taking a role as a leader has been an opportunity to put into practice all that I have learned and the skills that I have developed throughout the degree, such as responsibility, creativity, effort, dedication, respect or the organization and management of time (Sandra Villar Soler, fourth year of Primary Education. Leads a first year Degree of Mechanical Engineering).

> […] The idea that I am left with from the leadership process is to have had the first contact with a competence that gains importance day by day in a world increasingly characterized by continually enhancing individual capabilities and skills in order to achieve a profile that will help us to develop a future career with the best preparation (Juan Palazón, fourth year of Primary Education. Leads first year Degree of Tourism).

Other notable constants that we find in reviews are: the applicability of the leadership experience to professional future; the opportunity to be involved from a different perspective in the Interdisciplinary Project; personal growth through a responsible, respectful, tolerant and humble attitude with the team.

7.3.3.2 Assessment of the Experience by the Coach

In a similar vein, it is apparent from both the qualitative assessment questionnaires and the various coordination meetings of the multidisciplinary team, that the coaching team also provides a positive evaluation of the experience. The coaches based their evaluation on meetings with team leaders and also contributions written in their blogs. Two important points to note are: the implementation of the skills acquired in the degree course, and the individual reflections on the leadership experience of those who participated as leaders.

Since the coach follows the leadership experience from the blogs, this professional has an external point of view of the team and the leader. This allows him/her to accompany the leader in a process—that is not without its complications—and undertake reinforcement as necessary as an external observer, whilst at the same time being aware of the strategies and mechanisms used in the process.

From this perspective, the Interdisciplinary Project methodology of Florida Universitaria offers a complete and unique vision of the learning process and competence development.

7.3.3.3 Assessment of the Experience by the Coordinator and the First Year Students

Using the triangulation of sources typical tool of qualitative research, a positive evaluation of the leadership experience is observed from analysis of the qualitative data obtained by the coordinators of the first year students. Some of the conclusions reached refer to the high level of availability of the student leader for resolving questions about the objectives and activities to be undertaken in the project and other organizational issues that require teamwork. That the student leaders have already had the experience of the Interdisciplinary Project in previous years and are finishing their studies is a positive influence, since it shows the first year students the importance of effort, perseverance, and communication with the faculty, and also provides them with useful guidelines for the continuity of their education.

To illustrate this we reproduce two excerpts from this assessment that can be found in the conclusions sections of the final reports of each project:

> […] It is worth mentioning the figure of our leader who, as a fundamental pillar of our team, has been present at all times, exercising good participation and communication, guiding and motivating us in performing our Interdisciplinary Project, given that this was something new and at first we struggled to organize ourselves as a group and focus our work towards the desired objectives. (Smurf Community Team, first year of Early Childhood Education)

> […] has not only exercised the function and role of leader, but has also been very supportive, showing us the importance and value of perseverance and effort, as well as giving us ideas and sharing her own experiences. Since Laura, the leader, had already gone through this process, she knew how to adjust her needs and concerns to ours. (Team 4. first year of Early Childhood Education)

In this sense, the coordinator of first year students has noted that each group established its own work dynamics, including meetings outside class time that encourage the exchange of ideas. Similarly, an improvement is observed in the academic results achieved with respect to those corresponding to the same period prior to the leadership experience.

The coordinators positively value the communication with the leaders as the latter have regular contact with the group and this helps the coordinators to know the reality of each group and its members in greater depth. This also contributes to the improvement of the instruments for assessment of each individual's participation in the project.

Considering the different evaluations, the first year tutors have identified some elements which are essential for optimising the function of the process and which contribute to the success of the experience: coordination with the coaches of the leaders, the availability of spaces and time for meetings between leaders and coordinators as well as between them and the coach.

7.3.3.4 Assessment of the Experience by the Specialist Trainer

Training seminars on leadership competency provide participants with the tools to regain power over capabilities lost as a result of external influences. To that end, it is proposed that the student leaders study their own leadership capacity, a concept that in the past was reserved for managerial positions in companies and institutions but which has been spreading throughout society.

The training programme is not just related to the functions of strategic business management, but also to influence others in a beneficial way. The days of the opacity of group and organizational strategies have been replaced by fluid systems and visible information. Leadership is thus exercised over life in all its dimensions.

The programme covers three areas based on the three basic forms of communication between people: self-communication (personal development), communication with other individuals (interpersonal communication) and communication with the world (systemic thinking).

As reflected in the assessments discussed above, the students evaluate very positively the development of these sessions and comment on the perceived improvement in their ability to know what they want to target, how to achieve it and, finally, how to find the opportunity to do it. This helps them develop a leadership role committed to the different modes of communication with people.

7.4 Conclusions

Learning leadership is most effective when based on experimentation and when undertaken with the active participation of the student. In this way the concepts associated with the activity along with the skills to be developed and strengthened acquire new dimensions since the effort involved is expended in the formation of an 'intrinsic belief', which is the way people generate experiences, rather than the comprehension of abstract ideas.

This leadership experience offers individuals the opportunity to assimilate ideas originating from it, and the nature of the development of the experience ensures that students learn via all five senses, living sensations, emotions and situations. They become conscious of aspects that require attention and improvement, and assume the need to act accordingly.

The design of the leadership experience is based on the theory of The Learning Pyramid which concludes that we learn: 5 % of what we hear; 10 % of what we read; 20 % of what we see and hear; 50 % when we take part in guided discussion groups; 75 % when we do things; and 90 % when we teach and help others, which is when we immediately apply what we learned.

As a final reflection, this experience supporting and training students to be leaders has been highly rewarding, both for the students and the professional team alike. Specific aspects worth highlighting are: the high level of emotional maturity, mental clarity and the creative inspiration stimulated, and the high degree of responsibility

demonstrated by the participants. Furthermore, the experience has helped students to know themselves better as they become more aware of their inner self, as they discover their talents and deploy them to achieve their goals, as well as to know how to communicate effectively within themselves and the world around them, all of which derives from Systems Thinking. It has enabled them to experience different forms of leadership and has helped them to contemplate environmental objectives that benefit the development and evolution of the group to which they belong. For the faculty members who formed the integrated multidisciplinary team, it has provided a very rewarding experience of cooperative work that has stimulated the best in everyone. They shared a collective learning framework of a joint project based on critical pedagogy and action research to contribute to the challenge of innovation and continuous improvement.

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Chapter 8
Simulation Games and the Development of Competences. Empirical Evidence in Marketing

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Abstract The use of simulation games in education is a growing tendency in Spanish universities. This has been spurred on by their need to renovate their teaching methodologies to adopt them to the European Higher Education Area (EHEA). These simulators are used in teaching to develop the students' capacities and skills related to, for example, encouraging the entrepreneurial spirit, teamwork and competitiveness among peers. On the other hand, as they allow the students to adopt a business role and apply their acquired knowledge, they contribute to narrowing the gap between theory and practice. Nonetheless, the usefulness of this valuation depends on the users' involvement and active participation. This is conditioned by their global assessment of the simulators. This is why, knowledge of the factors which affect this assessment is considered to be a key addition to the success of the simulator-based didactic methods. This study means to contribute by presenting the results of an experience in teaching innovation founded on the use of the Quantum marketing simulator, which was developed by investigators in the Carlos III University, Madrid. From a questionnaire given to 138 students, the global valuation of the Quantum experience is analyzed, as well as its relationship with motivational aspects and the acquiring of capacities and competences. The results suggest a positive global valuation conditioned by prior motivation and the student's perception of the simulator's impact on the acquiring of capacities and skills.

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8.1 Introduction

In recent years, Spanish universities have undertaken a process of reform oriented at improving the quality of their teaching and learning through a greater involvement and commitment of the students. The educational model has evolved and the emphasis has passed from the professor being an active protagonist of the teaching to the student being a key element of the learning (Fernández, 2006).

In the dynamic and turbulent environment in which the future graduates will have to compete, the skill of learning and the capacity of reacting to changes are considered to be essential. This is why we need teaching methodologies which promote the acquiring of autonomous knowledge and the development of a series of skills (capacities and abilities). Learning models which encourage the development of people must be designed. At the same time, their capacities have to be strengthened to tackle problems constructively, critically, thoughtfully, and via autonomy and self-management (Brito, Ferreiro, & Garambullo, 2010).

In this framework, participatory teaching-learning methods have become of great importance. This is because they allow the students to apply the theoretical knowledge acquired in the cognitive phase and develop a set of skills and abilities (Coll & Sánchez, 2008; Inkpen & Crosan, 1995). These methods have been favored by the development of Information and Communication Technologies (ICTs). These have influenced the use of didactic instruments which afford the students the chance to interact and put their knowledge about firm management into practice (Massetti, 1996). We are referring to simulation methods: widely used in the management field as tools which help in decision making (Eom & Lee, 1990). Their application to the teaching environment has meant a notable advance toward putting acquired knowledge into practice (Arias, 1999).

These simulators are used as support tools in the teaching-learning process, inasmuch as they represent a virtual business atmosphere. This provides the students with the chance to take part in the firm management process of one of its specific fields through a set of decisions. These allow the key aspects to be considered in decision making to be shown. They also contemplate the internal factors which affect this decision making and the most important variables of the context which influence its performance. This is done in such a way that the impact which the decisions taken have on the firm performance can be observed (Blanque & Odriozola, 2010). Their usefulness lies in their capacity to develop in the student the capacities and skills related to teamwork, decision making and the critical assessment of results. However, their effectiveness in teaching practice depends on the students' valuation and their degree of involvement and persistence with the tasks of participating in the experience.

This work means to contribute to the knowledge of the students' global assessment of simulation games. To do so, we present the results of the teaching innovation experience based on the Quantum marketing simulation software carried out in the framework of Commercial Management. This is taught in the third course of the Degree in Business Administration and Management of the University of Seville.

8.2 Literature Review

8.2.1 Simulation Games and the Teaching-Learning Process

Simulation is considered to be a controlled representation of real world phenomena (Castro, 2008; Göktepe, Özgüc, & Baray, 1989). On the other hand, simulation games (Hacer, 1960) are simplified mathematical abstractions of a situation related to the world of firms which allow the participants, either individually or in groups, to run a firm or part of it. In doing so, they make decisions regarding the operations which take place in it over a specific period of time. More recently, business simulation has been defined as the creating of a real business atmosphere with the aim of experimenting and learning through new experiences. The participants assume a role in which they have to make decisions that impact on the firm's environment, situation and results (Blanque & Odriozola, 2010).

The "modern age" of simulation and games (García-Carbonell & Watts, 2007) arose in the 1950s in the United States as a result of introducing computers into business schools. The so-called firm games originated in the convergence between war games and student-centered educational theories. At the beginning, they were a modeling of a series of management variables, related via simple programing subroutines, in such a way that the students handled these variables from the analysis of a figurative model. Later, these games were perfected thanks to the advances in computer systems. They gave rise to the current simulator concept, referring to a computer program which allows the putting into practice of acquired theoretical knowledge.

Simulation-based training consists of 'learning by doing'. That is to say, "making decisions in real scenarios" (Guaralnick & Levy, 2009). This type of learning facilitates 'adhesion' or information retention and the development of a greater intuition when making real decisions (Paniagua, 2006). Simulators are more accepted by students than other learning methods because they make it possible to know the results of the decisions made, compete with other groups of participants and interact among the group members to discuss the decisions to be made (Blanque & Odriozola, 2010).

8.2.2 Learning Experiences in the Field of Marketing

Learning is an opportunity for students to have a shared experience. This leads them to discover, know, create and develop abilities and skills. Experiential learning "takes place when the person is involved and participates in a certain activity, critically reflects about what has happened, extracts important conclusions from introspective analysis and incorporates what has been learnt through a change in their way of thinking or behaving" (Rodríguez, 2010, pp. 5). Experiential learning focuses not only knowledge but also, and fundamentally, on skills and attitudes

(Rodríguez, De Pablo, & Malcenido, 2010). It also requires the creating of learning experiences by the teachers. The traditional teaching roles are reversed in these experiences. The student becomes the main protagonist of the learning process and the teacher assumes a role which aims to create the learning scenarios and to facilitate and integrate the student's work (Rodríguez, 2010). However, this new role is difficult to assume when the teacher faces very large groups (Malmi, Korhonen, & Saikkonen, 2002).

The characteristics inherent to teaching marketing make simulators very appropriate tools to create learning experiences in this area. The multiple variables involved and the fact that a firm's decisions are interrelated to the results of the rest of the firms endows it with great complexity. Likewise, this is an area in which making decisions, putting them into practice and valuating their effects on results is practically unviable (Fortmüller, 2009; Göktepe et al., 1989; Lee & Hammer, 2011). On the other hand, the possibility of using simulators with a large group of students (thanks to the development of ICTs) and their work dynamic—based on setting up teams—makes them very appropriate for degrees with large groups. Finally, marketing requires an integration factor. Encouraging the integration of knowledge is one the advantages of this method (Stephen, Parente, & Brown, 2002).

8.2.3 The Quantum Marketing Simulator

Quantum is a tool for the development of skills in marketing management and the strategic management of firms oriented to the market and an international context. The students act as members of marketing management teams. They make decisions which have a strong impact on the results of their firms. In this way, each team must make annual decisions in the framework of all the functional areas of marketing management (strategic and operational). This takes place in such a way that the marketing strategy of each firm is adapted to its particular situation. The competition is developed over six rounds. The dates of these rounds are published at the beginning of the course. After each of the decisions, the game's professor-instructor loads the firms' files and carries out the simulation. A hierarchy of these firms is set up from the scores of the firms in four financial and market indicators. The final qualification obtained by each group is based on its position after the last round's classification. This ranges from 3 to 10 points. The game means to achieve the following aims: to encourage the students' participation via an interactive methodology, to favor teamwork, to promote continuous interaction with the teaching group through the tutorial sessions, to improve the assimilation and integration of the subject's theoretical and practical contents and to increase the students' degree of motivation.

Based on this, we propose as the main aim of this research the analysis of the general valuation of the students taking part in the marketing simulation game (Quantum), as well as getting to know the factors which explain these valuations.

8.3 Empirical Study

8.3.1 Objective and Hypothesis

The theoretical review has clearly shown that educational simulators have a significant impact on learning, as they propose situations which develop knowledge and competences (Brito et al., 2010). Likewise, educational simulation allows the practicing of professional skills with the certainty that the mistakes will not generate consequences beyond those of the game itself (Baglione & Tucci, 2009; Osorio, Ángel, & Franco, 2012). On the other hand, simulators are an educational tool which improves motivation and stimulates learning through the student's active interaction (Blanque & Odriozola, 2010). Taking this into account, we propose the following working hypothesis:

H1
The global valuation with the simulator (Quantum) is determined by the student's motivation, by the capacities which he/she develops and by the competences acquired with its use.

8.3.2 Methodology and Measurement Scale

The empirical study was carried out in January 2012 with a sample of 138 students enrolled in the subject of Commercial Management in the Degree of Business Administration and Management in the University of Seville. All of them received a questionnaire concerning their participation with the Quantum simulator. This had 26 items on a 7-point Likert scale and was adapted from Arquero and Jiménez (1999). In order for the qualification of the activity not to condition the answers, the information was gathered prior to the publication of the final results and once the game was over. The data was processed with the SPSS version 22.0 software using a linear regression model.

8.3.3 Data Analysis

The linear regression model considers the global valuation as a dependent variable, contemplating the motivational aspects, the capacities developed and the improvement of the competences acquired as predictive variables. Stepwise regression was used, as this allows the contribution of each of the regression model's predictive variables to be examined (Hair, Anderson, Tatham, & Black, 1999). The resulting model considers two independent variables: motivation and the improvement of competences acquired.

From the results, 47.9 % of the dependent variable's variation—the global valuation of the game—can be explained via the independent variables included in the model (R2 = 0.479). The F statistic verifies the null hypothesis that a population value of R is zero and, therefore, allows it to be decided whether there is a significant linear relationship between the dependent variable and the independent variables considered as a whole. The value of the critical level Sig. 0.000 indicates that there is a significant linear relationship (F = 56.03).

One of the basic suppositions of the linear regression model is the independence between remainders. The Durbin-Watson statistic provides information about the degree of independence which exists between them. This statistic ranges from 0 to 4 and independence between the remainders is accepted when it is between 1.5 and 2.5. We can assume this independence given that this statistic is 1.958.

The Tolerance indicators and the Variance Inflation Factor (VIF) have been estimated in order to analyze the degree of collinearity between the variables. The threshold from which collinearity problems can be considered to exist is 5 (De Vaus, 2002). The Tolerance levels (0.519) and the VIF values (1,926) are appropriate and collinearity problems were not detected. Likewise, the remainders were studied. No problem was identified.

The standardized regression coefficients allow the valuing of the relative importance of each variable in the regression equation. In this case, from observing the Beta coefficients it is concluded that the relative weight of the predictive variables is similar (Knowledge Beta = 0.378; Motivation Beta = 0.374).

The significance tests confirm that the variables Motivation and Improvement of competences significantly contribute to explaining the game's global valuation. Observing the critical level associated with each test t, it is concluded that the two variables considered have coefficients which are significantly different from zero (sig. = 0.000). In accordance with the students' perceptions, the greater motivation and the improvement in the development of competences positively affect their positive global valuation of the game.

8.3.4 Results

The students positively valued the simulation game (65.2 % consider that the experience was worthwhile) and believe that its generalization to other subjects of this type of activities would significantly improve the quality of university teaching (66.4 %).

On the other hand, the students state that the activity has helped them to develop analysis, synthesis and critical capacities (55.8 %) and theoretical-practical relationship abilities (58.1 %). 65.9 % also point out that the views and alternatives in the debating of differences of opinion with their companions enriched their knowledge.

From the point of view of motivation, they consider that taking part in the game has allowed them to feel more involved in the subject than if they had worked more theoretically (68.6 %), at the same time that it has boosted their interest in marketing (79.8 %).

8.4 Conclusions

The results obtained indicate that the students perceive the use of the Quantum simulator as a stimulus for self-learning. This is because it allows them to integrate knowledge, make decisions working in a team and evaluate their suitability based on the results obtained. It is, then, a useful methodology to develop the student's skills and knowledge in the field of commercial management and marketing (Liébana-Cabanillas & Martínez-Fiestas, 2013; Pasin & Giroux, 2011; Smith, 2011; Tanner, Stewart, Totaro, & Hargrave, 2012).

Likewise, it has been proved that there is a linear relationship between the general valuation of the activity and motivation and knowledge improvement. These are aspects of great relevance in the learning process. Therefore, we can conclude that the Quantum simulator contributes to increasing motivation toward learning, incrementing the process' effectiveness and developing intrinsic motivations in the students, despite the obligatory use of simulation tending to diminish the internal wish to participate (Konetes, 2010).

On the other hand, the great value of simulators in the educational field is in generating practice possibilities in circumstances in which it is very complex, costly or risky to develop skills in real situations. However, they are not so effective when the student is left alone with them and their maximum exploitation occurs when they are used with professors-tutors.

Finally, it should be further noted that we share the opinion of other authors when pointing out that simulators are not sufficient for learning (Arias, 1999; Blanco & García, 2006; Garris, Ahlers, & Driskell, 2002; Snow, Gehlen, & Green, 2002). Simulators also entail the potential risk of being used as "pseudo-learning tools" (Arias, 1999, p. 13) due to their ease of use. Hence, students without theoretical training could think that they are prepared to make decisions in the business area. On the other hand, there still exists a simulation-reality gap. A lower level of the risk of making mistakes is perceived and this can lead to making riskier decisions than those which would be adopted in reality (Arias-Aranda, 2007).

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Chapter 9
Feedback and Self-Regulated Learning: How Feedback Can Contribute to Increase Students' Autonomy as Learners

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Abstract Feedback is a scaffolding process that facilitates continuity of student learning, without which assessment becomes a firewall that separates the effort to learn from the reward of learning. Without feedback, no formative assessment is possible and students' chances of improving their learning are considerably reduced. Research and projects in this field have provided an increasingly accurate picture of feedback, rendering it possible to identify with ever-greater precision the aims, foci, agents, types, means and timing of feedback offered to students. Considerable advances have been made in the last 10 years as regards the theoretical foundations underpinning feedback; a set of principles has been identified to guide its implementation, and new concepts have been introduced, such as sustainable feedback or feedforward, which question the theoretical premises on which feedback is based. Student participation in the feedback process has opened up new areas to explore, such as self-assessment and peer assessment. Furthermore, technology is redefining the way in which feedback is conceived and managed, enabling students, classmates and teachers to employ new channels of communication for real-time or deferred dialogue that are capable of improving or enhancing learning. In short, it is possible at the moment to speak of a revival of interest in the role played by feedback and in the link between feedback and self-regulated learning, in a scenario in which present-day society is moving forward not on the back of certainty but on the basis

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of conflict resolution, and higher education must meet training needs in an increasingly uncertain professional framework.

9.1 Introduction

Formative assessment is currently one of the concepts around which the definition of teaching and learning processes revolves. In fact, formative assessment can be defined as the interface that facilitates communication between the teaching and learning processes. This is particularly so if one considers that there can be teaching without learning; "it makes no more sense to require learning in order to be teaching that it does to require winning in order to be racing or finding in order to be looking" (Fenstermacher, 1986: 37).

The problem arises when we try to define 'formative assessment', since "the term, 'formative assessment', does not yet represent a well-defined set of artefacts or practices" (Bennet, 2011: 19). In fact, a problem of definition has been apparent ever since the concept first appeared use was first made of the term. Thus, Scriven (1967) used the term 'formative evaluation' to refer to assessment aimed at improving educational programmes, whereas Bloom (1969) used the same term to refer to the improvement of student learning. Subsequent studies that have had great academic impact, such as those by Sadler (1989) or Black and Wiliam (1998), established the philosophy that underlies the present concept of 'formative assessment', namely using the information obtained from student performance to systematically help students improve their learning, but they did not manage to delineate a consistent theoretical framework (Taras, 2009).

An explanatory framework of formative assessment should address questions related to the complexity of student learning goals, the learning tasks proposed and their influence on the quality of learning outcomes. In addition, it should be able to explain interactions between the teacher, the student, and the latter's classmates, friends and family members during the assessment process. Lastly, formative assessment should also address identification of student learning needs, the function of the information students are provided on the quality of their performance, and the influence of specific factors (timing, agents, strategies, student background and characteristics, etc.) on the use students make of this information.

This latter aspect, the use students make of the information they are given on their performance, is a good indicator of the formative function of assessment. The research results indicate that the majority of students are unsatisfied with feedback, both as regards quality and quantity (Hounsell, Mccune, Litjens, & Hounsell, 2005: 49). Students perceive certain forms of feedback as having only a limited value as regards giving information on details of their work, and as having very little value in terms of opening debate on the work done or understanding the assessment (MacLellan, 2001: 213). In addition, there is evidence to suggest that feedback messages are extraordinarily complex and difficult to decipher, and that students

need opportunities to actively understand them before they are able to use them to regulate their work (Nicol & McFarlane-Dick, 2006: 201). For some researchers, the explanation for these findings is that the feedback provided by teachers is often directed at somewhat nebulous goals that students are expected to achieve ('do more', 'do it better'), so that students receive little feedback aimed at improving the processes that allow them to complete an assessment task, or which addresses the meta-cognitive attributes of the task (thinking, checking, revising, etc.). Teachers seem to understand feedback merely as commenting on the students themselves rather than on their learning, and thus the potential benefits of feedback are diluted (Hattie & Timperley, 2007: 101). For other researchers, the reason for this lack of effectiveness of feedback is that teachers are under enormous time pressure due to the phenomenon of 'modularity' of content, a larger number of students per class and a greater diversity of students; under such circumstances it is difficult for them to provide comprehensive and useful feedback for students (Gibbs & Simpson, 2004).

These results not only pose the question of which strategies render assessment formative or not, but also force us to examine the purpose pursued with such training. Without dismissing other goals, in this chapter we argue that formative assessment should primarily promote self-regulated learning. In support of this position, we will consider the process of formative assessment as a whole, placing particular emphasis on student self-regulation of learning.

9.2 Formative Assessment Process

The development of a theory of action of formative assessment, consistent with one or more concrete instantiations necessary to define the nature of this type of assessment (Bennet, 2011), is something beyond the scope of this chapter. However, we will refer to two elements that seem to us crucial to understand this nature: the situated and interactive nature of formative assessment and the need for it to promote sustainable learning.

Formative assessment is a situated (Lave & Wenger, 1991) and interactive process, and is thus dependent on the academic and social context in which it occurs and the people who carry it out. In order to plan and implement formative assessment, decisions must be adopted regarding contexts that favour or limit collaboration among teachers, student participation in the assessment or the involvement of elements external to the educational institution (family, friends or other institutions). Some of these decisions entail determining the expected learning outcomes in a subject and individual learning goals, designing or selecting learning tasks, establishing assessment criteria and standards (defining good performance), deciding how and when to complete the assessment tasks, using one or another assessment tool and defining and specifying the information students will receive after completing the task (see Fig. 9.1).

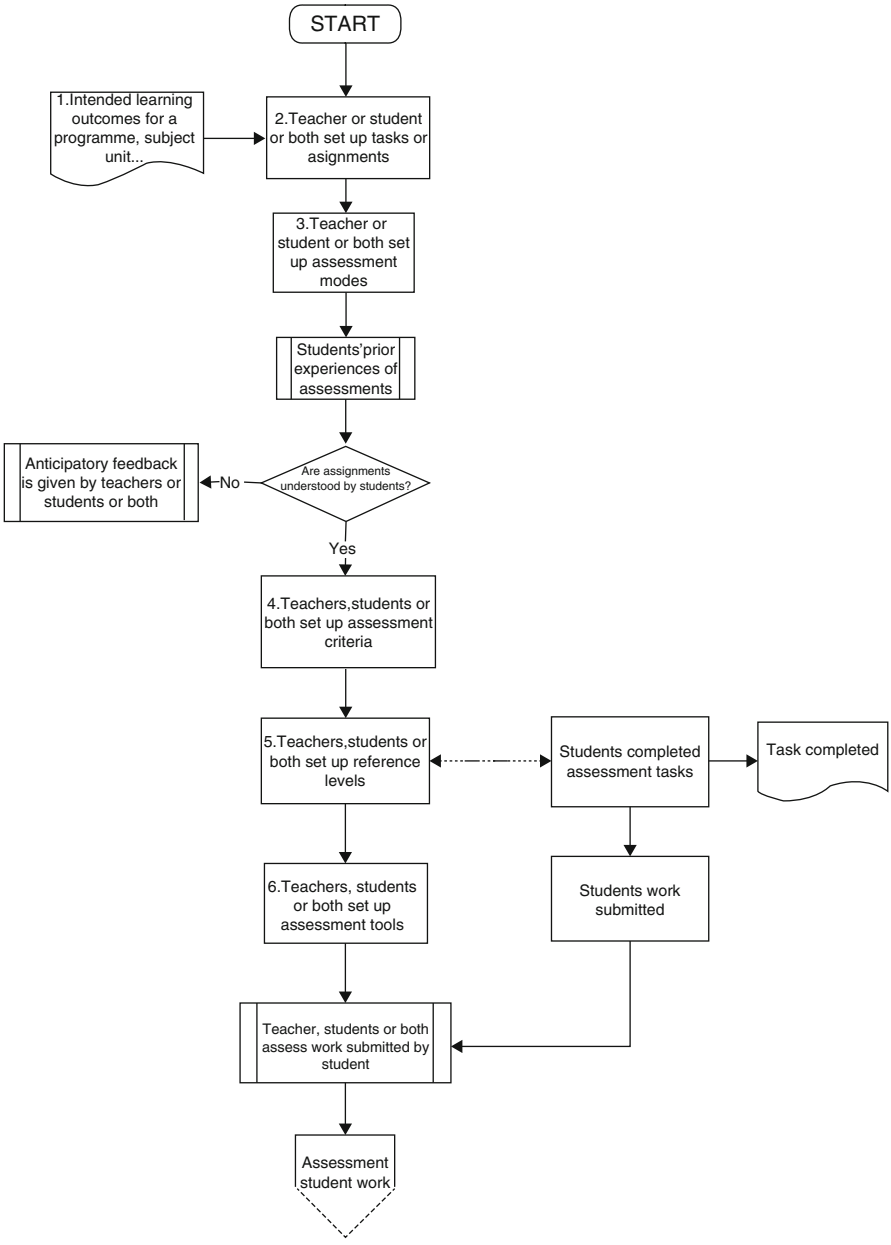

Fig. 9.1 Formative assessment process (part 1)

Formative assessment should also be a sustainable process, at least in two basic dimensions. On the one hand, as proposed by Boud (2000: 151), assessment is sustainable when it "meets the needs of the present without compromising the ability of students to meet their own future learning needs". Nevertheless, Boud

recognised that assessment must also fulfil a summative role if we want students to perform better in the future: "they must also be prepared to undertake assessment of the leaning tasks they face throughout their lives". On the other hand, formative assessment should pursue a balance between quality assessment and economy of effort (Hounsell et al., 2005: 31), taking into account the number of students or groups of students, the learning outcomes to assess, etc. It is important to keep this balance in mind when choosing the assessment task, the criteria and reference levels, the tools employed and the strategy used to promote learning based on student performance.

9.3 From Feedback to Feedforward: A Roadmap for Self-Regulation

In keeping with the sustainable dimension of formative assessment, educational institutions and society in general should implement actions that help students advance towards professional and personal maturity. Such maturity should be understood as the students' ability to self-regulate their own learning at the cognitive, social and emotional levels. Meanwhile, self-regulation can be defined as a process by which students decide what they want to learn and in what depth, and then attempt to monitor, modify and control their learning strategies. In addition to relying on themselves throughout the process of self-regulation, students can also rely on teachers, classmates and their 'communities of practice' (Wenger, 1998), in other words, on other students, family and friends.

As shown in Fig. 9.2, each student is integrated into a community of practice, and by interacting with these communities and the students themselves teachers may play different roles during the different stages through which students' progress on the path to self-regulation of academic and vocational learning.

In "**A**", teachers direct the process for students with a low level of self-regulation, who have yet to achieve full integration into a community of practice (or who are even marginalised within it), and in some research, for students with lower performance (Hattie & Timperley, 2007: 94). This is a typical directive, teacher-led feedback process, in which classmates or other students have little influence on student work. The teacher provides students with information and guidance on what they should revise or modify within the scope of a specific assessment task. As shown in the diagram presented in Fig. 9.3, the function of this type of information is to direct student learning.

Figure 9.3 indicates three possible functions associated with the information that is provided to students on their work: goal-oriented, directive and facilitative. Each of these represents a different approach to how this information is provided: scaffolding, feedback and feedforward.

When students are given information which fulfils a directive function, they learn whatever is necessary for them to successfully undertake a specific assessment task.

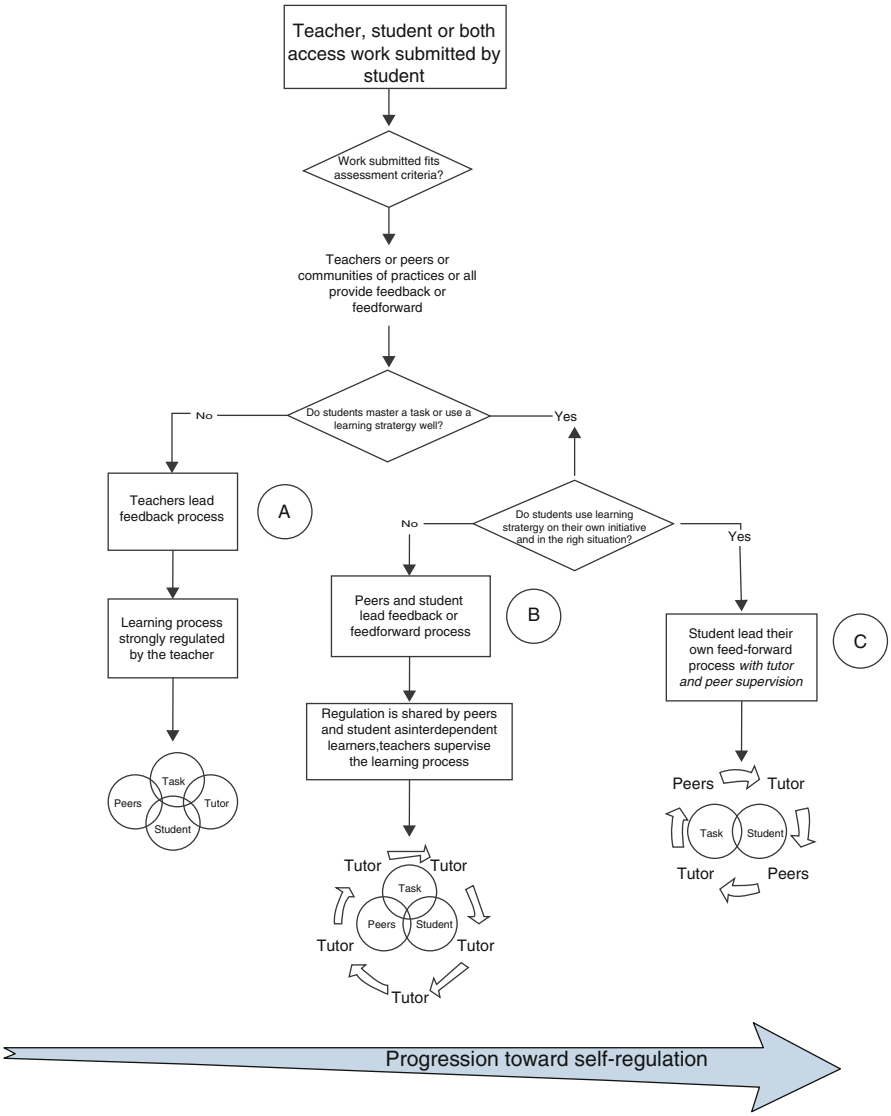

Fig. 9.2 Formative assessment process (part 2)

Thus, this feedback helps students reduce the discrepancy between their earlier attempts and the reference level set for the task, so that once modified, their work meets the specifications. Teachers and other students help "close the gap" between the learning expected and the learning achieved (Fig. 9.4).

However, although the information students receive about their work is crucial for improving it, to great extent students have the last word (Hounsell et al., 2005: 64). Feedback is not always implemented within a schema in which the teacher says what needs to be corrected or improved, and students follow his or her guidelines

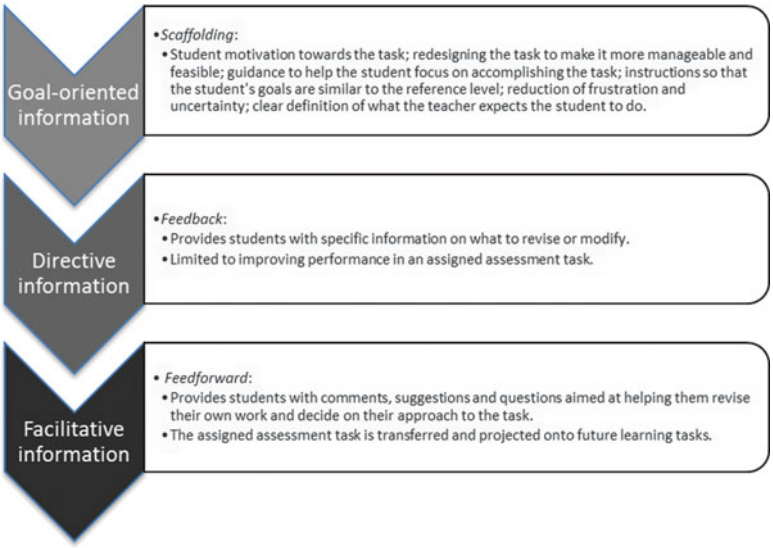

Fig. 9.3 Purpose and types of information provided to students to improve their performance

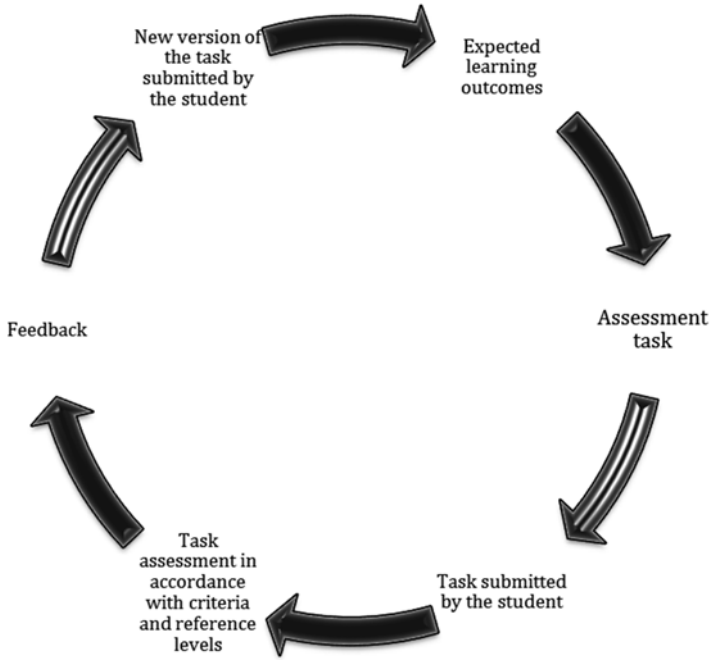

Fig. 9.4 Feedback process

and improve their work. Rather, when given feedback, students may accept, modify or reject the information they have received to help them improve the quality of their work (Kluger & DeNisi, 1996: 260; Kulhavi, 1977). As discussed above (see Sect. 9.1), the fact that students are presented with information on what to modify in their work and how to do this is no guarantee that they will act in accordance with the advice given (Hounsell et al., 2005: 49).

In "**B**" (Fig. 9.2), the student's leading role in the process of improving the assigned assessment task is now shared by teachers, classmates and other members of their community of practice. Now, all are involved in directing the process, which takes place with guidance from the student's classmates but under the supervision of the teacher. This flow of information and advice that the student receives comes not only from the educational institution, but also via the 'peripheral participation' of his or her community of practice. Learning now becomes to some extent an 'interdependent' activity in which students and their classmates 'appropriate' each other's knowledge, strategies, last minute resources, experiences, examples, etc., and use them to improve their performance.

Besides helping them to identify their mistakes, the information that teachers and classmates usually offer complements what the individual student already knows about his or her task (e.g. "watch this video with different types of jump to see why you haven't been successful"), suggesting why performance of the assessment task falls below the reference level ("really, the problem is your jump style, it's very similar to the Soviet style with a very high jump angle, but that requires a lot of strength, which you don't have") or giving hints or tips ("perhaps if you tried a flatter style, the Polish style, you could improve your distance in the triple jump by leveraging your speed").

In "**C**" (Fig. 9.2), where the information given to students fulfils a facilitative role, they learn to revise their own work and decide for themselves how they will tackle the current task and future ones. Feedforward helps students to generalise what they have learned to new tasks and situations that may arise in the future (Fig. 9.5). In this respect, feedforward enables students to "leap out of the loop" and start a progressive "spiral" of self-regulation (Hounsell et al., 2008). Obviously, this means that teachers must relinquish a substantial part of the responsibility for assessment of learning to the students, prepare them to assume this role by equipping them with the necessary knowledge and skills, and trust in their ability. Students could learn to identify for themselves what they need to learn, to set their own learning goals, to monitor what they are learning, to modify their learning strategies when these are not appropriate and to judge the quality of their work bearing in mind a number of contextual factors (Boud & Falkinov, 2006: 402–403). For teachers, this course of action involves adopting a different position as regards the role they have traditionally been allocated in the assessment process: evaluating student work, helping them improve it and assigning a mark.

As shown in Fig. 9.2, students should progress on their journey towards self-regulation by assuming an increasingly active role in the assessment of their learning, while teachers should adopt a role more closely concerned with equipping the

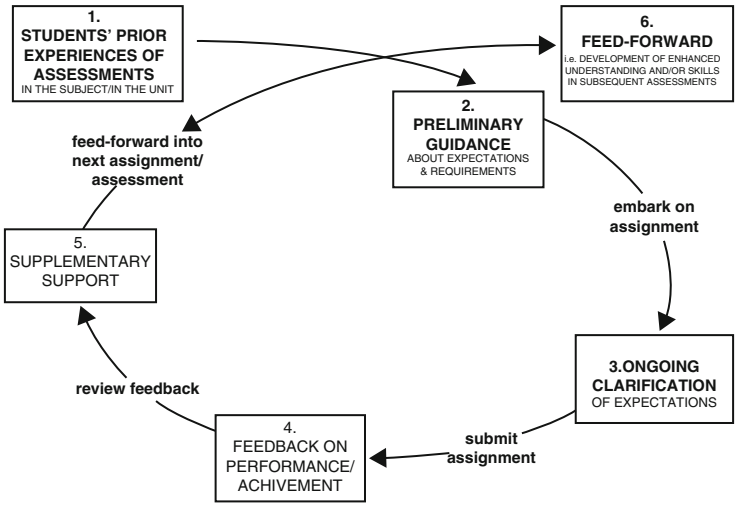

Fig. 9.5 The guidance and feedback loop: Main steps (Hounsell, McCune, Hounsell, & Litjens, 2008: 60)

students to perform this role (especially as regards the skills they need to conduct the assessment well) and advising on how to improve their self-assessment. It is possible that despite the teacher's intentions to promote a self-regulatory process in students, if these are only beginning to learn about a given field of knowledge (describing, combining, enumerating, carrying out a series of actions, etc.) they may need some correction as they take their "first steps". In contrast, when students have gained a better grasp of this field of knowledge (analysing, arguing, relating, justifying, criticising, generalising, theorising, etc.), they may aspire to self-regulate their learning. The results of research on feedforward processes suggest that directive information (feedback) may be more useful to those students who have just started learning a subject or field of knowledge, whereas as they advance in this field and their thinking becomes more complex, facilitative information may be more useful (Shute, 2008: 163).

Students play a key role in the process of self-regulation; however, teachers may hinder or facilitate the process of growth towards self-regulation. In the second option, teachers can perform a set of actions that favour the progressive 'independence of the student under their supervision'. The seven good feedback practices proposed by Nicol and McFarlane-Dick (2006) provide a good frame of reference for how to guide students in the process of self-regulation of their learning.

The research and reviews of greatest impact in this field have concluded that dialogue between teachers and students is a crucial strategy for promoting the student self-regulation process (Black & Wiliam, 1998; Boud & Falkinov, 2006; Carless, Salter, Yang, & Lam, 2011; Hounsell et al., 2005; Kluger & DeNisi, 1996; Nicol & McFarlane-Dick, 2006; Orsmond, Merry, & Callaghan, 2011; Sadler, 2010; Shute, 2008).

9.3.1 Talking to Students About the Role of Assessment in Lifelong Learning

Teachers should embrace student participation in assessment, opening dialogue about their learning that makes them more aware of the quality of their work (Carless et al., 2011). Indeed, all the elements that make up the assessment process can be analysed and discussed with students. Without such dialogue, it is possible that students will not understand what is required of them in the tasks or what type of learning these are aimed at achieving. Similarly, without teacher-student dialogue, there is little possibility of knowing whether anticipatory feedback is required to prevent students from failing the task simply because they have not understood it (Orsmond et al., 2011: 6).

The first thing that students would need to learn in this regard would be how to analyse the structure and purpose of the proposed assessment tasks. This would enable students to begin to identify the lessons that are embedded in the assessment tasks. The second thing that students should learn is to identify how these tasks have been devised, on the understanding that these are complex tasks which to a certain extent reproduce professional practices. Here, teachers should show the greatest degree of transparency possible with respect to students. Similarly, as part of the students' road to greater self-regulation of their learning, teachers could encourage them to participate in the design of assessment tasks. To this end, they would need to promote the systematic pursuit of knowledge, adopting an approach in the subjects and courses they teach that focuses on the generation rather than the reproduction of knowledge, and they should recognise that students are capable of constructing their own knowledge in the light of the actions demanded of them by the world around them (Boud & Falkinov, 2006: 409).

Regarding dialogue on assessment tasks, it should be borne in mind that discrepancies may exist between what is proposed through feedback or feedforward and the student's goals in relation to an assessment task. Having received information about their work, students may increase, maintain or reduce their effort depending on how stimulating, challenging or manageable they find changes they have been advised to make; they may maintain or change their goals in relation to the task, or change the assessment task (e.g. decide not to continue with the task but to attempt other, different tasks) (Kluger & DeNisi, 1996: 260). The way in which students use the information provided by the teacher or their classmates is in great part conditioned by their own goals in the subject and what they will learn from it (Black & Wiliam, 1998: 14). Similarly, their motivation to learn affects not only the way they respond to that information (ignoring it, using it, etc.) but also their commitment to self-regulated learning (Nicol & McFarlane-Dick, 2006: 211). Thus, they will have different reactions depending on whether their goal is to meet the requirements of an assessment task, and therefore pass the course or obtain good marks (performance-oriented), or to further their command of a skill (learning-oriented) (Shute, 2008: 162). In the case of performance-oriented goals, students will be more interested in specific information about their work that helps them

obtain better results (passing the subject or obtaining a better mark), whereas in the case of learning-oriented goals, students may require less specific information about their work (Shute, 2008: 167) and perhaps more help to improve their learning skills. Above all, it should be borne in mind *what information or guidance students expect to receive and what kind of support they expect from us as teachers* relative to the work they are going to do (Hounsell et al., 2005). Research on this point has highlighted the need for teachers to invite students to discuss what kind of information or guidance they would like to receive before or after completing an assessment task (Orsmond, Merry, & Reilin, 2005: 380–382).

Dialogue with students should also focus on the evaluation criteria and reference levels, because talking about these issues with students enhances communication and facilitates understanding of the criteria (Sadler, 2010: 537). Students are often unfamiliar with both the evaluation criteria and the reference levels used to determine the quality of an assessment task. In this respect, it is necessary for teachers and students to work together to clarify the role and importance of the criteria and reference levels used in the assessment (Boud, 2000: 161; Nicol & McFarlane-Dick, 2006: 206–207; Sadler, 2010: 546). As far as possible, teachers should not impose the assessment criteria but should listen to how students perceive these criteria; such dialogue will help avoid misinterpretation of these concepts and their erroneous application in a given subject or course (Orsmond et al., 2011: 16). In essence, by talking with students about what constitutes a good piece of work, and even accepting that it may be the students themselves who establish such criteria and reference levels, teachers can enhance the students' understanding of the assessment task itself and the implications (in terms of cognitive effort, time spent, etc.) of assessing it according to one or another criterion and reference level.

The first task that teachers could tackle in this area would be to show students the importance of conducting an assessment based on criteria and reference levels, so that students can thus understand their meaning when they have to assess their own work in the light of what is considered acceptable assessment practice (Boud & Falkinov, 2006: 407). A second task would be to develop students' ability to identify what assessment criteria should be applied in each case and, consequently, their ability to recognise the key elements of quality work (Boud, 2000: 158–161). However, this task will be difficult unless students are presented with opportunities to distinguish—through practical activities—the most important aspects to evaluate in an assessment task, and to identify the knowledge or skills required to tackle them successfully. Furthermore, for students to progress on the path to self-regulation, they need to be helped not only to clearly identify criteria and reference levels but also to devise and implement them in order to assess the work of their classmates as well as their own work (Boud & Falkinov, 2006: 408). As Nicol (2013) has remarked, development of the skills necessary for lifelong learning and self-regulation requires paying much more attention to the construction of feedback from students than to the process of receiving it.

Dialogue with students also constitutes dialogue with the communities of practice to which they belong. Goals, tasks, assessment criteria and reference levels are likely to be analysed and discussed outside the strictly academic sphere (e.g. in social

networks), and from this extra-academic field they will then be discussed again in the context of the subject or course in question, but now with contributions from other students, friends, family members, etc. (Wenger, 1998).

9.3.2 *The Role of Technology in the Process of Self-Regulated Learning*

Technology is redefining the way in which feedback is conceived and managed, enabling students, classmates and teachers to employ new channels of communication for real-time or deferred dialogue that are capable of improving or enhancing learning. It is also a powerful tool to underpin the process of providing quality feedback to students, since this is a complex process that requires planning and organisation and entails an increased workload for teachers.

However, it is not always the most complex technology that provides the most appropriate solutions. The key is to have clearly defined criteria of what is considered quality feedback (Carless et al., 2011; Gibbs & Simpson, 2004; Nicol & McFarlane-Dick, 2006; Sadler, 2010), and only subsequently to integrate technologies that provide students with opportunities for self-regulation and learning and support the work of teachers.

Thus, in order for technology to support the process of providing facilitative information that promotes self-regulated learning, it must permit, as a minimum: *personalised* feedback (not individual) as well as automatic feedback, a *variety of media*, including both *written* and *multimedia* formats (podcasts, videos, etc.), extending the channels for receiving the information (attention to diversity), and *interaction* between those who offer and those who receive feedback, whether synchronous or asynchronous, because as noted earlier, feedback should principally consist of dialogue.

9.3.2.1 Learning Management System (LMS) Tools

These days, most universities have incorporated virtual teaching platforms that facilitate the management of student and teacher information and knowledge. An analysis of the tools offered by the most widely used LMS (Moodle, WebCT, etc.) indicates that there are variety of possibilities:

- the use of *e-mail* to personalise guidance based on the assessment results
- *videoconferencing* to provide verbal and visual feedback
- *chats* to give synchronous, interactive feedback
- *forums* to offer feedback asynchronously
- feedback can be included in the interface for *handing in tasks or activities online*
- *questionnaires* or *tests* with automatic correction can be used to provide immediate feedback

These tools endow the feedback process with a wider range of possibilities for dialogue and communication, immediacy and contingency, as well as a variety of means to meet the diverse needs of students and deliver non-classroom based learning (JISC, 2010). However, the fragmentation and individualisation of these tools raise the question of the cost-effort equation where a high number of students is involved, because although technology offers a multitude of possibilities, there is no specific technological tool for automating the characteristics of this type of feedback (personalised, range of different media, and interactive).

Nevertheless, considerable progress has been achieved in the project conducted at the Sheffield Hallam University in collaboration with Blackboard Inc. on the use and development of specific tools for delivering effective feedback for self-regulated learning.

The aim of this initiative has been to explore the potential of technology for providing feedback and improving learning by assessing how the use of specific technological media can motivate students to formulate feedback on their performance and decide how to improve their future learning.

The three tools analysed and developed were (Hepplestone et al., 2010; Hepplestone, Parkin, Holden, Irwin, & Thorpe, 2009):

a) The Blackboard Grade Centre, for posting feedback and marks on the VLE (Virtual Learning Environment), allowing students the possibility of subsequently modifying their tasks in the light of the feedback received.
b) The Assignment Handler, which is a customisable extension to the Blackboard LearnTM platform that was developed by Sheffield Hallam University in partnership with Blackboard Inc. to improve assignments and the means by which feedback is offered. This tool allows teachers to release information about students' task performance, but hide the mark they have given for the same. To view their mark, students must first reflect on their performance, identify the key learning points and develop a plan of action to improve their work. Once students have submitted their plan of action, they can automatically access the mark given to their work, without requiring the teacher's intervention. This process encourages students to consider feedback as more important for improving their learning than simply the mark given for the assignment.
c) The Feedback Wizard, using Visual Basic and Microsoft Office functionality, which allows teachers to generate individual feedback documents for a cohort of students using a specific template that contains the task assessment criteria and feedback comments. The teacher enters the mark for each assessment criterion and the program automatically generates pre-set feedback comments,[1] which can be supplemented by more specific feedback customised to the task and the student. Once the assessment is complete, a file is created containing the mark and the feedback linked to the assessment criteria for each student, which is then uploaded to the Blackboard Grade Centre via the Assignment Handler.

[1] The Feedback Wizard automatically populates the feedback grid from a bank of pre-populated comments.

9.3.2.2 Audio and Video Feedback

It would be unnecessary to dwell at length on the obvious change in priorities regarding access to knowledge among the new generation of young people, who are highly influenced by technology and the multimedia and connection possibilities it offers. This new generation, which is more attuned to digital rather than textual thought (Prensky, 2004), routinely uses devices and applications with great communicative potential, and these are beginning to be explored as alternatives to the traditional text-based feedback aimed at facilitating self-regulated student learning.

Furthermore, the use of audio and video to provide feedback could not only facilitate adaptation to students' needs (Nicol, 2007) but, supported by the technological wealth available, could also help meet the essential requirement of delivering feedback in the manner and at the time most likely to foster consolidation of learning and self-regulation of the student's learning process (Nicol & McFarlane-Dick, 2006).

In recent years, video and audio feedback has primarily been developed in those areas or domains of knowledge where use of the voice or visualisation of movement is of particular importance. Thus, there are many examples of the use of video and audio feedback in areas such as language teaching (Brenes-Castaño, Contero-Urgal, Rodríguez-Gómez, Gómez-Ruiz, & Gallego-Noche, 2011; Maione, 2006; Storch & Wigglesworth, 2010), the development of communication skills (Roter et al., 2004) and specific behaviours or conduct (Goodwyn, Hatton, Vannest, & Ganz, 2013) and to improve motor skills, as in the case of physical education (Russell, 2007; Silverman, 2005).

Despite being a useful and meaningful resource for learners, the ways in which these resources are used vary widely depending on the approach employed, and may include:

a) Video and audio for recording and storing performance, and subsequent analysis and revision. In these cases, a camcorder or audio recorder is used to record students' activities and those of the teacher for subsequent analysis in order to establish meaningful guidelines for improving student learning. This option encompasses both direct feedback via self-analysis of performance by the student who performed the task, and reinforcement or guidance from the teacher and other students through video, audio and even in written or verbal form.
b) Video and audio as a model of correct performance. Audiovisual resources are also frequently used to show learners a model of the correct, ideal or expected response. Similarly, as in the previous case, this application can be supplemented with other kinds of information of the same or a different nature. Besides facilitating the creation and presentation of examples of good practice for students, this approach can also be used to create examples of poor practice in a specific activity or in different contexts. This is usually based on the principles of learning by imitation.

c) Video and audio as the medium or route of feedback. From this perspective, audiovisual resources are used so that the teacher or other students can send information or advice about a task, normally in the context of a Learning Management System or Virtual Learning Environment. Audio and video platforms can also be used in real-time for communication and delivery of feedback between teachers and students.

Thus, video is assuming a prominent role in e-learning, compared with audio. Audiovisual content can not only be used with students asynchronously or in deferred mode, but can also enable direct, real-time interaction between teachers and students, thus enriching this educational process with immediate guidelines and feedback to facilitate learning mediated by technology despite the distances.

One of the highlights of the use of video feedback is probably the variety of elements that can be used with it. Screenshots, text, audio, slideshows, images…almost everything can be delivered in a portable and reusable video format. To the advantages of diversity can be added the importance of using a medium that the recipients of the information find familiar and user-friendly.

However, we cannot ignore the difficulties that teachers will have to overcome when working with these resources. These may include problems with feedback delivery, due to the size and specificity of the files, technical requirements, the need for specific skills and the cost of the necessary software or hardware.

Furthermore, the question arises of how to personalise video and audio feedback. In other words, irrespective of any technical difficulties, it would be possible to automate audio and video feedback using specialised virtual assessment systems or, in general, a Virtual Learning Environment, in practically the same way as is done with text on these platforms, but personalising video and audio feedback for large groups of students may at first seem an inefficient task given the large amount of technical and human resources that would be required.

However, an interesting feedback method has been described in a recent study (Jones, Georghiades, & Gunson, 2012), based on a digital video screen capture (screencast) procedure whereby the computer screen is automatically captured while the teacher corrects a student's work; the video can also include verbal comments, text, notes, attachments, etc. The learner then watches the entire video, complete with corrections, comments and advice as if the tutor was there in person, but with the advantage of being able to view it as often as necessary. Some of their findings are related to the importance of hearing the tutor's voice in the feedback given to the student, and the tutors' corroboration of the wide range of possibilities offered by this type of practice for enhancing student learning.

In relation to the above, it should borne in mind that both video and audio feedback, and feedback in general mediated by technological resources, should include an appropriate measure of dialogue as a necessary element in student self-regulation and engagement with learning (Nicol, 2010; Nicol & McFarlane-Dick, 2006). In this case, the use of video or audio as a means of synchronous communication can be a useful tool to overcome the problems that can arise mainly in virtual or blended learning contexts.

In conclusion, formative assessment is a situated and interactive process aimed at facilitating sustainable learning. In this process, students assume much of the responsibility for their assessment, and their teacher or classmates provide support and advice to facilitate their progress towards self-regulated learning. A substantial part of the formative assessment process involves providing students with information on how to improve their learning. The use that the students make of this information in order to enhance their learning depends largely on the agent (teachers, classmates or the students themselves), timing, mode or content of the information received, but also on the nature of the assessment task, the students' age and other personal characteristics and their level of progress in a subject. Bearing these personal and task-related factors in mind, the information provided to students may be offered in the form of feedback or feedforward. Feedback can help students improve their performance in a given task, and thus their command of the knowledge and skills needed to tackle it successfully. Feedforward promotes self-regulation and can contribute to improving the strategies students use to approach different types of learning throughout life.

The use of technology as a channel for feedback offers many opportunities and a diversity of applications to provide information in a way that enhances student interest, whilst its flexibility means that it can be implemented in any context through the use of such everyday devices as mobile phones, tablets and laptops. However, despite being one of the most active areas of research in recent years in this field, it should be stressed that the use of such means does not absolve teachers from the need to explicitly consider what they aim to achieve with the information they provide to students via assessment, or how to implement this in such a way as to encourage student self-regulation.

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Chapter 10
Measuring Competencies in Higher Education. The Case of Innovation Competence

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Abstract Within the context of permanent change, innovation has become a vital value for the survival and development of the organisations. The development of this increasingly important value will help students to gain access to the labour market and to adapt to their future jobs in accordance with these characteristics. Competency describes what training participants should be able to do at the end of such training. Competency is acquired through the various learning objectives to be achieved. Innovation competency is closely related to Self-assessment and the learning methods, Ability to work in interactive communication situations, Ability to create and maintain connections work, Ability to cooperate in a multidisciplinary and multicultural environment and Ability to communicate and interact in an international environment, etc. In this chapter, we develop a method for measuring the innovation competencies in higher education by introducing different levels of mastery.

10.1 Introduction

Innovation is becoming a requirement for competitive advantage in organisations. Therefore, it is an increasingly demanding and important aspect. Promoting the acquisition of innovation competence is one of the aspects to be solved. The current trend in higher education is improving the creativity and individual thought of students to bring them closer to the world and complex problems that they will find.

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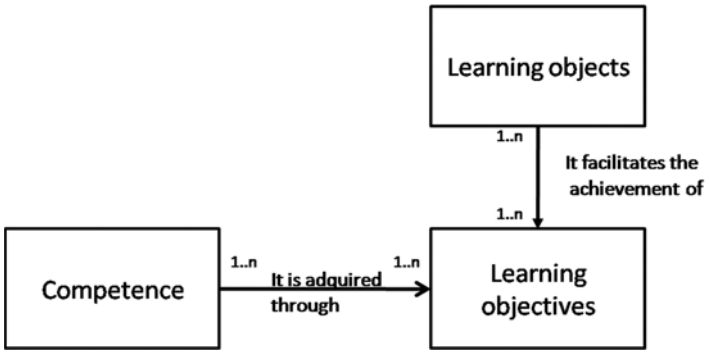

Fig. 10.1 Structural model of competences

The qualifications of the UPV have a structure based on subjects and matters. Matters include the list of subjects. The dimensions of UPV competence aim to synthesise the skills profile acquired by UPV students by also ensuring the framework of regulations and recommendations in bachelor and master degrees. Thirteen competences have been defined: Understanding and integration; Application of practical thinking; Analysis and problem solving; Innovation, creativity and entrepreneurship; Design and project; Teamwork and leadership; Ethics and professional responsibility; Effective communication; Critical thinking; Knowledge of contemporary issues; Lifelong learning; Planning and time management; Instrumental specific.

To acquire competences, certain learning objectives are established, which must be met. The way to transmit knowledge to fulfill these learning objectives is through learning objects. The relation between these elements is illustrated in the previous figure (Fig. 10.1)

According to Incode (2012) we can define competence as the complex know-how resulting from the integration, mobilisation and adaptation of capacities and skills to situations that share common characteristics. Competence describes what training participants should be able to do at the end of such training. In this work, corresponds to undergraduate and master students. The objectives are the way to get to the acquisition of such competence. One competence is acquired through several learning objectives to be achieved.

Thus, we find two distinct aspects, how to encourage or promote the ideal environment for the development and achievement of these learning objectives and secondly how to evaluate the acquisition of those objectives. The first issue should be addressed through learning objects given to students. These learning objects are given in form of lectures, laboratory practices, case studies etc. Learning objects can be used to support the achievement of one or more learning objectives. (The definition of learning objects is beyond the scope of this paper). Moreover, it should be able to assess the level of achievement of the learning objectives to measure the degree of acquisition of competence. In this second part is where the objective of this work is framed. The aim is to define a rubric to assess the learning objectives

associated to bachelor and master degree in the generic competence for innovation, creativity and entrepreneurship.

Innovation, creativity and enterprising deals with the mindsets and skills associated with creativity and innovation as well as the qualities and practices associated with successful entrepreneurship. It is necessary to consider how to apply these mindsets and skills in their organisation/business (Markwell et al., 2003). Few innovations in education have been rigorously compared with traditional practices to measure quantitatively what they contribute to educational outcomes. Although traditional assessments are limited in the types of data they can provide to evaluate educational systems and practices, there are other means to ensure that educational practices achieve the desired ends. (Braun, Kanjee, Bettinger, & Kremer, 2006).

Innovation has been a topic of considerable interest in the education sector for some time. Indeed, successful innovation depends upon the human creativity, knowledge, skills and talents that are nurtured and developed, in large part, through education (Looney, 2009).

Assessment is vital to the process of innovation. We can identify four terms related to assessment (Keeves, 1997; UNESCO, 2000b): measurement, testing, evaluation, and assessment. *Measurement* refers to the process by which a value, usually numerical, is assigned to the attributes or dimensions of some concept or physical object. *Testing* refers to the process of administering a test to measure one or more concepts, usually under standardized situation. *Evaluation* refers to the process of arriving at judgments about abstract entities such as programs, curricula, organisations, and institutions. *Assessment* is defined as "the process of obtaining information that is used to make educational decisions about students, to give feedback to the student about his or her progress, strengths and weaknesses, to judge instructional effectiveness and curricular adequacy and to inform policy" (NCME, 1990). Assessment in the context of individual learning is sometimes referred to as "formative assessment," in contrast to "summative assessment," which is intended to guide decision-making (see Black & Wiliam, 1998).

In this sense, standardization is a prerequisite for fairness when scores must be comparable (Braun et al., 2006). The rubric concept significantly facilitates the performance rating of the students in tasks that are vague and complex, and unwieldy subjectivity to the assessment. A rubric (or valuation matrix) can be defined as a scoring tool that lists the specific criteria for assessing a complex task (e.g. purpose, organisation, details, voice, …); also it articulates a gradient of quality for each of the criteria, from "weak" to "excellent" (Goodrich, 1997). Usually designed so that the student can be assessed as "sufficiently objective" and consistent. It can remove the uncertainty associated to the evaluation, ensuring to the student a very accurate prediction of the evaluation that will make the teacher (Lopez, 2002). The criteria are defined which gives the position of the task and provides guidance for improvement.

The rest of this paper will be organized as follows: Sect. 10.2 will describe the methodology adopted and the review of the literature relevant to learning objectives in innovation will be carried out; section three will depict the method for measuring the innovation competencies in higher education by introducing different levels of mastery; and finally section four will outline the main conclusion obtained and future work lines.

10.2 Learning Objectives Resulting from the Literature Review

The research methodology was based on a literature review to identify learning objectives related to innovation competence for bachelor and master degree. The literature review is a systematic, explicit and reproducible process for the identification, evaluation and interpretation of existing documents registered. The steps involved in the process included gathering materials, analysing, selecting and evaluating them.

The collection of material was carried out through the search performed on Google Scholar (scholar.google.es) and Scopus. This search was enriched with the preliminary list of learning objectives from the Institute of Education Sciences (ICE, 2014) and the results of the Tempus project (Tempus, 2014).

The search expression was: (ABS(innovation) AND TITLE-ABS-KEY (competence) AND TITLE-ABS-KEY(assess*) AND TITLE-ABS-KEY(evaluate*)) AND DOCTYPE(ar) AND PUBYEAR>1999; in total 34 results passed the filtering process, alter that some of them were rejected due to not being related to our research.

The literature review has allowed to us the identification of learning objectives for bachelor degree and master degree. Firstly, the relevant learning objectives were extracted from the literature review (mainly from Adams, 2005; Kairisto-Mertanen, Penttilä, & Nuotio, 2011; Looney (2009), Marin-Garcia, Pérez-Peñalver, & Watts, 2013; Markwell et al., 2003; Watts, Marin-Garcia, García Carbonell, & Aznar-Mas, 2012), the primary list were compared to the list generated by Institute of Education Science (ICE, 2014) and the result of the Tempus project (Idea Tempus, 2014) with the aim of identifying similarities or complementarities. Once the final list was obtained, the learning objectives were classified according to Bapat et al. (2014) to obtain an structured list according to the characteristics of innovation.

Bapat et al., 2014, states that leaders must be able to think creatively while taking initiative and calculated risks. Effective leaders have a vision beyond the immediate work of the group. This involves exploring and integrating diverse perspectives and recognizing unexpected opportunities. The perspectives that should be considered in the innovation competence are creativity, enterprising, integrating perspectives, forecast and change management.

Creativity includes, generating ideas, critical thinking, synthesis and reorganization; and creative problem solving. Enterprising corresponds to problem identification, seeking improvement, gathering information, independent thinking and technological savvy. Integrating perspectives includes openness to ideas, research orientation, collaborating, engaging in non-work interests. Forecasting comprises perceiving systems, visioning and managing the future. Managing change consists of sensitivity to situations, intelligent risk taking and reinforcing change.

Based on these aspects the learning objectives identified are the following (Tables 10.1 and 10.2):

Table 10.1 Classification of learning objectives associated to innovation competence in bachelor degree

Perspective	Learning objectives
Change management	Analysing the risks and benefits of innovation.
	Taking risks intelligently
	Recognising limitations and weak points in processes and working methods.
Creativity	Acting creatively while following working methods
	Acting creatively when solving problems
	Contributing with original ideas on content
	Contributing with original ideas on their materialisation
	Offering suggestions to the ideas, situations, cases or problems that arise
	Tackling the task from different points of view
	Questioning the reality in which innovation is put forward
	Finding new methods and processes to do things
	Critically evaluating the bases of ideas and actions
	Experimenting with new procedures
	Becoming familiar with idea-generating instruments and techniques
	Coming up with original, quality ideas that can be formally presented and defending them in known and unknown situations
	Generating and transmitting new ideas or producing innovative alternatives to the known situations or problems set out
	Introducing new procedures and actions in the work process itself to better respond to any limitations and problems encountered
	Formally present the ideas generated
	Propose innovative ideas and solutions on the content and process and carry them out
	Propose suitable suggestion and alternatives for task requirements
	Reflect on the new ways of doing things
	Responding in detail and with integrity
	Responding with flexibility (variability of ideas in responses)
	Responding fluently. Number of answered responses (fluency)
	Responding with originality (rareness of the response)
	Transmitting their ideas coherently and efficiently
	Using creativity techniques to propose and defend quality ideas that are original or not conventional
Enterprising	Analysing the given situation and identifying improvement aspects
	Contributing their own quality suggestions for the given situations and problems
	Seeking new procedures and methods to do things.
	Seeking and proposing new methods and solutions in real or hypothetical situations with problems
	Identifying the innovation results
Integration	Expressing newly generated ideas to someone else
	Integrating knowledge of several disciplines, or from various sources or domains, to produce novel ideas for known or unknown situations
	Considering who and how innovation affects

Table 10.2 Classification of learning objectives associated to innovation competence in master degree

Perspective	Learning objectives
Change management	Facing reality by weighing up risks and opportunities, and by assuming consequences.
	Being willing and able to take calculated risks whenever necessary
	Evaluating situational forces that promote or inhibit ideas to bring about change
	Being willing to go against tradition if it prevents improved performance
	Reinforcing change. Encouraging subordinates to obtain innovative solutions
	Analysing risks and benefits
	Embarking on ambitious (complex and challenging) projects that imply a social decision.
Creativity	Adopting open attitudes to produce new lines of thought
	Adopting creative approaches in relation to the content of the situation itself and the way to do so
	Critically evaluating the data and reaching conclusions
	Identifying improvement requirements in complex situations and contexts
	Introducing unique or leading solutions which improve some aspects or spheres of action
	Obtaining results with innovation
	Responding in detail and with integrity
	Responding with flexibility (variability of ideas in responses)
	Responding fluently. Number of answered responses (fluency)
	Responding with originality (rareness of the answer)
	Using specific methods to improve creativity
	Using suitable methods and solutions for innovation
	Designing and performing appropriate experiments, interpreting data and drawing conclusions
	Designing and applying innovative process in the organisation, which lead to better results for real situations and/or projects
	Finding new methods to do things differently
Enterprising	Identifying, locating and obtaining the required data
	Investigating the application of new and emerging technologies in their field of engineering
	Thinking up and making decisions independently
	Making searches in the technical literature using databases and other information sources
	Creating projects of own initiative by compromising certain resources to exploit an opportunity
	Reflecting on causes and purposes of innovations
	Taking the initiative and working responsible in accordance with community objectives
	Facing reality initiatively
	Designing and conducting analytical model-based and experimental research

(continued)

Table 10.2 (continued)

Perspective	Learning objectives
Forecasting.	Constructing scientific knowledge about engineering problems (projects) in order to efficiently solve problems in a given context
Integration	Taking a critical and autonomous point of view on knowledge about his/her own discipline
	Contributing with original, practical and applicable, flexible and complex ideas and solutions that affect him/herself and the processes he/she is involved in, and closely related people and processes
	Establishing constructive relations based on dialogue
	Encouraging subordinates to obtain innovative solutions
	Taking initiatives by counting on others by allowing them to participate in his/her vision of the future and his/her projects

Once the learning objectives associated to innovation competence have been identified and classified, we are able to develop an assessment method for measuring the achievement of these objectives and therefore the acquisition of the competence.

10.3 Assessment Method Proposal

The objective of this proposal is the measurement of the innovation competencies in higher education by introducing different levels of mastery. As noted in the introduction section, following a standard process improves the fairness when evaluating.

In this sense, rubrics can be considered a good assessment tool. A related concept to both structure and functionality is the maturity model. The maturity model provides a rubric for determining process maturity levels as well as a roadmap for achieving the optimal level of high-quality operations. Maturity is defined as a measure to evaluate the capabilities of an organisation in regards to a certain discipline. As a rubric, the Maturity Model identifies critical factors with progressions across the levels of maturity.

In order to develop the rubric as an assessment tool and its similarity to established maturity models, we follow the methodology defined by Cuenca, Boza, Alemany, and Trienekens (2013). This methodology incorporates the following steps (Fig. 10.2):

Phase 1: Scope: The most significant decision in this phase involves focusing the model. This refers to which domain the maturity model would be targeted and applied. In this proposal the focus of the model is the competence of innovation, creativity and enterprising.

Phase 2: Design: The design of the model incorporates the needs of the intended audience and how these needs will be met. In this particular case, it is necessary because of the impact the properly innovation assessment has on the students, the model design gives an appropriate definition of the learning objectives at different levels of education, in this sense the model can be applied to bachelor degree and

Fig. 10.2 Methodology to define maturity models (Cuenca et al., 2013)

Table 10.3 Maturity levels

Maturity level definition in innovation competency	
Level 1:	Learning objectives associated with the management areas of change, creativity and entrepreneurship are considered of difficult or limited achievement. Integration of perspectives and forecasting shows little evidence.
Level 2:	Learning objectives associated with the management areas of change, creativity and entrepreneurship are generally limited, but predictable. Integration of perspectives, while forecasting is incomplete and contains few details.
Level 3	Learning objectives are generally adequate and complete.
Level 4:	Learning objectives associated with innovation, creativity and entrepreneurship are consistent, widely proven and complete.

master degree, it involves the participation of the students. The proposed assessment model will follow the common design principle to represent maturity as a number of cumulative stages where higher stages build on the requirements of lower stages. The number of levels for the developed models varies between three and five. In this proposal, four levels are considered sufficient to reach the evaluation objective with 4 (achieved) representing high maturity and 1 (initial) low maturity. More levels could make the evaluation complicated and fewer levels could mean that some aspects are not considered.

According to De Bruin, Rosemann, Freeze, and Kulkarni (2005) it is important that the final stages are distinct and well-defined, and a logical progression through stages. Stage or levels definitions should be developed to expand stage names and provide a summary of the major requirements and measures of the stage, especially those aspects that are new to the stage and not included as elements of lower stages. Table 10.3 describes the different levels.

Phase 3: Populate In this phase it is necessary to identify in detail what needs to be measured in the maturity assessment and how this can be measured. The goal is to collect all relevant criteria that are necessary for the assessment of the specific domain. In this proposal Tables 10.1 and 10.2 gather the learning objectives associated to the innovation competency, hence correspond to the relevant criteria to be assessed.

The proposed assessment model includes the best practices to be carried out on innovation competency that must be implemented to achieve the maximum level of maturity in the learning objectives, grouped by perspectives or key areas for bachelor degree and master degree.

Table 10.4 shows an extract of the rubric created, where it could be seen the different levels applied to the learning objectives associated to the enterprising competence in bachelor degree.

Table 10.4 Assessment rubric for the innovation competence in bachelor degree corresponding to the enterprising perspective (extract of the whole rubric)

BD-E: Bachelor degree-Enterprising	Level 1	Level 2	Level 3	Level 4
BD-E1: Analysing the given situation and identifying improvement aspects.	A limited analysis of the situation was done, but no improvement aspects were identified.	The situation was analysed, and the identification of improvement aspects was limited	The situation was analysed, and the identification of improvement aspects was complete	The analysis of the situation and the identification of improvement aspects were complete and increased with time
BD-E2: Contributing their own quality suggestions for the given situations and problems	No suggestions of one's own are offered	Some suggestions of one's own are offered; some are quality suggestions for some problems that may arise	Some suggestions of one's own are offered, some of sufficient quality for some problems that may arise	Quality suggestions of one's own some of sufficient quality are offered for the problems that may arise
BD-E3: Seeking new procedures and methods to do things.	No new procedures and methods to do things with were searched	The search for new procedures and methods is limited, not completely thorough and lacks details	The search for new procedures and methods is of sufficient quality	The search for new procedures and methods is consistently made and increasing.
BD-E4: Seeking and proposing new methods and solutions in real or hypothetical situations with problems	No methods for some real or hypothetical difficult situations were sought and proposed.	The search for methods and solutions is done for some real/hypothetical difficult situations, but is limited, not thorough and lacks details	The search for methods and solutions is done for real/hypothetical difficult situations, and is of sufficient quality	The search for methods and solutions is done for real/hypothetical difficult situations, which are consistently applied.
BD-E5: Identifying the innovation results	No innovations results were identified	Some innovations results were identified, but they are limited and lack details	The identified innovation results are complete and of good quality	The identified innovation results are complete, of good quality and increase with time

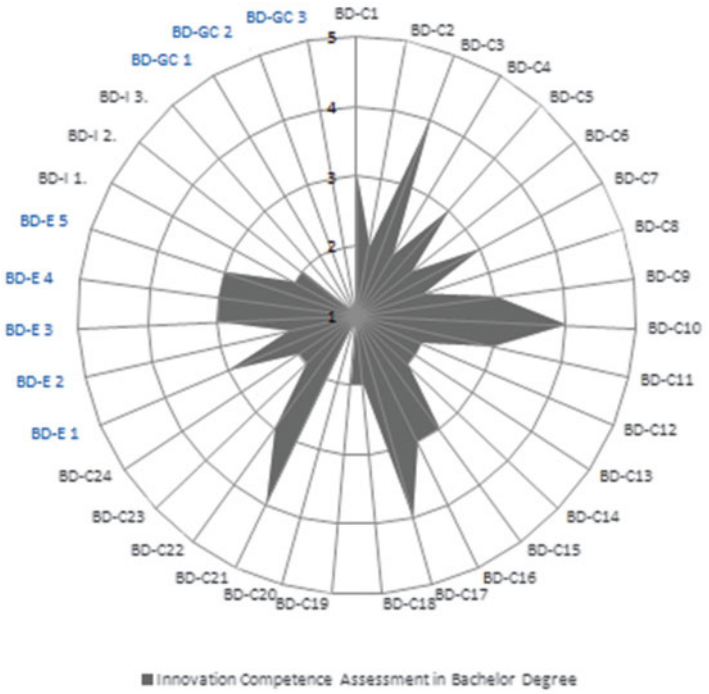

Fig. 10.3 Assessment results for the innovation competence in bachelor degree

Phase 4: Deploy: This phase includes a preliminary validation. This is the first step in determining the issue of model generalisation and can lead to general acceptance of the model. In this case an evaluation was developed in a pilot group in the School of Computer Science, fifth year of computer science bachelor degree with the following results (Fig. 10.3).

From the results obtained, relations can be established within the learning objectives of each area evaluated to identify strong and weak points; for instance, students are capable of producing many responses; BD-C 21 Number of responses given (fluency) (given a value of 4), but almost always in the same way BD-C 20. Respond flexibly (variability of ideas in responses) (given a value of 1) and with few details BD-C 19. Respond with details and integrity (given a value of 2).

Phase 5: Implementation: The goal of this phase is related to the resources necessary to maintain the model's growth and use.

10.4 Conclusion and Future Work

This chapter puts forward an evaluation method based on rubrics for the innovation competence in bachelor and master degrees. The literature review allowed us to obtain the learning objectives associated with this competence and to classify them

into different perspectives: creativity, entrepreneurship integration, forecasting and managing change.

The learning objectives identified for the bachelor and master degrees are practically the same: 35 and 37 for the bachelor and master degrees, respectively. However, the assigned classification varied more substantially. The former (bachelor degrees) are divided into 24 learning objectives associated with creativity, 5 with entrepreneurship, 3 with innovation, 0 with forecasting and 3 with managing change. In master degrees, the number of learning objectives associated with creativity lowers to 15, as it is understood that they were acquired in bachelor degrees. However, they increase in the other areas: 9 for entrepreneurship, 5 for integration, 1 for forecasting and 7 for managing change. This indicates that guidance in master degrees must be based on a broader, more long-term vision, which includes aspects about forecasting, integration and managing change.

The proposal facilitates the evaluation and identification of the relations between their learning objectives or different perspectives. When analysed separately as areas or perspectives, it provides flexibility and functionality when the results are analysed and when applying proposals for improvement.

Now it is necessary to work to correctly define the learning objects that favour and provide opportunities to students to help them meet and improve at higher maturity levels.

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Chapter 11
Three-Dimensionality in Competencies: The Inclusion of Ethics in the Generic Competency of Teamwork and Leadership

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Abstract The context of the European Higher Education Area requires the alignment of teaching degrees and research projects on offer at university level with social and labor market needs. The purpose of this chapter is to provide a sufficient base upon which scoring rubrics on teamwork and leadership can be established and/or expanded. Such rubrics will guide and assess not only what to do but also how must it be done. This approach will be built on both the classical Greek foundation of what constitutes action—*praxis* and *poiesis*—and on two areas of knowledge—management and ethics.

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11.1 Introduction

The European Higher Education Area (EHEA hereinafter) calls upon universities to comply with and adapt to the current needs of society. It is a task that requires the alignment of teaching degrees and research projects on offer at university level with social and labor market needs. Responding to these demands implies combining competency-based education with the changes in course subjects.

The EHEA asks universities to train students to be able to face "real life". Beyond the role traditionally attributed to university as content-transmitter, it should also educate its students in facing day-to-day reality and moreover the ethical problems that may arise due to their activity: lack of time, and the inability to do what is considered to be morally right, amongst others (Sporrong, Arnetz, Hansson, Westerholm, & Höglund, 2007). This is the framework of competencies, also known as student outcomes, which must be established in order to generate an understanding of the world of work and its social context. The purpose of this chapter is to provide a sufficient base upon which scoring rubrics on teamwork and leadership can be established and/or expanded. Such rubrics will guide and assess not only what to do but also how must it be done.

This approach will be built on both the classical Greek foundation of what constitutes action and on two areas of knowledge. As regards action, there are two dimensions: *poiesis*, related to the professional point of view of results, and *praxis*, which studies the consequences that actions have on the subject. The two areas of knowledge, on the other hand, are Management and Ethics.

Poiesis, centered in a technical and economic perspective, may make use of Management tools in its assessment. Such tools, however, are poorly and insufficiently suited for assessing the dimension of *praxis*, which analyzes the good or bad in actions. For this dimension the reference area should be Ethics.

11.2 Ethics as an Essential Dimension of Competencies

When studying action from a two-dimensional approach it is possible to distinguish action focus between the doing, *poiesis*, and on the becoming, *praxis*. It is from this focus that we will study competencies, understood as a "combination of attributes (regarding knowledge and its applications, skills, abilities and responsibilities) that describes the level or degree to which a person is able to perform them" (González & Wagenaar, 2003). According to Boni and Lozano (2007), these traditional competencies can be deployed at three levels: knowing and understanding, knowing how to act and knowing how to be. From the third element of this distinction we can see the need for Ethics, that is, the discipline which gives meaning to action not only with regard to what is done, *poiesis*, but also to the internal consequence that the action has on the agent *praxis*, that is, how the actor has been influenced. When studying an action in terms of a person's goodness or badness, Ethics provides a very suitable qualitative perspective.

Its suitability lies in the fact that ethical competency is not static but dynamic, since its formation is generated in a given social context. This requires the creation of "scenarios" which are capable of generating a collective ethical competency to ensure the sustainability of a workplace or profession. For this, a clear understanding is required, not only of what has to be done but also of the context in which it is to be done (Sporrong et al., 2007). But, more importantly, Ethics is what gives meaning to an action in so far as it sheds light on the reasons for the action itself in terms of "what", "with whom" and "for whom" things are done. In that sense, the answer is always the same: things are done "by", "with" and "for" people.

This contextual element configures ethical competency as the ability of a person who faces a moral problem, to think and act in a way that is not limited by moral fixations or automatic reactions (Kavathatzopoulos, 2003). Since Ethics is an element of action, knowing Ethics is not enough; it must and should be applied. It is important to understand that one can be an excellent cognitive interpreter while acting with very poor ethical behavior (Rossouw, 2002).

When integrated and regularly exercised, this capability makes it possible to habitually act in a moral fashion, which in turn generates good habits and virtues, which influence the formation of a personality with a moral dimension. In short, possessing ethical competency in the workplace involves understanding oneself as responsible for one's actions so as to be able to achieve the ability to integrate perception, reflection and action (Sporrong et al., 2007).

Following Boni and Lozano (2007), the contributions of this dimension can be grouped into four categories: autonomy, in the sense of self-autonomy; dialogue, considering capacity for dialogue, empathy and social perspective; social behavior, considering social and interpersonal skills and the ability to transform the environment; and, finally, moral judgment, in the sense of critical understanding and moral reasoning. Before proceeding, it is necessary to resolve the question of whether this ethical dimension ought to be incorporated into the generic skills that are taught in universities.

Although it seems that what has been said above may lead to an affirmative answer, this response should be supported by what has previously been said on the reasons for providing moral training in universities. In sum, two arguments can be taken as a reference point: those that come from ethical demands and those which make strategic requirements (Boni & Lozano, 2007). The first group responds to social demands ranging from the pursuit of happiness (Aristotle, 350 BC/1976), through to the understanding of morality as part of education (Kant, 1803/2007) or to the pursuit of a moral human dimension (Ortega y Gasset, 1930). Meanwhile, strategic requirements aim to respond to problems of a global nature dealing with social and professional contexts that help to recognize internal professional goals and demands of labor market—common good, social capital, and trust (Boni & Lozano, 2007). It would appear that the arguments for strategic requirements are those that best align with the provisions of the EHEA.

Given the above, this work will argue for the need to include Ethics in the set of generic competencies in universities. Specifically, these competencies will be linked with a single generic one; the competency of "teamwork and leadership".

11.3 Integration of the Ethical Dimension in Teamwork and Leadership Competency

The competency of "teamwork and leadership" is required for any activity, whether conducted within an organization or not, since leadership, understood in its classical sense as *auctoritas* (socially recognized knowledge (Domingo, 1997)) is indispensable. Perhaps, the need to include Ethics in such jurisdiction is not so evident and herein lays a fundamental question: should Ethics constitute a competency in itself or should it be present as one dimension in every competency?

Before answering this question the assumptions of ethical learning should be reviewed. The first of these stems from the respect for personal freedom and individuality (Martínez, Buxarrais, & Esteban, 2002). The Universal Declaration of Human Rights might be taken as the minimum requirement whereas an anthropological understanding of an individual may be the maximum. Regardless of which is chosen, they are nonetheless references which serve as a sound basis for a critical analysis of reality and from which the process of building or rebuilding those values upon which they are based can begin. Moreover, dialogue can be utilized as an instrument (Buxarrais, 2004), and will take on a clearly dynamic orientation, since its very nature is based on the knowledge construction process itself. All this provides of an understanding for conflict resolution according to the parameters of rationality and communication (Boni & Lozano, 2007).

These assumptions allow us to show the contributions of the incorporation of the ethical dimension (Table 11.1). Amongst those contributions resulting from the inclusion of an ethical dimension in generic skills emerges the importance of respecting personal freedom and individuality. What is certain is that the understanding of an action would be enriched by showing that it is not an isolated event and must be understood as constituted from its own dynamism. In turn, such understanding provides a reference for the maximum and/or minimum scenarios to enable support for any process of rationalization, and dialogical conflict resolution (see Table 11.1).

Table 11.1 Premises and contributions resulting from the inclusion of the ethical dimension in generic skills

Main premise		Respect for personal freedom and individuality
Nature	Dynamic	Its very nature is based on the process of the construction of knowledge itself.
Scenarios	Minimum	Universal Declaration of Human Rights
	Maximum	The search for an anthropological understanding of the individual.
Support elements	Rationality	Whether maximum or minimum, the scenarios serve as rational basis for critical analysis of reality and the beginning of the process of construction or reconstruction of those values upon which they are based.
	Dialogue	Dialogue is the tool for transmission
	Conflict resolution	Understanding of conflict resolution according to parameters of rationality and communication

Source: Bañón, Cortes, Lajara, Cobos, and Pérez de los Cobos (2014)

Table 11.2 Implications of the explicit inclusion of the ethical dimension in "teamwork and leadership" competency

"Teamwork and leadership" competency	
Without the explicit consideration of the ethical dimension	Potential contributions of the ethical dimension
Analytical thinking	Starting from people's essential understanding that freedom and individuality must be respected
Systematic thinking	
Time management	From a dynamic process of building knowledge of a holistic and contextual understanding
Participation in decision making	Based on rationality and articulated through dialogue
Participation in the management of objectives	
Participation in project management	
Resolution of disputes in accordance with rational and communicative parameters	

Source: Bañón et al. (2014)

With these assumptions and contributions we can now propose a relationship with competition "teamwork and leadership." For the purposes of this paper, we take the definition by Villa and Poblete (2007) who consider teamwork and leadership to be that which generates integration and active participation as a consequence of common goals with other people, areas and organizations, and which influence people and/or groups, and anticipates the future, contributing to personal and professional development. From this definition some essential elements can be extracted: analytical and systematic thinking, time management, participation in decision-making and management objectives and projects. As can be seen, understanding this competency does not explicitly include ethical consideration. The issue lies in trying to ascertain what would happen if the ethical dimension were to be explicitly included. To do this, we have drawn up Table 11.2 which aims to answer the question in a systematic way.

In Table 11.2, certain consequences of the explicit inclusion of the ethical dimension of the "teamwork and leadership" competency can be observed. First, it sets limits on analytical and systematic thinking which are based on respect for individuality and personal freedom. Second, it implies a dynamic process of knowledge construction which departs from a holistic and contextual understanding of time management and avoids those guidelines which are based solely on a task-centered orientation. Third, it proposes an understanding of participation, whether in decision-making, management objectives and/or project management, based on rationality and articulated through dialogue. Thus, it facilitates the generation of an environment based on the creation of criteria and aimed to circumvent speculative scenarios or founded on opinions. If such environments manage to achieve, its direct consequence is a minimization of conflicts. Conflict is inherent in the existence of relationships; therefore, the emphasis is not on removing them but to explicitly incorporate the resolution of the ethical dimension to provide the parameters of rationality and communication.

11.4 Development of a Rubric as an Assessment Tool of the Competency

From a practical point of view the assessment of teamwork presents the difficulty of obtaining direct evidences of the involvement of each of its members in the development of teamwork. This feature forces the use of alternatives to the traditional techniques. The same applies to the interactions that occur intra-group. Based on the above, the most suitable methodology to be applied in the assessment of teamwork seems to be self-assessment and peer-assessment using rubrics in both cases.

The rubric is a tool that facilitates both the orientation and assessment (Wamba, Ruiz Aguaded, Climent, & Ferreras, 2007). With its use, the teacher not only specifies in advance the evaluation criteria but also provides information about the levels of achievement for each of them. There is an explicit gradient of quality that provides a safety assessment environment to the student (Martínez, Tellado, & Raposo, 2013).

The use of rubrics in self-assessment and peer-assessment improves the involvement of the students and results in an exercise of responsibility and self-criticism that contributes to personal growth.

In the literature there are numerous articles of rubrics related to personal performance in teamworking, but the one of Chica (2011) stands out because of being based on the contribution, attitude, responsibility, attitude and conflict resolution (see Table 11.3). This is the one chosen to be the initial point of the development of an improved tool. However, the process of building an agreed rubric with the students can be motivating and enhance their participation in the activity.

Based on these considerations, it was decided to actively involve a group of students so that through the response to a questionnaire information to improve the rubric could be gathered. In the next section, this experience is described.

11.4.1 Empirical Study of the Rubric Development

The study group corresponds to students of a postgraduate international MBA, the course in which the experience took place was “Teamwork and leadership”. During the courses students had theoretical sessions complemented by the development of a practical work that had to be performed in teams, outside the class. This work had to be exposed in class. Specifically, three working teams were formed.

Prior to beginning, students were given an incomplete model of rubric in which they had a double task to carry out: on one hand they had to discuss if the different criteria had to be weighted in order to give more or less importance to some aspects of the teamworking and on the other hand they should decide how to include Ethics in the rubric.

After the final presentation of the results obtained by each group, students were asked to fill in a questionnaire about their experience when teamworking and their opinion about the consideration of Ethics in professional environments.

Table 11.3 Rubric for teamworking assessment

	Level of performance			
Categories	1—Poor	2—Scarce	3—Good	4—Excellent
Contribution	Never offers ideas for work nor proposes suggestions for improvement. Sometimes he/she opposes to other's proposals to achieve group goals	Sometimes he or she offers working ideas but never proposes suggestions for improvement. He or she accepts the proposals of others to achieve group goals	He or she offers ideas working ideas but rarely proposes suggestions for improvement. It strives to achieve group goals	He or she always offers ideas for work and proposes suggestions for improvement. He or she strives to achieve group goals
Attitude	He/she rarely listens and shares the ideas of their peers. He/she doesn't contribute to the maintenance of the unity of the group	Sometimes he or she listens to the ideas of their peers and accepts to integrate them. He or she does not care about the union of the group	He or she tends to listen and share ideas from his colleagues but he or she does not offers how to integrate them. He or she works to keep the union in the group	He or she always listens and shares ideas from his colleagues and tries to integrate them. He or she looks for how to maintain unity in the group
Responsibility	He/she never gives his work on time and the group must change dates or times	Often he or she is late in delivering his or her work and the group sometimes has to modify his or her dates or deadlines	Sometimes he or she is late in delivering his or her work, although the group does not have to modify sometimes his or her dates or periods	He or she always delivers work on time and the group does not have to change dates or deadlines
Punctuality	He/she attended a maximum of 60 % of the meetings and always came late	He or she attended from 61–74 % of the meetings and was not always punctual	He or she attended 75–90 % of the meetings and was always punctual	He or she always attended meetings and was punctual

(continued)

Table 11.3 (continued)

	Level of performance			
Organization	He/she never tries to share available resources with other group members. He/she never thinks as a team and focuses only on individual goals. He/she never cooperates and helps other member in a common objective	Sometimes he/shares available resources with other group members. He/she rarely thinks as a team and focuses mainly on individual goals. He/she rarely cooperates and helps other member in a common objective she	He/she thinks as a team member and is not just focused on individual goals. He/she makes an effort in cooperating with other members and sharing results but not as actively as it should be	He/she always shares available resources with other group members. He/she thinks as a team member and is not focused on reaching individual goals. He/she actively cooperates with other members
Conflict resolution	In situations of conflict or disagreement, he or she does not hear other opinions or accepts suggestions of others. He or she proposes alternatives and has trouble accepting consensus or solutions	In situations of conflict or disagreement, he or she rarely hears other opinions or accepts suggestions. He or she does not propose alternatives for consensus but accepts them	In situations of conflict or disagreement, he or she almost always hears other opinions or accepts suggestions. Sometimes he or she proposes alternatives for consensus but accepts them	In situations of conflict or disagreement, he or she always listens to other opinions or accepts suggestions. He or she always offers alternatives for consensus but accepts them

Source: Adaptated from Chica (2011)

11.4.1.1 Sample Characterization

The sample consists of 13 students, 7 of them are men and 6, women. They are mainly between 20 and 30 years old.

It is a heterogeneous group, both in branch of specialization and origin. For the former, a 54 % are related to economics or business while a 15 % work in communications. To the latter, origin, it is very diverse: Indonesia, Russia, India, Germany, Italy, Pakistan, Canada and Spain are the countries of origin. This diversity enriches the study as well as the results of teams.

Figure 11.1 shows a word histogram built from the responses of students to the question of why is it important to develop an ethical behavior in professional environments.

When asked about the three characteristic they value most in a colleague when it comes to teamwork, the answers where responsibility (92 %), honesty (69 %), punctuality (38 %), proactivity (31 %), creativity (31 %), organizational capacity (8 %), leadership (8 %) and autonomy (8 %).

This hierarchy of priorities that was obtained from the individual questionnaire is aligned with the weighting for the different criteria that had been proposed by the groups, as it can be observed in Table 11.4.

Although the features proposed in the questionnaire are not exactly the same as the ones defined in the rubric, both results do show some commonalities.

Thus, it is possible to associate uniquely some aspects such as responsibility, organization or punctuality, while others should be indirectly linked. In the latter, Ethics would be associated with honesty; contribution would be aligned with proactivity and creativity and finally attitude would be the sum of conflict resolution, leadership and autonomy.

Fig. 11.1 Frequency of words of the responses about the importance of the development of an ethical behavior in professional environments

Table 11.4 Mean weights proposed by students to the assessment criteria in the rubric of "Teamwork and leadership"

Criteria	Mean weight (%)
Responsibility	22.0
Organization	15.5
Ethics	12.5
Contribution	20.0
Attitude	11.5
Punctuality	10.5
Conflict resolution	8.0
Total	100.0

Source: Authors

Additionally, 62 % chose the statement "the strength of the team lies in each one of its members. The strength of each member is the team". 23 % selected "I love teamwork. I love the idea that everyone rallying to help me win" and 15 % chose "education without values, useful as it is, seems rather to make man a clever devil".

Finally, students were asked about their opinion about how they thought the bad practices in professional environments could be prevented. This issue shows greater division of opinion; 31 % believe that humanizing education, another 31 % said that audit controls should be improved; a 15 % said that penalties should be hardened and 23 % were in favor of other measures such as Ethics and training combinations of bottom-up and top-down approaches and development of respectful and ethical professional environments.

11.4.1.2 Results Obtained by the Teams

It should be first noted that all teams considered that different weights had to be assigned to the criteria in the rubric. Mean values for the weightings are shown in Table 11.4. Students ranked responsibility and contribution as the two main criteria in teamwork, followed by organization, ethics, attitude, punctuality and conflict resolution.

From the above table it also follows the mode of inclusion of ethics by the students in their assessment of the teamwork. Unanimously all groups considered ethics as another criterion to be evaluated, meaning that it was possible to distinguish different level of achievement and that it could be assessed separately from the rest of criteria. Students were told that they had to decide whether they considered ethics as a dimension of the competency or as an element to be weighted in the evaluation of each of the dimensions. All groups chose to consider ethics as a dimension within the teamwork and leadership competency.

This proposal, as discussed in the next section, contrasts to the initial assumptions on which the work of the rubric was based. In it, Ethics was seen as a component of excellence, as one level of achievement more, affecting each criteria.

11.4.2 Proposal of a 3D Model for the Inclusion of Ethics

Initially, the inclusion of Ethics by the teaching team was designed to complement the dimensions of the competency or to supplement the quantification criteria. In any case, the presence of Ethics intended added to the two dimensional competence approach that related its dimensions and quantified them. From the theoretical point of view it was assumed that it would make sense that Ethics have presence in every one of the dimensions of competence and therefore be included supplementing the quantification standards. However, when we contrast this approach with the proposals of the teams of students we observed that they did not understand it that way and considered Ethics as dimension that should complement performance.

In analyzing this discrepancy and discuss with students, the vast majority agreed with the additional focus although some expressed their belief that a realistic approach could not provide Ethics with the ability to overshadow what has been done. After all, this highlights evidence: in an organizational environment performance is what is mainly measured, in other words, focus is placed in what is done, i.e. the *poiesis* dimension. From this analysis arise the idea of considering that perhaps the two-dimensional approach was insufficient and that may be it could be necessary to introduce an extra dimension moving into a three-dimensional conception of competence. In this regard, in line with the approach of the three e's of Guillén (2006) we consider that the skills assessment was due to start from an understanding of organizational action based on effectiveness (targeting purposes), efficiency (with a focus on the means) and Ethics (with a focus on the active and the passive subjects of the action, i.e., people).

From that point of view, it was considered that the inclusion of a third dimension based on Ethics could be very convenient because it considered the three e's and could show and clearly distinguish the action from the *poiesis* from that arising in practice, see Fig. 11.2.

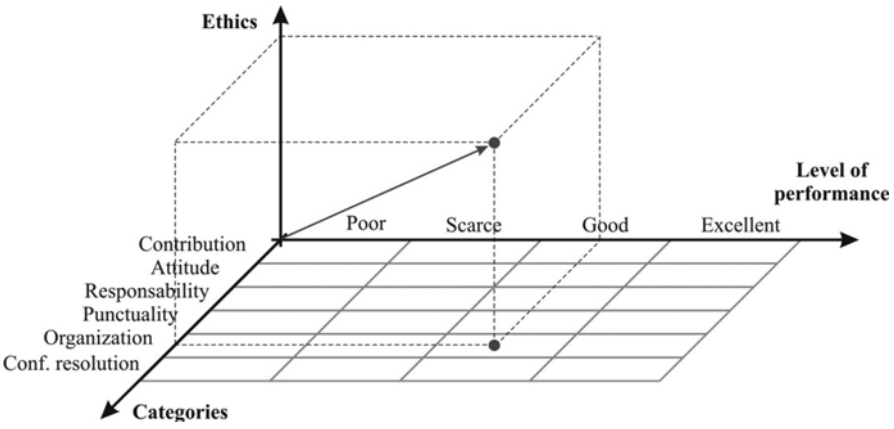

Fig. 11.2 Three-dimensional approach for the teamwork and leadership competency. *Source*: Authors

Figure 11.2 shows the three-dimensional approach to leadership competence and teamwork conceived in its integral sense, i.e. contemplating action in its two-dimensions: *poiesis*, which is usually evaluated, and *praxis*, which shows the good or bad elements of the action as to be able to enrich or impoverish the subject, aspect of which Ethics is responsible for.

11.5 Conclusions

This work attempts to comply with EHEA demands from the point of view of current and foreseeable future social and labor needs. The approach is clearly in favor of complementing the traditional role of the university with the proposition of Ethics as a response to the society demands, being its pending issue.

To achieve this purpose it has tried to show the role of Ethics in general action and particularly in organizational environments. The proposal of the work has been to introduce a third component in the classical two-dimensional approach of action; so it will consider not only what it is done (visible, tangible result) but also how it is achieved (invisible, intangible result). With this approach it has been feasible to locate Ethics in the action and show the benefits of its introduction. Subsequently the work has been to study how Ethics could be considered in the assessment of competencies. This task has been undertaken using a rubric since it is an excellent tool to describe skills and grade them.

The explicit incorporation of the ethical dimension in the "teamwork and leadership" competency through the use of a scoring rubric has been developed in an analytic and systemic way. Thus, people and their free and individual essentiality are considered as premises of beginning and end. Moreover, this dimension provides a holistic and contextualizing perspective, which illuminates issues such as working time management. In turn, its rational and dialogic character complements and sets means for achieving participation in decision-making, management of objectives and/or project management. The same is predicated about conflict resolution which, far from focusing on purpose, so does, thanks to the ethical dimension, on the means to do so.

Finally, being aware of the need to assess the acquisition of competencies, this work has focused on the measurement of the competency of teamwork and leadership. To this end, a proposal of a rubric has been formulated. It includes Ethics in a third dimension in order to consider the action as a whole in organizational environments. The proposal is the third dimension, Ethics, to outline the other two, effectiveness and efficiency. The difficulty lies not only in finding the criteria but also, and mainly, in applying the appropriate weights. This proposal not only opens an interesting field of research in teaching environments but can also inspire current performance assessments in business which tends to leave aside the eternally present but always neglected Ethics.

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Chapter 12
Student Opinion on the Application of Active Methodologies

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Abstract The newly established European Higher Education Area (EHEA) has prompted a reformulation of teaching methodologies, placing greater focus on student-centred learning. Integration of theory and practice together with development of academic skills have become important educational objectives.

The purpose of this research is to determine student perceptions of the application of active teaching methodologies, including collaborative learning and case studies for the development of generic skills. The research was conducted following protocol for designing learning activity as defined by the Institute for Science Education (ICE) at the Polytechnic University of Valencia.

12.1 Introduction

Adaptation to EHEA implies subject design based on competencies and learning objectives, which affect both teaching–learning methodology and evaluation. This has forced academics to rethink their use of new teaching methods, which must undergo a major renovation. They must be adapted to prioritize student work, promote both autonomous and collaborative learning, and encourage the development of a range of skills and competencies, both specific and generic.

Another important change introduced by EHEA is to focus on student training, specifically in skills development. This is to prepare students for integration into the labour market as well as ensuring their specific expertise in their chosen field of study. It also helps students develop certain skills (called generic or transversal skills) that can be transferred to a variety of functions and tasks, and that enable students to integrate themselves successfully into social and work spheres.

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For this, teachers need to change dynamics of traditional education based on rote learning to one whereby students play an active role and take responsibility for their own learning (Whitehead, 2008). This ensures that students are well prepared for changes in social and professional environments.

This paper presents findings of a teaching innovation project where, through cooperative work and case studies, students engaged in a number of strategies to acquire generic skills. The university established a mixed system of assessment following a participatory model that incorporated three types of evaluation: self-evaluation, co-evaluation (peer review) and hetero-evaluation.

12.2 Training and Skills Development

EHEA has set out a series of proposals aimed at improve the quality of university education. One such proposal is to focus on teaching and learning processes based on competencies, under the premise that competency-based learning at universities combines academic training (acquisition of knowledge) and personal development (generic skills). Hernández Pina, Martínez, Da Fonseca, and Rubio (2005:52) suggested that a new Higher Education set-up is needed, where training skills form one of its basic pillars.

According to the Tuning Project (Tuning, 2008), the term *skills* represents a dynamic combination of attributes—related to knowledge, and its application, attitudes and responsibilities—that describe the level of proficiency a person is able to obtain. This concept is closely related to other terms of similar meaning such as capacity, ability or dexterity. In the Tuning project final report, competencies are defined as "know and understand" (theoretical knowledge of an academic field), "know how to act" (practical and operational implementation of knowledge in certain situations) and "know how to be" (values as an integral part of how we perceive others and live in a social context).

Arguably the most important classification of skills is that proposed by the Tuning Project. This classification differentiates between specific competencies and generic skills as follows:

- Specific skills: Attributes that must be learnt by students while at university and must be defined in the curricula of their qualification. These are the competencies that are specifically job related.
- Generic skills: Skills that are common to any degree. They refer to transversal skills, common to most professions or disciplines.

According to the Tuning Project, generic skills can be subdivided into three groups:

1. Instrumental skills: Cognitive skills (ability to understand and manipulate ideas and thoughts), methodological skills (organizational skills, strategies, decision making and problem solving), and technological and linguistic skills.

2. Interpersonal skills: Skills that promote the processes of social interaction and communication.
3. Systematic skills: Individual competencies related to understanding complex systems.

Interpersonal generic skills include elements of cognitive and motivational faculties, and can be divided into three groups:

1. Instrumental skills, which may be methodological or procedural, and include analysis, synthesis, organization, planning and information management.
2. Personal skills such as the ability to work in a team, the ability to handle interpersonal relationships and ethical commitment.
3. Systematic skills, including autonomous learning, adaptation to new situations, creativity and leadership, among others.

12.3 Active Methodologies

The renewal of the EHEA calls for adaptation to a system of competency-based learning, whose goal is not only to achieve a progressive accumulation of general and specific knowledge, but also to acquire skills and/or abilities to accomplish learning outcomes. Likewise, active methodologies should help promote, acquire and/or consolidate transversal skills that are a necessary part of students' overall training.

Active learning methodologies emphasize student participation (Braxton, Milen, & Sullivan, 2000; Huber, 2008). Students should play a responsible and active role, both in learning planning, and interacting with teachers and peers, to boost intrinsic motivation based on interest and curiosity (Cannon & Newble, 2000).

Active learning requires combining methods that promote student participation and independent work. Teachers are no longer the main sources of knowledge and inquiry, but rather assume the role of facilitator and guide, accompanying and guiding students through their learning process (Alvarez, 2005).

Methodological diversification is recommended. In particular, lectures should be combined with some active method (León & Crisol, 2011) adapted to objectives, student characteristics and subject. The main active teaching methods include case studies, cooperative learning, project-oriented learning and problem-based learning. Some authors (Fernández, 2006; Ritt & Stewart, 2010) have remarked that no method is universal and suitable for all teaching–learning situations, but each is valid for certain purposes and specific conditions of the educational process.

Finally, it is important to note that one of the main reasons for using active teaching methods is to provide students with a deeper understanding of the subject.

The following section offers a brief description of methods used in the active subject and their main features.

12.3.1 Cooperative Learning

Cooperative learning (CL) is a pedagogical approach where the class is structured into small, heterogeneous groups, where students work in a coordinated manner to complete academic tasks and achieve a better understanding of their own learning.

The components of a cooperative activity are (Johnson, Johnson, & Smith, 2007) positive interdependence, face to face interaction, individual responsibility, interpersonal skills, and ability to work in small groups and group assessment. Advantages of CL versus competitive and individualistic learning are widely discussed in the literature (Barkley, Cross, & Howell, 2007; Casey, Dyson, & Campbell, 2009; Goikoetxea & Pascual, 2005, Palazón-Pérez De Los Cobos, Gómez-Gallego, Cándido Gómez-Gallego, Pérez-Cárceles, & Gómez-García, 2011; Slavin, 1989). Advantages include achieving better academic results, positive attitudes towards learning, establishing connections between theoretical and practical learning, and increased self-esteem and more positive interpersonal relationships.

Also, CL represents a major change in the role of teachers, who must not only explain and evaluate at the end of the process, but must perform new activities. However, teachers may encounter many difficulties when implementing CL (Apocada, 2006, Durán, 2009):

- Not all group members are always fully involved in the task.
- Lack of trust in students' learning to organize autonomously.
- Increased workload, and more time needed to correct and evaluate.
- Overcrowding of students and unprepared classrooms.
- Students lack time to work together outside class.
- Teachers unaccustomed to using this method or have a lack of training.

Atwood, Turnbull, and Carpendale (2010) found that areas such as engineering are very focused on information and monologue. Some generic skills that CL helps develop (Apocada; 2006; Exley & Dennick, 2007; Serrano, 2012) are teamwork, analysis, synthesis, critical thinking, reflection, planning, organization, decision making, conflict resolution, negotiation, and oral and written communication.

12.3.2 Case-Study Method

The case-study method offers an intermediate method between traditional theory and actual business training, reducing the gap between academia and the business world (Rippin, Booth, Bowie, & Jordan, 2002).

Through case studies, students learn by practice, developing analytical and decision-making skills, learning to deal with real life problems, and developing communication skills and teamwork (Herreid, 1994). The method can be applied individually or in groups. Group case studies force critical and reflective thinking and allow students to contrast opinions with other group members (Urosa, 2004).

The teacher's role changes from information provider to facilitator. Teachers act as promoters of discussions and students have to come prepared and ready to participate actively in class (Roy & Banerjee, 2012). The case-study method has also been criticized for not being true to managerial reality, due to its inability to capture the full complexity or scope of the business environment and organizational life (Parast, 2010).

12.4 Description of Educational Progress of Innovation

12.4.1 Context

The pilot exercise was carried out with 74 students enrolled in "Fundamentos de Organización de Empresas" (Management Basics). This subject is taught in the second year of Energy Engineering, in the School of Industrial Engineering at Valencia Polytechnic University. This subject is worth 4.5 credits (2.4 for theory and 2.2 for practical). The pilot was carried out in 2013–2014 academic year.

12.4.2 Generic Competencies of Management Basics

Generic competencies were "ethical responsibility in professional career activity", "teamwork", "planning and organization", "analysis", "synthesis and thought", "oral communication", and "writing communication".

12.4.3 Goals

This innovation project had two main goals:

1. To garner student opinion on the application of active methodologies, in this case collaborative learning (CL) and case study (CS) methods.
2. To garner student opinion on generic competencies developed by applying active methodologies.

12.4.4 Subject Evaluation System

For collaborative learning in theoretical sessions, a "one-minute paper" assessment was used. This carried a weight of 10 % in the subject final mark.

Case-study evaluation had three components: written answers marked by the lecturer (40 %); oral presentation made by a randomly selected student (30 %); and questions posed by the lecturer to different team members (30 %). The oral presentation was evaluated by other group members (co-evaluation) and by the same group (self-evaluation). Evaluations were made applying a standardized mark scheme and were compared to the lecturer's evaluation (hetero-evaluation). Final marks were calculated as the average between co-evaluation and self-evaluation if variation from the hetero-evaluation was less than 1.5 points. Otherwise, final marks were equivalent to the hetero-evaluation. The weight of these case studies in the final grade was 25 %.

12.4.5 Work Methodology Applied in This Pilot

This method mixed applied expositive and participative methods in theoretical classes to explain key concepts. It accounted for 25 % of total classroom time. Periodically, some topics were set for collaborative learning with materials posted via intranet.

In classroom and laboratory activities, groups comprised four or five members. Each team elected its leader and defined its work rules and tasks. Outside classroom time, groups had to resolve complex cases, applying cooperative learning. In a specific session, all groups presented their work. They were evaluated in the same way as in laboratory sessions.

12.4.6 Tools and Results Obtained

Students answered two questionnaires. First, "Views and perceptions of teachers and students on the use of active methodology" (Table 12.1), with 13 items using a Likert scale (1–4) and two open questions. Second, "Generic competency development applying active methodology" (Table 12.2), based on a Likert scale (1–5). Questionnaires were posted via intranet and had to be completed and returned within 24 h. We received 64 students' responses to both questionnaires (86.5 % response rate).

Table 12.1 shows that neither statement scored higher than 2.5 (arithmetic mean). Moreover, standard deviation was greater than 0.9. The highest three arithmetic means belong to the following statements:

- "I consider the application of case studies in the classroom appropriate" (statement 7). This average is higher than when the same activity is set for completion outside classroom time (average = 2.75). We consider that reasons for this are an overburden of homework and laboratory work outside habitual classroom time with complex timetables, other individual and team assignments, and study time.

Table 12.1 Questionnaire: The views and perceptions of teachers and students on the use of active methodologies. *Source*: adapted from León and Crisol (2011)

Your opinion as a student will let us learn more about the use of active methodology (specifically, collaborative learning and case study methods) applied in this subject. We therefore request that you complete this questionnaire, and we thank you in advance for your collaboration. The questionnaire is anonymous. Place an X in the box to show the extent to which you agree or disagree with the following statements. Use the following scale:
1. Strongly disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Strongly agree.

Statements	**1**	**2**	**3**	**4**	**Average**	σ
1) Lecturer's work style is different when applying active methods in the classroom	0	19	28	17	2.96	0.75
2) Lecturers were trained in applying active methodologies.	1	21	30	12	2.82	0.74
3) I consider it suitable to apply a mix of different methods in the classroom.	0	20	18	26	3.09	0.84
4) The use of active methodologies has gone together with new evaluation models.	1	18	30	15	2.92	0.76
5) With active methodologies, learning process efficacy is greater than with traditional expositive methods.	3	18	28	15	2.86	0.83
6) I consider the application of collaborative learning in the classroom appropriate	6	25	23	10	2.58	0.86
7) I consider the application of case studies in the classroom appropriate	0	11	33	20	3.14	0.68
8) I consider it appropriate to resolve the most complex case studies outside classroom time, and to review them in class.	5	17	31	11	2.75	0.83
9) I consider that complementary material given in collaborative learning sessions was appropriate and sufficiently extensive.	9	20	27	9	2.60	0.90
10) I prefer working in groups because it is more pleasant and allows you to learn from other group members.	3	18	22	21	2.93	0.89
11) Use of active methodologies promotes student participation	2	19	27	16	2.89	0.81
12) Active methodologies let students train by solving real problems analogous to those they will encounter in their professional life.	4	9	31	20	3.05	0.84
13) I would like to repeat this experience in other subjects and courses.	9	16	32	7	2.58	0.86
14) Write down two or three positive aspects or elements of this experience. 1. 2. 3.						
15) Write down two or three negative aspects or elements of this experience. 1. 2. 3.						

Table 12.2 Questionnaire: development of generic competencies applying active methods. Source: Authors' own work

Active methodologies support development of generic competencies. Mark your response with an X to show your agreement with the statements according to the following scale: 1. Not at all, 2. Only a Little, 3. Medium, 4. Significant, 5. Very significant.							
Generic competencies	1	2	3	4	5	Average	σ
1. Oral communication	0	4	17	19	24	3.98	0.94
2. Writing communication	0	5	15	25	19	3.91	0.91
3. Analysis	0	8	14	17	25	3.92	1.05
4. Synthesis and thought	0	12	16	22	14	3.59	1.03
5. Planning and organization	0	15	20	17	12	3.41	1.04
6. Teamwork	0	12	16	16	20	3.69	1.10
7. Conflict resolution	0	10	14	19	21	3.80	1.06
8. Negotiation	0	12	16	16	20	3.69	1.10
9. Empowerment	0	17	21	17	9	3.28	1.01
10. Leadership	0	14	20	18	12	3.44	1.03
11. Ethical responsibility on professional career activity	0	19	17	17	12	3.33	1.09
12. Time Management	0	12	12	23	17	3.70	1.06

- Statement 3 ("I consider it suitable to apply a mix of different methods in the classroom") received a score of 3.14. We consider this assessment a consequence of the current widespread application of expositive methodology in engineering grades. Students are therefore used to such methods, and, as always, are somewhat resistant to change or innovation.
- Finally, Statement 12 ("Active methodologies lets students train by solving real problems analogous to those they will find in their professional life") (arithmetic mean of 3.05). We consider the valuation is connected to engineering students' concerns about their future professional life.

According to students, the most positive aspects were the following. Working in teams and not spending all class time listening and taking notes. If contents have previously been studied, it is necessary only to explain the most difficult points and resolve doubts, which leaves free time for doing other class-activities. (In this way the classes can be more pleasant.) It makes it possible to talk to companions when it had not been possible before. It is easier to contrast opinions with companions, especially in case studies. Finally, feedback from other groups complemented with clarifications by lecturers. The most negative aspects mentioned by students were the following. Not to be able to choose other team members; sometimes a group member takes advantage of other group members; difficulties evaluating peers; and difficulties to get together outside class time because some live far away and depend on public transport.

The second questionnaire, based on a Likert scale (1–5), was designed to gather students' perceptions of development of generic competencies by applying active methods. Table 12.2 shows that all arithmetic means were higher than 3.25 for 12 generic competencies considered in the study.

12.5 Conclusions

We first highlight that the engineering degree which respondents were enrolled on in this pilot experience was Energy Engineering. This degree is characterized by a very high technical level in subjects in the curriculum. The subject of Management Basics therefore represents a methodological change that may be hard to accept for some students because it implies a different way of studying and a different evaluation procedure.

Initially, it is natural to think this methodological change could cause a decrease in students' attendance in class. They may consider this subject to be less important and less technical and complex than others that cover their core degree material. They may therefore relegate it to secondary importance. This would be natural given that students try to optimize their time according to what they think will be more important for their professional future. In fact, however, on only 4 days in the whole semester were more than five students absent, and only six students had more than four unjustified absences. Hence, the methodological change was well accepted in spite of differences from other subjects.

Lecturers were very satisfied with student behaviour. Students actively participated in the learning process. Lecturers applied active methodologies and new evaluation tools. Importantly, introducing these methods was a complex process, and caused some overburdening of lecturers. One particularly complex task was to specify the most appropriate contents to which to apply active methods, especially collaborative learning. In order to determine such course contents it was necessary to decide what is actually relevant and what can be considered ancillary. This task becomes increasingly complicated as subject contents become denser. Moreover, it is necessary to consider time required to build new case studies reflecting the Spanish economy, where small firms prevail.

Student evaluations of development of generic competencies were considerably higher than lecturers expected. Of even greater interest is that these high scores applied to all competencies considered in this pilot exercise. Therefore, lecturers who took part in this innovative experience feel very hopeful about the future of this learning approach, and are very encouraged to continue working on this type of teaching in an open continuous improvement process.

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