4

Abductive Thematic Network Analysis (ATNA) Using ATLAS-ti

Komalsingh Rambaree

Introduction

Qualitative research methods rest on three types of reasoning—inductivism, deductivism, and abductivism. Through inductivism, qualitative data are organised and structured for theorisation based on gathered evidence. This type of reasoning is commonly used in the Glaserian grounded theory approach. In deductivism, theory precedes observation. Through deductivism, a theoretical framework is developed and used by researchers to gather evidence from the field. Deduction is therefore a logical form of reasoning which is based on making deduction regarding a selected theory by gathering qualitative evidence. The deductive approach within qualitative research is more commonly used when researchers undertake, for example, content analysis or discourse analysis.

This chapter focuses on the third type of logical reasoning which is referred as abductivism. The use of abductive reasoning in research was introduced and advocated by Charles Sanders Peirce in the 1950s as

K. Rambaree (✉)
University of Gävle, Gävle, Sweden

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discovery, relating the term to the process of providing scientific explanation based on the newly found facts (as referred in Levin-Rozalis 2004). For Pierce, abduction is part of a broader pragmatic methodological process of inquiry for forming hypotheses or suggestions, through the use of back-and-forth reasoning between theory and empirical evidence (Dubois and Gadde 2002; Morgan 2007; Feilzer 2010). In particular, abduction is about discovering new concepts, ideas, or explanations by finding events, which lack theorisation within current discourses (Thornberg 2012).

Abductive reasoning is commonly used within mixed-methods research. Researchers using mixed-methods reject the 'purist' notion that positivist and constructivist ontologies are irreconcilable (Cupchik 2001). Instead, they promote the combination of qualitative and quantitative methodologies as a pragmatic and an efficient way of getting the benefits from both approaches. For a pragmatist researcher, the most important question is to find out what s/he wants to know (Hanson, as quoted in Feilzer, p. 8). Pragmatism is based on abductive reasoning which acknowledges 'uncertainty' in what is found as evidence. Thus, it is important to note that any knowledge produced through pragmatic research using abductivism is considered as being relative and not absolute. In other words, abductivism is firmly rooted on the belief that a theory (or whatever has been theorised) is provisional, tentative, and in need of confirmation (Cooper and Meadows 2016).

Abductive Theory of Method

Over the years, scientists have developed different strategies of using abductive reasoning in research, such as backward reasoning, probabilistic evaluation of explanations, eliminations of implausible explanations, testing abducted hypotheses by further empirical investigations, introduction of new concepts or theoretical models, and analogical reasoning based on conceptual abstraction (Thornberg 2012). Based on Pierce's idea on abduction, Gilbert Harman therefore introduced *Inference to the Best Explanation* model within abductive reasoning, which made abduction an appealing topic for philosophy (as referred in Paavola 2004, 2015). The governing idea of *Inference to the Best Explanation* is that

explanatory considerations are a guide to inference, that scientists infer from the available evidence to the hypothesis which would, if correct, best explain that evidence (Lipton 2000).

In a similar way, Haig (2005a, b, 2008a, b) and Haig and Evers (2016) argue that scientific knowledge in social and behavioural research is also based on abduction as a way of reasoning from factual premises to explanatory inferences. Using such a type of reasoning, social and behavioural researchers try to associate gathered data with ideas for logical explanation. Abduction is therefore used not as means of drawing conclusion but, rather, as a logical means of inferencing (Reichertz 2009). In other words, abduction is used as a process towards reaching conclusions through the use of analogical reasoning between existing knowledge and the discovery that needs to be explained. Haig (2008a) provides a sound description of *Inference to the Best Explanation* as given below:

> F1, F2, … are surprising empirical facts.
> Hypothesis H explains F1, F2, …
> No other hypothesis can explain F1, F2, … as well as H does.
> Therefore, H is accepted as the best explanation. (p. 1015)

Using such pragmatic way of reasoning, Haig (2005a) proposes Abductive Theory of Method (ATOM) which can be considered to be broader than both the inductive and hypothetico-deductive accounts of scientific method. As mentioned earlier, pragmatism in research offers scientists the flexibility of providing understanding on social phenomena through an integrated methodology with back-and-forth movement between theory and evidence (Morgan 2007; Feilzer 2010). This flexibility is sometime very important in research, as it provides scientists with the freedom to approach research questions in a non-coercive manner as it is in deductive and inductive approach (Haig 2005a). Haig (2008b: 1020) therefore proposes the following steps with regard to ATOM:

1. *Detection of Phenomena*: Sets of data are analysed in order to detect robust empirical regularities, or phenomena.
2. *Theory Generation*: Once detected, these phenomena are explained by abductively inferring the existence of underlying causal mechanisms.

(Abductive inference involves reasoning from phenomena, understood as presumed effects, to their theoretical explanation in terms of underlying causal mechanisms.)

3. *Theory Development*: Upon positive judgements of the initial plausibility of these explanatory theories, attempts are made to elaborate on the nature of the causal mechanisms in question. (This is done by constructing plausible models of those mechanisms by analogy with relevant ideas in domains that are well understood.)
4. *Theory Appraisal*: When the theories are well developed, they are assessed against their rivals with respect to their explanatory goodness. (This assessment involves making judgements of the best of competing explanations.)

Haig's (2008b) description is somewhat similar to some form of Grounded Theory Analysis (GTA). However, Haig (2005a: 386) argues that GTA can be regarded as an abductive method in the sense that it explains the qualitative data patterns from which theories are derived; however, 'it does not confine itself to existential abduction, and it imposes weaker constraints on the abductive reasoning permitted by the researcher than does exploratory factor analysis'. For instance, Strauss and Corbin's GTA has been criticised for being overly prescriptive, lacking explanatory power, and minimising the influence of existing theories and researchers' biases (Hodkinson 2016). Moreover, Haig and Evers (2016) argue that Glaser and Strauss' formulation of GTA does not make systematic use of the philosophy of science. While grounded theory still offers useful tools for the organisation of qualitative research, it is only in relation to abduction with exploratory factor analysis that theory construction becomes meaningful (Timmermans and Tavory 2012: 169). However, Haig and Evers (2016) conclude that ATOM does not replace grounded theory method but becomes an additional option, as the demand for methodological pluralism ensures a place for both in the scientists' toolkit.

Furthermore, Haig's (2005b, 2015) ATOM goes beyond theory generation by using exploratory factor analysis for making the appraisal of the developed theory providing innovative ideas by providing guides on using a generated theory as an analytical framework. The theory appraisal

phase therefore becomes a continuation within the research process where developed hypothesis through abductive reasoning are tested (deductive manner). For instance, Haig (2005b: 326) argues that, 'exploratory factor analysis functions as a data analytic method that contributes to the detection of empirical regularities', whereas 'confirmatory factory analysis can contribute to the goal of empirical adequacy in the subsequent hypothetico-deductive appraisal of common causal theories'.

Abductive Thematic Network Analysis

Thematic analysis is the process of identifying patterns in seemingly random information found in the collected data (Boyatzis 1998). In thematic analysis researchers organise segments of gathered data into 'themes', a process which is facilitated by coding. Braun and Clarke (2013) define a code as a word or a brief phrase that captures the essence of why a researcher think that a particular bit of data may be useful. Seal (2016: 452) distinguishes that, 'a code is a descriptor of a data segment that assigns meaning, whereas a theme is a theoretical construct that explains similarities or variations across codes'. Codes and themes are essential components of the data reduction process within thematic data analysis.

Braun and Clarke (2013) describe thematic analysis as a process of identifying and reporting patterns from the gathered evidence in a descriptive manner using back-and-forth movement between gathered evidence and the thematic description. According to Bazeley (2013), effective thematic analysis requires using gathered qualitative data to build a comprehensive, contextualised, and integrated understanding or theoretical model of what has been found, with an argument drawn from empirical evidence based across the data. Over the years, researchers using thematic analysis have come with creative and innovative techniques in the way to identify, organise, and present themes (Morse 2011; Vaismoradi et al. 2016).

For instance, Attride-Stirling (2001) presents Thematic Network Analysis (TNA) as a creative and systematic way of identifying and

reporting themes in qualitative research. Within TNA, researchers study the data to identify themes and then develop graphical representation/s of the linkages between the themes. According to Attride-Stirling (2001), the networks between the themes are merely a graphical tool to organise themes and show the interconnectivity between them in order to facilitate the subsequent analysis. TNA is a flexible method of qualitative data analysis which can be data driven or theory driven or even a combination of both (Rambaree and Faxelid 2013). By having a combination of both data- and theory-driven TNA, researchers can enhance the rigour in the analysis process by dealing with biases of self and others. TNA therefore requires researchers to, in priori, think about their qualitative data in a critical and analytical way (Seal 2016). However, the central part of TNA is where researchers relate the principal themes and patterns that emerged in the analysis to the original questions and then propose explanations to the questions (Attride-Stirling 2001).

Innovation and creative in qualitative research has often come in the form of a new analytical tool (Taylor and Coffey 2009; Morse 2011; Vaismoradi et al. 2016). Given that TNA requires back-and-forth movement and it is possible to apply an abductive theory of method within such an analysis process, it becomes appealing to combine the technique of thematic network analysis with the abductive reasoning as an innovative way of analysing qualitative data (Rambaree and Faxelid 2013). ATNA becomes an innovative and creative way of undertaking qualitative data analysis with a combination of ideas borrowed from Haig's (2005a) Abductive Theory of Method (ATOM) and Attride-Stirling's (2001) Thematic Network Analysis (TNA). ATNA can be broadly defined as an abductive way of reasoning in looking at and explaining the linkages between the emerging themes from the analysis of the gathered qualitative data (Rambaree and Faxelid 2013). However, it is important to point out that not all recommendations of Haig's (2005a) ATOM and Attride-Stirling's TNA have been strictly followed. The steps proposed in this chapter are the author's own recommendations for undertaking ATNA as a pragmatic way of analysing qualitative data using some of the recommendations made by Haig (2005a) and Attride-Stirling (2001) (Fig. 4.1).

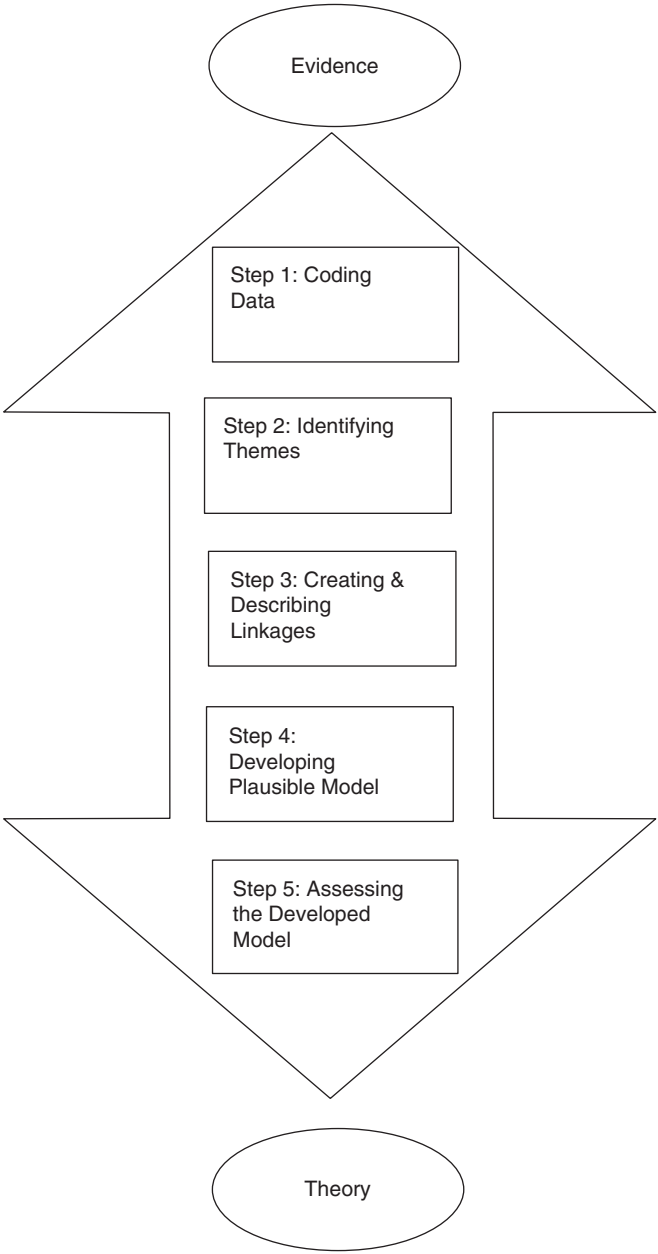

Fig. 4.1 Process and steps in ATNA (Source: Adapted from Rambaree and Faxelid (2013: 176))

ATNA in Researching International Social Work Practicum: An Exemplar

In this part of the chapter, a data set is used as an example to demonstrate, in a simplified manner, how ATNA can be applied in qualitative research.[1] The aim of this exercise is to develop a model that can help in theorising how social work students describe their cross-cultural experiences during their field practice in a foreign country.[2] The research questions are: (a) What kind of cross-cultural observations social work students make? (b) How do the students act/react to cross-cultural differences?

The data set considered here is the practicum placement reports of some Swedish social work students[3] from a particular Swedish University. The selected social work students, as cases, have been on field practice within a social work organisation for about two months outside Sweden, during the period 2010–2014. In their practicum placement reports, students write about their cross-cultural experiences. A total number of 22 students' reports are selected and analysed, for this chapter, using ATLAS-ti v.7.5.13 software.[4]

Steps for setting up a project (New Hermeneutic Unit) in ATLAS-ti and adding your materials as Primary Documents (P-Docs) for analysis[5] (refer to Fig. 4.2 as an example).

- Right click on Project (far top-left corner).
- Go to Save As, and then give a name to the project (example: Cross-Cultural).
- Click on Project. Then move curser to Add Document(s) and then after click the option, Add Documents to select the source where your materials (P-Docs) are located. Select all materials that you want to assign in ATLAS-ti as P-Docs for analysis.

ATNA Step 1: Coding Data

Coding is much more than just labelling a segment of data. It is a vital building block in qualitative data analysis and a fundamental skill that

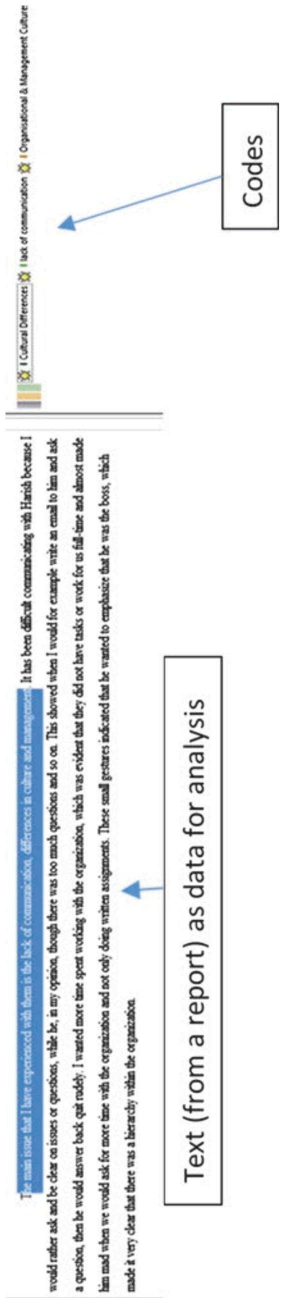

Fig. 4.2 Coding in ATLAS-ti

researchers apply in accessing evidence for testing assumptions and making conclusions (Bazeley 2013; Braun and Clarke 2013). Open coding starts by systematically and meticulously examining the data and identifying appropriate codes from selected segments of empirical data. A 'good code' tries to capture and represent the qualitative richness of the phenomenon under study (Boyatzis 1998; Fereday and Muir-Cochrane 2006). Haig (2015) argues that phenomena are the appropriate source of evidence for the explanatory theories. Braun and Clarke (2013) remind researchers that coding is an organic and evolving process that provides researchers deeper understanding of phenomena being studied through the gathered empirical data.

During the data analysis process, researchers therefore need to revisit the codes and modify, if required, according to latest reflexivity captured within analytical memo. Birks et al. (2008: 69) argue that, 'the very nature of qualitative research requires the researcher to assume a reflexive stance in relation to the research situation, participants and data under study'. Reflexivity basically means making reflections through memos (notes) on the knowledge construction within the whole research process that allows researchers to be aware about biases in analytical process. Analytical reflexive memos assist researchers in making conceptual leaps from raw data to those abstractions, such as codes and themes that explain research phenomena in the context in which it is examined (Birks et al. 2008).

In order to start with the open coding process, follow the below given steps in ATLAS-ti (refer to Fig. 4.2).

- Under P-Docs, select the document that you want to start coding.
- Once the document is open, you can select the segment of data (quotation) that you want to code.
- Then, right click to go on Coding to choose 'Enter Code Name'.
- Give a name to your code (example: 'Cultural Differences' is chosen as a code).

As mentioned earlier in this chapter, codes provide the basis for developing themes within the process of thematic data analysis. While deciding a name for the code it is important to bear in mind the research

questions and the overarching goal of the research project. The code name needs to direct the data analysis towards organising themes that could help in reaching the overarching goal of the research project. If required, researchers can use the 'Edit Comment' function in ATLAS-ti to make reflexive notes on a code (as shown in Fig. 4.2). The steps are:

- Right click on the code.
- Then click on 'Edit Comment'.
- In the panel, make notes.
- Finally, go to 'Comment' section within the panel, and click Save.

ATNA Step 2: Identifying Themes

Once the gathered data are coded,[6] the following step is to identify themes. A theme is a fuzzy concept based on organisation of codes that qualitative researchers use to characterise the phenomena being studied (Ryan and Bernard 2003; Fereday and Muir-Cochrane 2006). It emerges from a segment of data through coding, categorising, and analytical reflection (Saldana, as referred in Bazeley 2013). A theme has therefore a high degree of generality that pull ideas together regarding the subject of inquiry (Vaismoradi et al. 2016). To identify a theme, researchers need to study the codes in relation to the respective associated quotations and context, and try to make analytical reflective memos on selection of codes that can be pulled together as a concept in providing explanation towards answering the set research objectives/question(s). It is through a systematic study of the codes that researchers extract the salient, common, or significant themes in the coded part of the empirical data (Attride-Stirling 2001).

Within ATLAS-ti, a theme can be identified by regrouping codes that show pattern towards answering the research question. Under ATLAS-ti there is no such thing labelled as theme, but only codes that could be assigned as a 'Family' or using 'Merged Codes' as 'Theme'. Therefore, the 'The Family Manager' function can be used for this particular purpose. It is worth noting that a theme (referred as Family under ATLAS-ti) can share codes with other theme/s. Therefore, a researcher can use a code

under different themes, if required, to start mapping pattern in the gathered data. The steps to follow in ATLAS-ti for creating a theme are as given below (Fig. 4.3):

- Click on 'Codes'.
- Bring curser to 'Families', and then click on 'Open Family Manager'.
- When the panel is open, click on 'Families' and then click on 'New Family'.
- Assign a name—which will become a 'Theme'.

Step 3: Creating and Describing Linkages

At this stage, researchers create and describe linkages between the themes using abductive reasoning. Here, the emphasis is on considering how the different themes intersect to create a constellation (network) in expanding the observed pattern/s towards answering the research question/s (Bazeley 2013). It is important to note that themes can be organised in different rank order. Attride-Stirling (2001: 388) presents three levels of themes, which are: (i) Basic Themes, lowest-order premises that are evident in the text, but on their own they say very little about the text or group of texts as a whole; (ii) Organising Themes, categories of basic themes grouped together to summarise more abstract principles and simultaneously group the main ideas proposed by several basic themes to dissect the main assumptions underlying a broader theme that is especially significant in the texts as a whole; and (iii) Global Themes, superordinate themes encapsulating the principal metaphors in the text as a whole and indicate what the texts as a whole are about within the context of a given analysis.

The central aspect in TNA is the analytical reflexivity use in linking the themes. The linkages create flow in describing the observe phenomena within the gathered data. However, Attride-Stirling (2001: 393) points out that, 'the networks are only a tool in analysis, not the analysis itself'. Researchers therefore need to go deeper in deconstructing the gathered data by further exploring the themes, the linkages, and the emerging patterns to provide interpretative explanation on the phenomena being

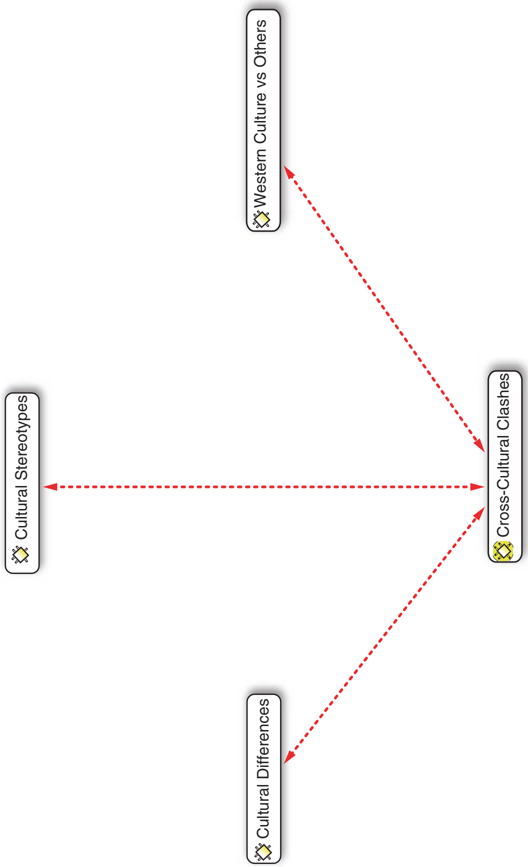

Fig. 4.3 Identifying theme in ATLAS-ti

observed with reference to the gathered evidence. This particular task requires the beginning of abductive reasoning (through making inferences) with a back-and-forth movement between themes and gathered evidence (data) to identify what is emerging as knowledge in answering the research question/s. This task is mainly done through creating and saving analytical reflective memos that are specifically dedicated to the linkages between the 'Themes'.

Within ATLAS-ti, the following steps can be followed for creating and describing linkages between the themes:

- Click on 'Networks'.
- Then go to 'Network View Manager'.
- Click on 'Create a New Item' (far left corner, there is a folder Icon).
- Give a name to your network (in the exemplar, it is labelled as 'Cross-Cultural Network').
- Click on it to open the networking panel.
- Then, click on Codes (not on the top row, but on row level three from the top next to P-Docs).
- Drag the 'Families' (Themes) that you want to explore the link in between in the network panel (from the left-hand side of the panel, not from the list of codes).
- Right click on each of the 'Themes' that have been dragged into the 'Network' panel; select 'Import Neighbours'.
- Then after, click on the 'Colour' Icon (round with multiple colours) on the 'Network' panel to select 'Colour by Density & Groundedness'.

The colour differences shown density (number of links to other codes and memos) and groundedness (number of links to quotations). In addition to pre-existing links (red ones, from the creation of themes from codes), new linkages in between the 'Themes' and 'Codes' can be drawn, if required (black one). Within the new links relationship between two 'Themes' and in between a 'Theme' and a 'code' can be assigned.[7] In addition, analytical memos on each of the themes that are being analysed can be created by clicking on them and selecting 'Edit Comment' to write up memos (notes), as explained and shown previously (in Figs. 4.2 and 4.4).

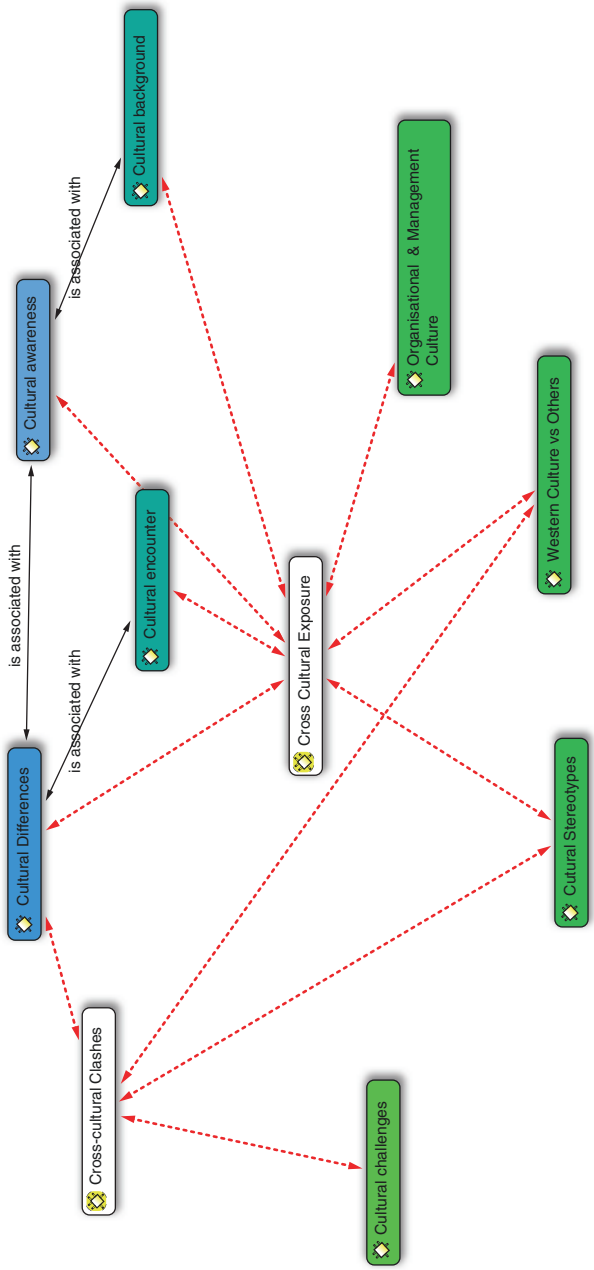

Fig. 4.4 Creating and describing linkages between themes with ATLAS-ti

Step 4: Developing Plausible Model

At this stage of analysis, the themes within a network are arranged in the form of a plausible model that could be used to facilitate explanation on the patterns being observed in reaching answer/s to the set research questions. Here, a model can be broadly defined as a graphical presentation that facilitates explanation on inter-linkages (e.g. cause-effect types) between themes as a system. In essence, modelling becomes a crucial step towards the theorisation of an observed phenomena. In a similar vein, Haig (2005a) posits that the construction of appropriate analogical models serves to assess the plausibility of our expanded understanding regarding the phenomena being studied.

For this particular task, Haig's (2005a, b) guidelines on analogical modelling, which is central in abduction theory of method, are followed. An analogical model of an unknown subject or causal mechanism is based on the pragmatic strategy of conceiving it in terms of what is already known, for instance from information available in discourses (Haig and Evers 2016). In the exemplar research, an extensive literature review of existing discourses (mostly journal articles and book chapters) related to cross-cultural learning during field practice was carried out using ATLAS-ti, to identify what is already known. For undertaking analogical modelling, Kolb's (1984) model of 'Experiential Learning' (refer to Fig. 4.5) was identified and used as an analogical model for theorising the known with respect to what is already known (extensive from literature review).

Kolb (1984) presents a theoretical model on experiential learning with four stages linked in a cycle as shown in Fig. 4.5. Kolb's (1984) model describes on how different people learn by integrating their practical experiences with reflection. According to his model, learning process from practice exposure takes place through four distinct phases: (1) feeling, through being involved in concrete experience; (2) watching, making reflective observation; (3) thinking, abstract construction of concepts; and (4) doing, making active experiment. Kolb's (1984) model has therefore relevant ideas in field of experiential learning that are well understood.

According to this model, it is therefore argued that social work cross-cultural learning takes place by direct experience of the social work

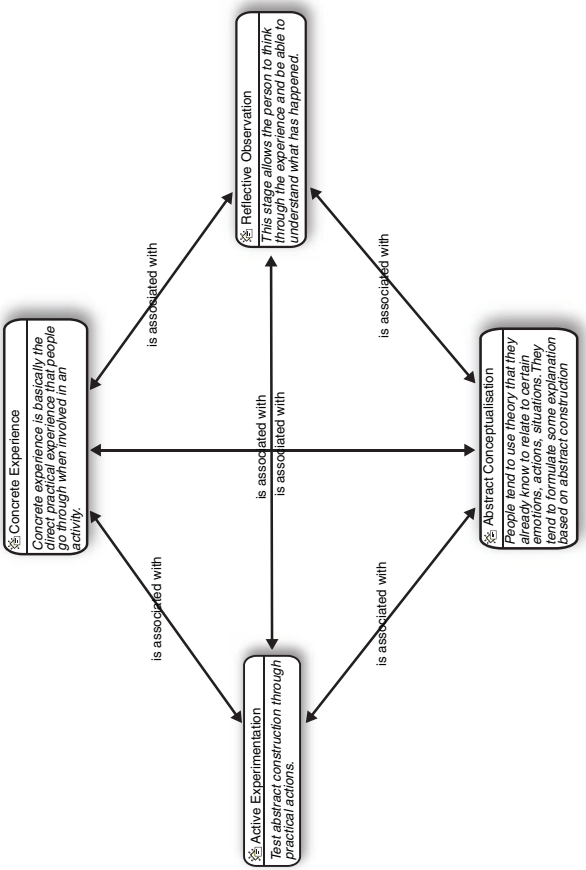

Fig. 4.5 Experiential learning model (for analogical use) (Source: Adapted from Kolb (1984))

practice in different cultural contexts, by reflecting on the cultural experiences during the practice, by conceptualising and thinking abstractly about different cultures, and by being active in putting cross-cultural learning in social work practice (Koob and Funk 2002). But, Kolb's model is limited in the sense that it does answer the set research questions: (a) What kind of cross-cultural observations social work students make? (b) How do the students act/react to cross-cultural differences? For this particular reason, Kolb's model is as an analogical model to develop a plausible model that can provide the basis for theorisation about how social work students describe their cross-cultural experiences during their field practice in a foreign country.

In developing the plausible models, the analogical reasoning used can be written and saved using 'Edit Comment' feature in ATLAS-ti.

- Download and organise literatures relevant to the subject matter for reviewing the analogical model (example: Kolb's Experiential Learning) in a folder in your computer.
- Upload the literatures from your computer to ATLAS-ti and start coding and organising thematic linkages (follow same steps 1–3 using literatures instead of data empirical data from the field).
- Using the developed linkages from both the literature review (including a selected analogical model) and the analysis of the empirical data from the field to create models that could support theorisation of new findings. Steps in ATLAS-ti are:
- Click on 'Networks'.
- Then click on 'New Network View'.
- Give a name (example: Theoretical Model on Cross-Cultural Experiences).
- When the network panel is open, drag Themes & Codes (from both the analogical model and the empirical data) to develop a nascent (plausible) model to support theorisation, related to the research aim.
- Organise the themes in an explanatory pattern, for example, by renaming central themes in an orderly manner, so as to facilitate the theorisation in a structured way (using analogical modelling). For instance, Stage 1: Cross-Cultural Experience, Stage 2: Cultural Observations, and so on.

See an example of analogical modelling in Fig. 4.6.

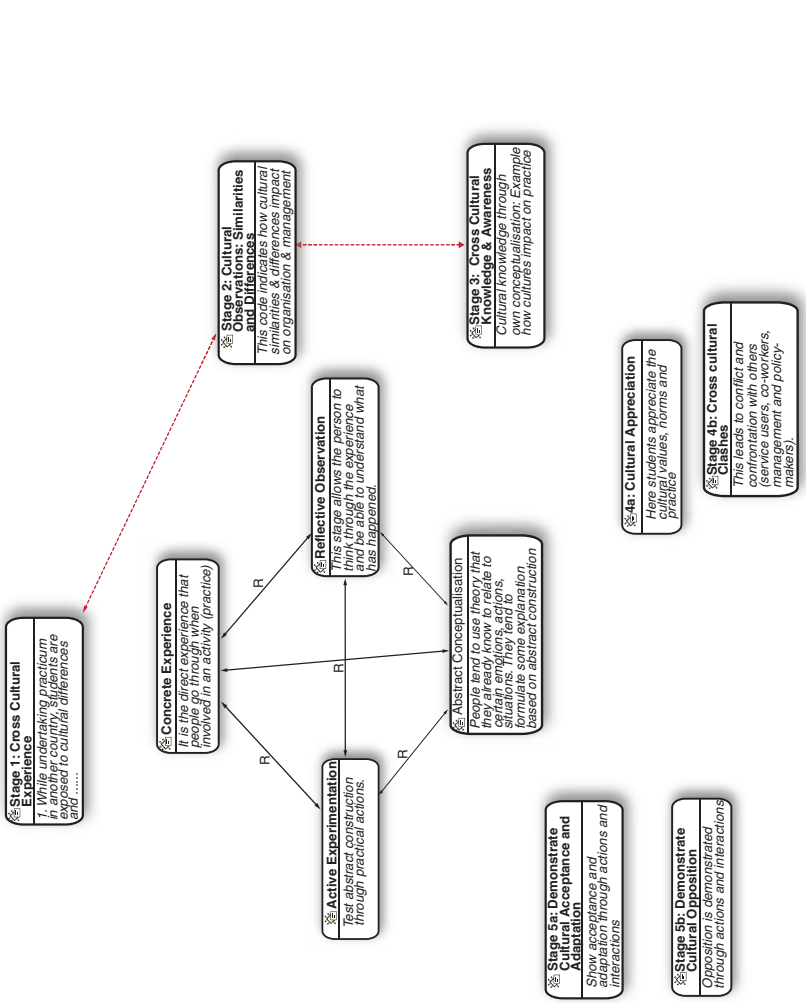

Fig. 4.6 Developing a nascent model using analogical reasoning (Mapped on Kolb's (1984) Experiential Learning)

Step 5: Assessing the Developed Model

When the plausible model based on the empirical data is completed (as shown in Fig. 4.7), researchers need to assess it for 'explanatory goodness' in comparison with existing model/s or explanation/s (from literature review) (Haig 2008a, 2015. The plausible model is therefore assessed for being theoretically elegant, coherent, and scientific (Lipton 2000). At this particular stage, two related techniques advised by Haig (2005a) become central within the data analysis process, which are termed as 'inference to the best explanation' and 'theory explanation coherence'.

Haig and Evers (2016: 85) argue:

> Inference to the best explanation is founded on the belief that much of what we know about the world is based on considerations of explanatory merit. Being concerned with explanatory reasoning, inference to best explanation is a form of abduction. It involves accepting a theory when it is judged to provide a better explanation of the evidence than its rivals do.

Haig and Evers (2016: 85) also point that the determination of the explanatory coherence of a theory is made in terms of three criteria, which are:

(i) *Consilience* (explanatory breadth): by explaining a greater range of facts
(ii) *Simplicity*: by making fewer special or ad hoc assumptions
(iii) *Analogy*: by supporting itself through analogy to theory/ies that scientists already find credible

Within ATLAS-ti the memo functions can be used to capture the 'inference to the best explanation' and 'theory explanation coherence'. Researchers can open new memo and write up qualitative inferential analytical and theoretical explanatory memos. Each created memos can be saved and linked with the themes or the relations between the themes in

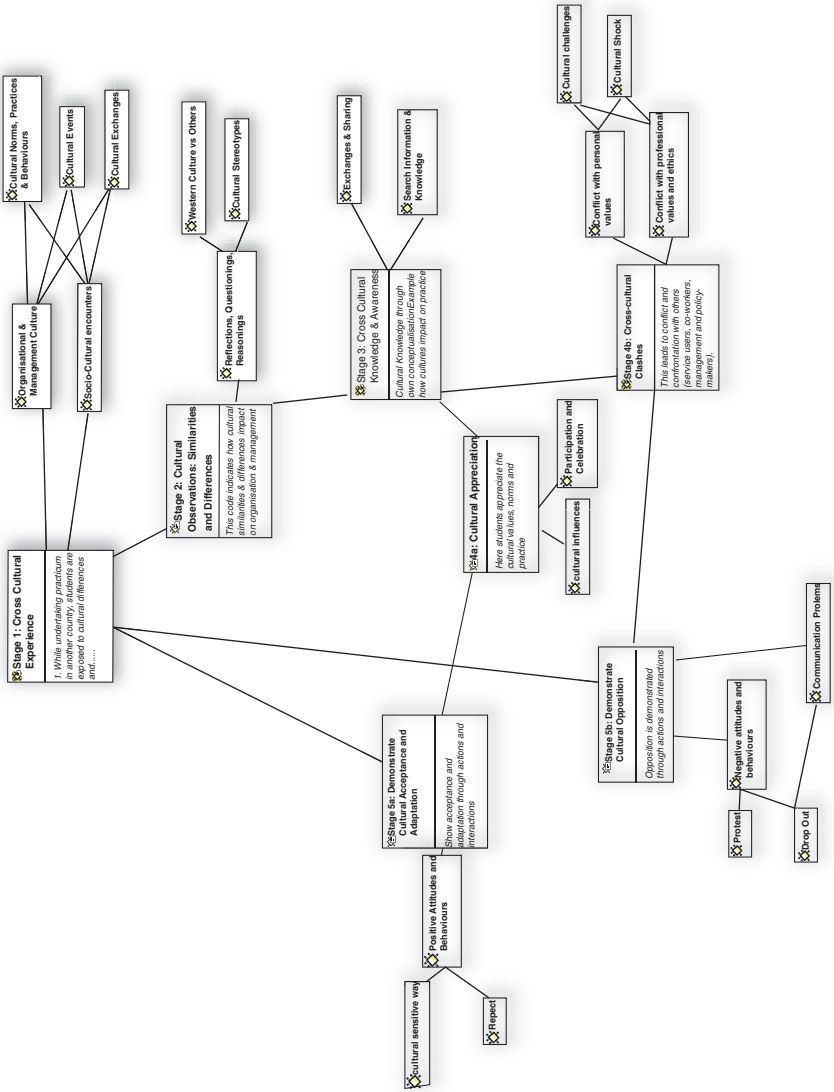

Fig. 4.7 Developed model on cross-cultural experiences

the network view panel of ATLAS-ti. For the final stage of ATNA, the steps within ATLAS-ti are:

- Click on 'Network' and then 'Network View Manager'.
- Select the network that has been developed as a model for theoretical explanation (in the exemplar study, it is labelled as 'Theoretical Model Cross-Cultural').
- Once the model (network of themes) has opened, select the themes/codes that have been used for analogical modelling by 'Right Clicking' on each of them and then selecting 'Remove from View'. This will leave only the nascent (plausible) theoretical model.
- Expand the nascent theoretical model with memos and additional codes or themes (if necessary).
- To create memos, click on 'Memo', and then click on 'Create Free Memo'. Give a name to the memo (example is the exemplar study: Analytical Memo: Cultural Competence Explanation).

In this way, a plausible model is developed to theorise how social work students describe their cross-cultural experiences during their field practice in a foreign country. The plausible model is based on analogical reasoning from a well-known theory (Kolb's 1984 model) on experiential learning. This nascent plausible model develops through the analysis of gathered empirical evidence. It helps to answer the set research questions through inference to best explanation as compared to the analogical theory. The theorisation is done in a logical and simple manner but with coherence and consilience.

Limitations and Conclusion

This chapter needs to be considered with some limitations. Firstly, it is limited to analysis in textual format. However, materials for analysis in ATLAS-ti can also be in audio and video format. Somewhat similar steps, as shown in this chapter, can be followed while using materials in other formats—such as audio/video. Secondly, the whole

explanatory process has been simplified in this chapter, so that readers can have a better understanding of the application of a theoretical model of qualitative analysis. Finally, the chapter has focused on the qualitative aspects of abductive theory of methods. In particular, ATNA, as a qualitative data analysis methodological approach, can be used as a basis for quantitative analysis, such as exploratory factor analysis.[8]

To conclude, ATNA can be considered as a core component within mixed-methodology research. It provides a pragmatic and logical way of reasoning, organising, and presenting qualitative data analysis. ATNA helps researchers to structure qualitative data analysis through stepwise application of abductive theory of method. Such approach allows researchers to go into deep details in exploring and working with qualitative data. It therefore allows researchers to theorise their findings through the development of conceptual/thematic model/s, which can be tested and validated through further research. It therefore brings rigour to qualitative data analysis.

Notes

1. For ethical reason some parts, that are not relevant to this chapter, are hidden in some of the visual demonstrations.
2. In a country other than where they are born and/or studying.
3. Swedish students—born and raised in Sweden.
4. For more detailed explanation on using the software, refer to Friese (2013, 2014).
5. Read more about setting up project from ATLAS-ti free manual available at http://atlasti.com/wp-content/uploads/2014/05/atlasti_v7_manual_201312.pdf?q=/uploads/media/atlasti_v7_manual_201312.pdf.
6. Coding from list is also possible, after open coding has been done. Refer to ATLAS-ti manual for more details on coding.
7. Read more about assigning relationship in network from the ATLAS-ti manual.
8. Refer to Haig and Evers (2016), for more information on exploratory factor analysis.

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