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## From a qualitative researcher's workshop— the characteristics of applying computer software in studies based on the grounded theory methodology

**Abstract** The purpose of the article is to show how computer aided qualitative data analysis tools can be utilized in research practice. Based on the example of a particular research project, I make an attempt to describe how studies are performed pursuant to the procedures of the grounded theory methodology, using NVivo software. This is a presentation of a workshop of a qualitative researcher who uses computer software to aid the research process on a daily basis. At the same time, I stress the existing improvements, but also the consequences and potential difficulties related to the application of computer software in qualitative research. The article is of a review and educational character, and it is intended to familiarize the reader with the possibilities of a tool belonging to CAQDAS and its real application in carrying out a research project based on a selected research method.

**Keywords** Computer aided qualitative data analysis, NVivo, grounded theory methodology, studies into sport of persons with disabilities

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### Introduction<sup>1</sup>

As the author of this article, my intention was to demonstrate the manner in which NVivo – a tool that belongs to the CAQDAS family – allows me to successfully perform research that is based on the grounded theory methodology. On the basis of the analysis that I carried out, I would like to demonstrate how to carry out data analysis by combining various functions of the NVivo program, that is, moving from original materials towards increasingly more advanced stages of theoretization and work on a higher conceptual level which would result in the development of a theory (Niedbalski 2014).

In the article, I have made an attempt – based on my own research – to present how computer-aided qualitative data analysis tools can be utilized so that the process of data interpretation can be carried out in accordance with the grounded theory methodology in a correct, effective and convenient manner (Niedbalski 2014). I do not try to describe methodologically the particular options and functions implemented in the computer software, rather I document and recreate how they served to create empirical materials while carrying out research into disabled individuals.

The contents presented in the article are a result of both my personal experiences, as well as studies into the literature of the subject (cf. Lonkila 1995; Kelle

<sup>1</sup> This article adopts certain fragments of my book entitled "Komputerowe wspomaganie analizy danych jakościowych. Zastosowanie oprogramowania NVivo i Atlas.ti w projektach badawczych opartych na metodologii teorii ugruntowanej." [Computer-aided qualitative data analysis. NVivo and Atlas.ti software in research projects based on the grounded theory methodology], Wydawnictwo UŁ, Łódź, 2014.

2005; Gibbs, 2011), raising the issue of computer-aided qualitative data analysis software in the context of research based on the procedures of grounded theory methodology.

### Preparation of data

While starting to work in the CAQDAS environment, we first of all need to pay attention to two main stages that an analyst's work may be divided into; and which correspond to particular sets of actions carried out with the mentioned software. These are: the preparatory work level (data management) and the conceptual level (of analytical work).

The first level mainly covers the actions related to preparing the materials (sources of data), the creation of a project, collecting data, and their proper sorting and grouping. This stage also covers the activities of the software user, such as: describing and transcribing data, as well as drawing up notes that play an informative role, or performing a simple search of the data in the project. Therefore, there is a whole series of actions that the user must take to carry out proper analytical and conceptual work. But at the same time, they pose a significant stage in the researcher's activity, as all of those actions provide the foundations for our interpretation of the data, that is, the process of theoretizing, including the development of the theory.

In turn, the conceptual level refers to the whole analytical process, which is based on such actions as: data coding, sorting and allocating it to particular categories, and then combining data and searching

through them in terms of connections and interdependencies. Hence, this level is inextricably linked to the development of hypotheses and establishing them in the source of further data analysis and interpretation. In this stage, one may also find helpful software functions – apart from the already mentioned coding and categorization – such as drawing up theoretical memos, the possibility to regroup and continuously modify generated data, using various kinds of search tools that are helpful in the process of not only searching through contents, codes or categories but also searching data on the basis of research queries, or finally tools that provide the possibility to visualize the data analysis process results and create models that reflect the network of connections and interdependencies that exist between elements of the project. And this is the aspect of work in the NVivo environment that the other three sections of the article are devoted to. I would like to stress that I focus here on the manner of conduct that complies with the grounded theory methodology and the arrangement of particular actions that accompany this process, and less space is devoted to the technical issues of the software itself, which can be found in other works of literature on the subject (cf. Niedbalski and Ślęzak 2012; Niedbalski 2014; Niedbalski and Ślęzak 2014).

### Coding

A basic procedure of analysis in the case of the grounded theory is coding, which means the process of determining “what the data is about” (Charmaz and Mitchell 2001:340) and is referred to as “connecting data without views about them” (Coffey, Holbrook, and Atkinson 1996:27; cf. Lofland et

al. 2009:275). In other words, the coding process consists in providing selected parts of the material with particular labels that give information about the contents of a given fragment. Regarding the degree of abstraction of such a label, “material” and “theoretical” codes are differentiated (Konecki 2000:51 and further). Furthermore, coding usually takes place according to a certain scheme: open coding (initial), when many codes are allocated, with the intention of labelling a given fragment in various manners, and then there is focused coding - focused on selected, key categories with a greater theoretical significance (Lofland et al. 2009:275). Thus, following the advice given by Strauss and Corbin (1990:59), I divided the particular stages of work into: “open coding” (a certain type of data reconstruction), “focusing on category coding” (which means the reconstruction that takes place at the level of generated categories) and “selective coding” (employed in order to validate the developed hypotheses).

### Open coding

I started my research by going into the field and “immersing” myself in the world of the researched individuals – in this case, disabled people who practice sport. My first action was to get acquainted with both the place where I would be observing these people and with the people themselves who were my potential interviewees within the scope of future interviews. Therefore, I treated the observation technique, on the one hand, as a manner to obtain data that are significant for the research, and on the other, as a source of “pilot” information on representatives of the researched society. When I decided that I had acquired a certain knowledge about the re-

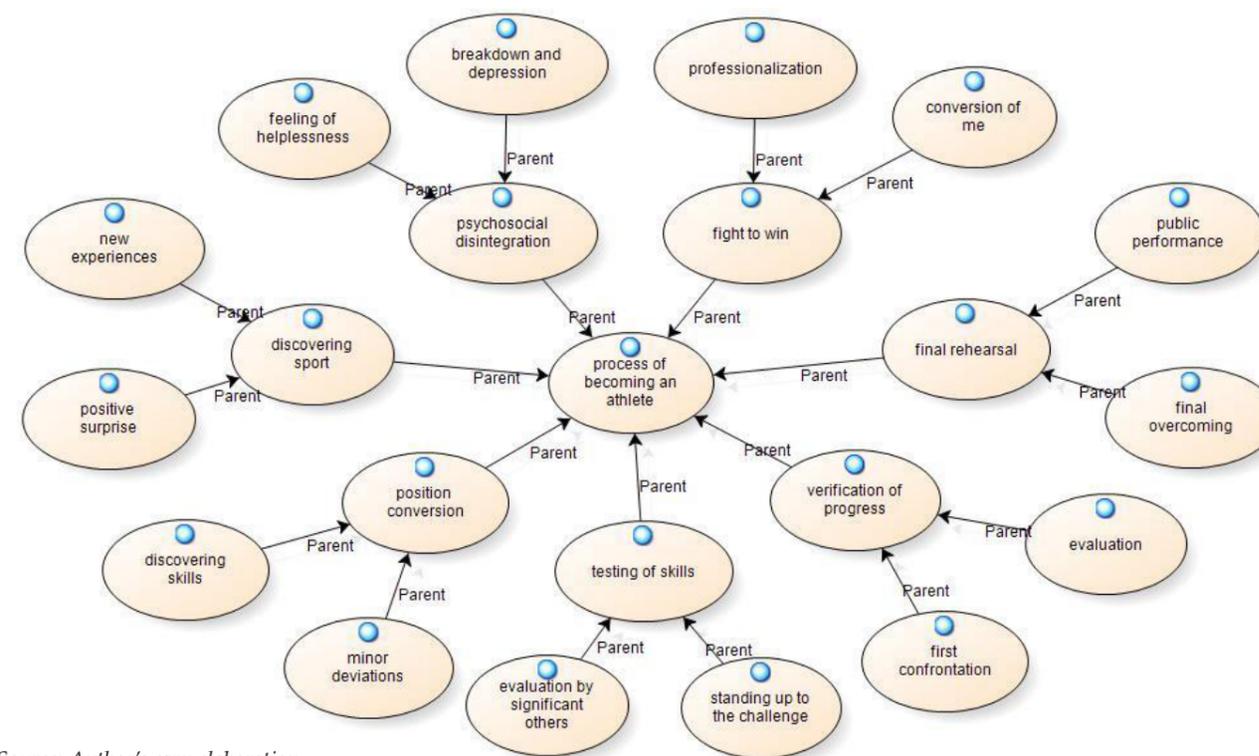
searched environment and, at the same time – based on my observations – I concluded that I had been accepted by its members to a greater extent than was the case at the beginning of my presence, and I was no longer making an unnecessary fuss among these people anymore, I started the interviews.

As research based on the grounded theory (GT) methodology is characterized by the fact that it is impossible to separate its subsequent stages – since applying GT means that they become intertwined, shifting fluidly from one into the other – I started to analyze the data which was coming from the observations, just as with the transcribed interviews, which provided me with an initial list of codes and categories. During the analysis process, I developed

and used almost 500 codes, which were gradually combined, grouped or simply excluded, ultimately providing 40 categories. The interviews and notes from the observations were coded as a “stage” in relation to the course of the story, which is composed of the following phases: “psychosocial disintegration,” “discovering sport,” “conversion of position,” “skills testing,” “progress verification,” “final rehearsal,” “fight for a win” and “specifically.” Fragments related to turning points identified on the basis of the data analysis within particular phases of the process of becoming an athlete were marked within particular stages.

During the analysis, there was a key for material codes developed for each phase in the scope of the

Figure 1. Coding scheme picturing various levels of categories



Source: Author's own elaboration.

main process, that is, the development of a sports career. Grouping codes into a hierarchical code took place from the bottom. Each of the above-mentioned phases was allocated several dozen codes which were later arranged into more general categories until seven main groups were achieved. The scheme of coding is presented in Figure 1. It includes the two highest levels of codes, corresponding to the phases and exemplary turning points included in their scope, which determined the sequence of the process of becoming a person who practices sport.

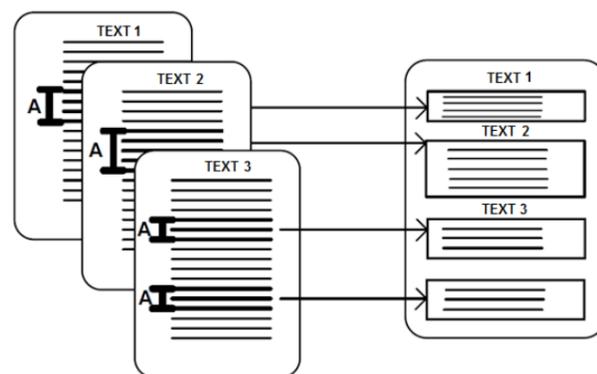
### Constant comparison

The process of providing categories, searching for relations between them, and developing hypotheses would not be possible without consideration of the “constant comparison” procedure, according to which a researcher-analyst searches for differences and similarities between data fragments, codes or cases, as well as determined dimensions that may occur between them. In other words, the constant comparison method is about confronting various components of the project in order to check the similarities between them or to emphasize certain features that differentiate them. Increasingly more general categories revealing underlying uniformities are generated on this basis (Gorzko 2008:86). It provides an opportunity to gradually focus on the first of all those fragments of obtained information that start to match each other in some terms.

An example here may be the coded contents of particular interviews and memos that come from observations, regarding all the information on the significance of sport apportioned by the disabled individ-

uals. Memories and thoughts regarding the current situation of each of my interviewees were often related to mentioning various (in terms of content and form) statements, but referring to the same notion, which I finally coded as the “function” of sport. For example, the function that is called “revealing” is actually a category that was generated on the basis of 23 fragments that come from particular interviews coded originally in the following manner: “overcoming the fear of showing oneself,” “publicly revealing one’s body,” “showing oneself without a prosthesis,” or “fighting shame in front of others.” Finally, there were a dozen or so functions determined. These are: “improvement,” “separation,” “strengthening,” “compensation,” “challenge,” “escape,” “support,” “reveal,” “prove,” and “pro-integration.” Each is a separate category that was created as a result of comparing from a few to a dozen or so fragments that bear particular etiquettes (codes allocated during material coding).

**Figure 2. Comparison scheme for the contents of codes (function of data “retrieval”)**



Source: Based on *Computer-Assisted Analysis of Qualitative Data*. Paper prepared for the Discussion paper series of the LSE Methodology Institute by Udo Kelle, University of Bremen, August 1997.

### Cases

The comparisons may also be made between various people, items, scenarios, or situations, as well as information obtained from the same people as regards places, items, or types of events (Charmaz and Mitchell 2001:165). Therefore, the constant comparison method should be related to the comparison of events and notions with other observed cases, and to the comparison of notions (Glaser 1978:49-50).

Cases may serve as a representation of particular people or organizations that pose a subject of interest to the researcher. Thanks to the numerous options of the program, particular cases may be given attributes and qualities, among the other particulars. It means that we can, for example, create separate cases that will, in turn, be described by selected attributes and their qualities, such as sex or education.

While making use of those possibilities in my research, I compared statements made by particular interviewees divided with regard to sex, in topics (or threads) which were interesting for me. From a practical perspective, I was able to search through segments of text that were limited by certain parameters (variables), which allowed me to, for example, separate information related to some topics that had come from those participants of the research that had a common feature. For example, among other things, I wanted my research to specify the scope of similarities and differences regarding the situation of disabled women and men who practice sport, respectively. Hence, I excerpted fragments from particular texts where women spoke about

the manner in which they are perceived by those around them, and how – according to them – others see their dysfunctions, and I compared them to the segments of texts raising the same topic, but coming from interviews with men. Such parameters related to the comparison of particular data allowed me to put forth several initial hypotheses related to the gender of disabled athletes. An example may be provided by the following hypothesis: “Men may count on greater approval from those around them as regards their bodies, which, despite certain dysfunctions, usually do not pose such a great barrier in relationships with the environment as they do in the case of women.”

### The coding paradigm—theoretical coding

In the case of numerous research projects, comparing text segments leads to descriptive typologies and theory development. An additional tool – a procedure present in the grounded theory methodology which plays a helpful role in the process – is the so-called coding paradigm, or focused coding, in other words. Strauss (1987:27) proposes that coding should not be limited just to naming categories, but it should also consider the causes of its occurrence, intervention conditions, interactions, strategies, and tactics of action, as well as the context and consequences of actions described by a given category. These elements pose the so-called coding paradigm, and such coding is called focused category coding (Strauss and Corbin 1990:96-116; Kelle 1997a:7-8; Konecki 2000:48a). It consists of specifying categories, their development and making references between them or searching for mutual connections (Gibbs 2011:98).

Here, it is worth remembering that the main objective of focused coding according to Strauss is:

- to reveal the presence of attributes of categories and their dimensions (which starts as early as during the open coding);
- the identification of a variety of conditions, actions/interactions, and consequences related to the “phenomenon”;
- referring a category to its sub-categories and determining their connections;
- searching for data clues, which can suggest the dependencies that may be established between the main categories (Strauss 1987).

According to Strauss, the analytical procedures of focused coding allow the researcher to recognize the relationships between the structure and the process (cf. Gorzko 2008:313). Also in this stage, the NVivo program provides the researcher with support, because it has elaborate functions which support the development of the hierarchy of categories, but also enable the creation of connections between codes. It is significant because, thanks to such tools, it becomes possible to continue the analysis and to take it to a higher conceptual level (Fielding and Lee 1998). The existence of various functions allows the user to create a structure of categories, which facilitates the process of arranging the coding results, thus enabling a reflection of the “superiority-inferiority” relationship (including the specification of categories, subcategories, and their qualities). It also allows the user to determine the character and rela-

tionships connecting the generated categories more precisely, meaning that it becomes possible to use the coding paradigm in the coding process. In other words, the coding paradigm means a general theory of action, which may be used to develop the structure or “axis” of a developing theory. In the research that I described, I applied the five-element Strauss and Corbin model (1990), in order to construct an initial analytical scheme: causative conditions, intervening conditions, context, micro-actions, and consequences. After completing those actions, the purpose of the studies, which, until that point had been very general, became more concrete and precise. While using the suggestions proposed by Strauss and Corbin (1990), I constructed the following structure of notions explaining the phenomenon that I was studying:

1. The causative conditions, which in my research meant comparing factors and circumstances that caused the main action, that is, the decision to start practicing sport and the gradual move from the physical activity being treated as a form of rehabilitation to an extreme sport;
2. The phenomenon (the main category), according to my analyses, was the reconstruction of the process of becoming an athlete.
3. Intervening actions, which meant the cognitive model was related to the perception of their own corporeality and a reconstructed concept of disability;
4. The concept was brought down to the circumstances that limited or supported the main ac-

tion, relating to the behaviors and actions of people from the disabled athlete's surroundings;

5. The strategies of actions/interactions were represented by two extreme categories: independence (internal steering) or dependence (external steering) in constructing the career of the disabled athlete.

Based on such elements of paradigm coding, I also succeeded in operationalizing so-called consequences, which meant reconstructing the notion of disability and the process of role realization and, later on, the concept of a disabled sportsman's career.

### Selective coding

The third phase of the analysis, according to Strauss and Corbin (1990:119) shifts to the construction of the “story” (Strauss and Corbin 1990:119) which is composed of a limited number of hypothetical statements which serve to construct the theory after being “tested.” In my research, the story was called “the reconstruction of ‘me’ from being a disabled individual to an athlete” (main category, and some of its hypothetical findings were presented in the following manner:

1. Sport allows reconstruction in the perception of the self;
2. The reconstruction of “me” depends both on external factors, as well as on the degree of motivation for the action and the willingness to search for meaning in the sport activity.

3. In the process of the reconstruction of “me” in the role of an athlete, the prevailing factor is the concept of disability felt by a given person;

4. Limitations that flow from the environment, including the behaviors and actions undertaken by others, hinder or reduce the chance for success of the disabled in the “me” reconstruction process through practicing sport.

5. The strengthening that comes from the environment, including the behaviors and actions undertaken by others, facilitate or improve the chances for success of the disabled in the “me” reconstruction process through practicing sport.

6. The consequence of the “me” reconstruction is the adoption of a certain concept for the realization of the role of the athlete.

Having drawn up the story, another step was to go back into the field in order to collect other samples of data. Therefore, I gathered further information in order to document the relevance of the above-mentioned statements, and thus to continue the basic task that, in the case of GT, should generate the theory. Research that leads to a theory is a time-consuming process that demands great amounts of work. Therefore, it is of great importance for the researcher to make the most of the information they possess, not only what they have just collected, but also the information they already had. Hence, apart from carrying out actions in the field, I also went back to my “old” notes with a new research “objective,” to confirm or reject the theses from the presented story. Each thesis must be supported with an

accurate description that complies with the facts. In other words, it must be enriched with details and episodes that show the reader that the research is solid and rich. Thus, I extended the story, I composed a more elaborate model, and I made the theory a little more “sophisticated.”

This is also the area where the NVivo program helped me, as it offers tools for drawing up theoretical memos. Here, it is worth remembering that the memos are a reflection of the analytical thoughts related to the codes, and they are adopted to make the applied categories more specific and to provide the coding process with a direction. What is more, as suggested by Gibbs (2011:68), they also provide a certain connector between two stages of the analysis – coding and writing a report. According to Gorzko (2008:101) the written notes are a kind of analytical tool, creating a certain thought and theoretical space where the researcher can conceptualize the data.

In the NVivo program, the role of theoretical notes is played by memos, that is, records of theoretical thoughts and concepts by the researcher. Memos are concise notes drawn up by the researcher, including information on concepts regarding the whole project, particular material, or issues to be discussed or interpreted in the future. The concept of memos in these programs is analogous to the procedure of generating notes in the grounded theory methodology. They are there to help the researcher move to a higher conceptual level, and they serve to generate theories as tools of theoretical coding (Konecki 2000). Therefore, the convergence of functions available in NVivo with the requirements that the

researcher is provided with by the research methodology is made visible. If used properly, that is, for successive and systematic creation, it may effectively contribute to the creation of a theory.

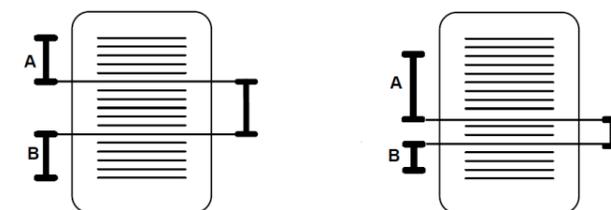
### Strengthening the hypothesis

The hypotheses that were generated must be “verified.” However, it needs to be kept in mind that in the case of qualitative research, the verification of hypotheses is a process that cannot be brought down to statistical testing. Instead of “testing” and “confirming” hypotheses (Miles and Huberman 2000:262), or “verifying” them (Strauss and Corbin 1990:108) the process of reviewing them means returning to the data (i.e., reading the shorthand notes or field notes again), or moving back to the territory of research (i.e., carrying out new observations and interviews) in order to find any confirming or disqualifying evidence for the correctness of the generated hypotheses. This results from, among others, the specificity of the qualitative hypotheses, which – especially in their initial form – are usually quite loose “connections” made by the researcher.

The computer program which I used to analyze the data also had special functions which enabled me to “verify” the hypotheses through scanning parts of interviews and notes from observations. Therefore, computer assisted qualitative data analysis software may be useful to improve theoretical concepts, and to create and “establish” hypotheses. In my research, for example, I was willing to test my intuition about the interdependency between involvement in a disabled person practicing sport and the influence others have on the process. In order to research such an

initial hypothesis, the option to search data in terms of the spatial presence of codes in the source materials turned out to be useful. For example, we can introduce a proper configuration, pointing to segments of texts coded with an “x” and those coded with a “y,” which appear quite far from the first instances of them being mentioned. Therefore, the hypothesis of the relationship between sport being practiced by a disabled individual and the impact other people have on the process may be studied through searching for all elements of the text coded by “sport interest” and fragments coded with “persons from their surroundings,” located a certain distance from the first time it is mentioned (expressed by the number of paragraphs). On the basis of a search presented in such a manner, it might be agreed that interviews carried out with various individuals were coded in such a manner that there are text fragment codes that represent the distance between fragments’. If such an interdependence is of a repeatable character, and it can be observed in various interviews, the researcher may claim that the hypothesis is confirmed in the current pool of data.

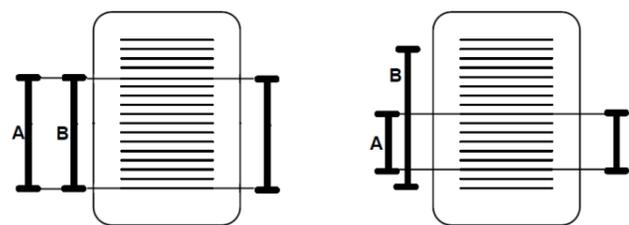
**Figure 3. Search scheme for data fragments marked with selected codes in terms of distance of presence**



Source: Based on *Computer-Assisted Analysis of Qualitative Data*. Paper prepared for the Discussion paper series of the LSE Methodology Institute by Udo Kelle, University of Bremen, August 1997.

A way to verify the hypotheses was also to use the code search tools adopting logic operators. As in the case of distance operators, the objective here is not the literal verification of hypothesis correctness but to download an original text encoded with particular codes and analyze it again. For example, I used two codes in my research for this purpose – “disability” and “significance of physical activity,” and two attributes – “man” and “woman.” Afterwards, while analyzing the data, I spotted a connection between such codes and attributes which gave grounds for the hypothesis: “Physical activity is a value in itself, most of all in the case of disabled men rather than in the case of disabled women.” Afterwards, I wanted to check whether the relationship between codes and attributes was confirmed in other cases, that is, in the remaining materials. Having introduced proper search parameters and adopting the “AND” operator between the “value in itself,” “physical activity” and “man” codes, and then later repeating the same procedure, but replacing the “man” attribute with “woman,” I was able to check in what documents and how often these codes occur in the same fragments of data. The use of the “and” operator meant that only those fragments of text were found that I had coded with both the first and the second code that provided the basis for the search (in other words, the program will not find data segments coded with only one code or those fragments that were not allocated any of the codes), and which at the same time were marked as words spoken by interviewees that were women or men (the scopes of codes does not need to fully overlap, it is enough when there are common parts).

**Figure 4. Search scheme in terms of the co-existence of data fragments allocated with selected codes**



Source: Based on *Computer-Assisted Analysis of Qualitative Data*. Paper prepared for the Discussion paper series of the LSE Methodology Institute by Udo Kelle, University of Bremen, August 1997.

Preserving a work style, as recommended by the authors of *The discovery of grounded theory*, in other words, treating the study as a whole process that is consciously directed at generating theories, leads very quickly to – as claimed by Glaser and Strauss (1967) – the formulation of a multiplicity of hypotheses. At the beginning not connected, in a short time they start to form a theoretical framework of the research (Gorzko 2008:84). Therefore, from the perspective of the processual character of the generation of theories, it seems useful that the created inquiry and interconnected search query may be updated according to subsequent changes introduced into the project. We can restate the inquiry at regular time intervals, and hence monitor the development process of our coding, and evaluate whether the recent analyses are going in a direction that is satisfactory for us.

Finally, there is a need to mention the existence of certain methodological requirements and limitations in the application of the search strategy in the

verification of hypotheses. First of all, the testing condition is that the search tools do not look through the same materials that served for the initial development of the hypothesis. Secondly, the hypotheses must be empirically verifiable, meaning that they must be precise enough and that they should have an empirical part. Thirdly, the codes employed for hypotheses testing must mark phenomena that are clearly determined (Kelle 1997a:14).

Furthermore, a search tool should not be used in an automatic manner, or the co-existence of codes should not be treated as an indicator confirming a hypothesis or not, but only as a clue that suggests the researcher's intuition complies with information that comes from particular interviewees (Kelle 1997b).

Moreover, it is worth remembering that although the search functions are one of the most effective tools available in CAQDAS, they are not without flaws and limitations. First of all, they can be used only when the text coding was carried out with special care and the particular attributes of given objects were specified. Secondly, discovering relationships between data may be reliable when the met assumptions are related to, among other things, the completeness of the recorded text and its adequate arrangement. Thirdly, it must be kept in mind that, at any given moment in a conversation, people may recall several various notions; and they remember certain matter later, often adding to their statement.

### Models and diagrams

Strauss and Corbin (1990) suggest that, during the process of generating theories, apart from coding,

sorting and arranging information, when seeking patterns between data and using a system of notes, we should also turn to visual representations of connections and interdependencies between generated analytical categories. Any visualizations in the form of charts, diagrams or networks are useful to order the relationships between categories which emerge during selective coding. From the GT methodology perspective, the most significant models are those which form the basis of diagrams that integrate data. Schemes, diagrams or models are used to visually represent connections and interdependencies which exist between components of the developed theory. What is more, in contrast to linear representations of various relationships, the network distribution of those relations is closer to the human manner of perceiving reality, and it therefore becomes one of the most important interpretation processes of the analyst (Muhr and Firese 2003/2004:211).

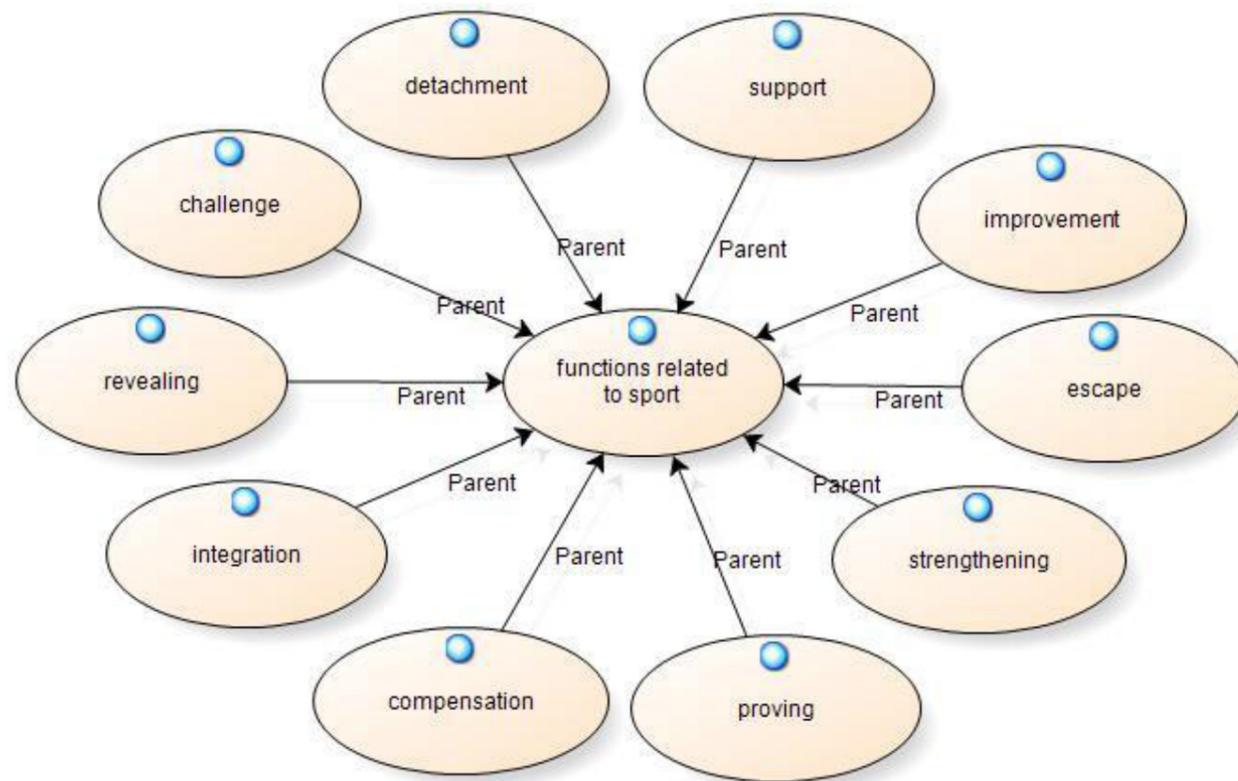
The comparisons, references and explanations formulated during data analysis form the basis for constructing and confirming the correctness of the models (Gibbs 2011:155). The model itself has a certain structure, within the scope of which the aspects of the analyzed phenomenon which were defined earlier as crucial are presented in relation to other aspects or qualities of a given situation (Gibbs 2011:154). The creation of models is of crucial significance within the whole process of data analysis, although it is especially visible when crystallizing the researcher's concept, which in turn is strictly connected with generating a central category. The visualization of categories and their relationships facilitates this process to a significant extent. Thus, the models play a crucial role during selective cod-

ing, where crystallization of the main phenomenon or process that all of the categories generated within the course of the analysis will be related to takes place. Strauss and Corbin (1990) recommend that, having refined the coding scheme, ordering the categories and comparing the cases a model should be done, specifying those elements that comply with the coding paradigm.

At the beginning of the analysis, we may use a model to plan the main research actions and draw our expectations or initial concepts. Afterwards, the models may help in presenting relationships between notions or other elements of the project.

The NVivo program, as a tool intended to support the researcher in the development of a theory, enables him to create models. These models can help to determine and review the initial concepts and idea on the questions that are interesting for the researcher, visually represent relationships between the project elements, identify emerging patterns, theories and explanations, as well as document and record subsequent stages of work over the project. Below is an example of a model that includes categories depicting functions that the researchers ascribed to disabled individuals' involvement in a sport activity.

Thanks to such a visualization of data, it has become much more convenient for me – a researcher performing analyses that lead towards the generation of theories – to compare various elements of a single project. First of all, the representation of subsequent stages of an analysis in the form of a mind map allowed for an improved observation of

**Figure 5. Functions related to disabled individuals practicing sport**

Source: Author's own elaboration.

the relationships and patterns of data. At the same time, applying the modeling function allowed me to develop a project draft, and a vision of my own ideas related to the development of material (Miles, and Huberman 2000; Seale 2008).

Finally, it is worth adding that when using a computer program, and creating various visual representations of the data analysis that we carried out (including the creation of an integrating diagram that somehow crowned the whole process), we can document the course of all actions undertaken by the researcher in this scope. Therefore, we – as researchers – can monitor subsequent stages of the formulation of our analytical “path,” but it also means we become

more transparent to our reader, who have a possibility to look into the development of the whole research process. Such a direct and tangible expression of this action may be a presentation of the history of the study, which we can present not only in a descriptive manner but also through the data exported from the NVivo program in the form of images presenting selected moments of the analysis that we conducted.

## Conclusions

Taking into account the challenges that researchers who employ qualitative methods need to face, especially those who implement their own projects based on the procedures of the grounded theory methodol-

ogy, it may be assumed that CAQDAS tools are a good way to improve the effectiveness and convenience of the work. The presented NVivo program is certainly such a tool, as it proves to be useful both with the material and in the theoretical coding process, through the systemization of coding and the ease of seeking appropriate fragments during data development and hypotheses “verification.” The NVivo program was also helpful when searching for connections between particular categories. While working in the program and using the implemented functions, we managed to perform data analysis (of interviews, notes from observations of existing data, as well as audio and video materials) in a manner which corresponded to the requirements put forward by the procedures of the grounded theory methodology. It is also worth emphasizing that the program proved to be helpful as a tool for collecting, and at the same time controlling a significant amount of material, which can be simply processed, modified, sorted and reorganized, as well as searched through. It enables the researcher to gain greater control over the collected data. It is also accompanied by the possibility to subordinate various elements of the projects through grouping them in accordance with the preferences of the researcher (Wiltshier 2011:4). The NVivo program allows comprehensive sorting of data – both source materials and any information resulting from an analysis carried out by a researcher (Seale 2008:235). It must also be kept in mind that computer software devoted to qualitative data analysis creates the possibility to constantly modify all project elements as new data emerges (Bringer, Johnston, and Brackenridge 2006:248). The flexible manner of creating and modifying the project elements allows the researcher to follow the data, and the generated code may

be quickly modified if it is decided that it does not reflect the data content to a sufficient extent (Glaser 1978:4-5; Konecki 2000:28). At the same time, the system of analytical notes allows the smooth alteration of actions related to the collection and analysis of the data. Furthermore, it is a program equipped with tools that facilitate the introduction of data triangulation procedures, methods or other researchers into a research project (Konecki 2000:86). It allows the cooperation of numerous researchers involved in a single project thanks to such functions as: identifying team members and tracing and comparing actions undertaken by particular individuals, including the possibility to verify who added what data and when they did it, and what modifications they introduced (Seale 2008:238; Wiltshier 2011:1-2;). It is a highly valuable possibility, especially if we consider the growing internationalization of research teams.

An additional asset of the software is the fact that all stages of a researcher's analytical work are recorded in the program. It is possible to verify the codes, categories, and memos created and show the analytical thought of a user developed at every moment. It allows the researcher to present the methodological and analytical background in a clear manner (Morse and Richards 2002 as cited in Bringer, Johnston, and Brackenridge 2004:252). It is also worth emphasizing that the program architecture itself somewhat forces the researcher to continuously think about the relationships between codes and categories, to compare and modify them, that is, to carry out a systematic analysis. Hence, the problem that awaits the qualitative researcher, connected with focusing just on data gathering and avoiding its in-depth analysis, may be avoided (Hammersley and Atkinson 2000:196).

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## Z warsztatu badacza jakościowego – charakterystyka wykorzystania oprogramowania komputerowego w badaniach opartych na metodologii teorii ugruntowanej

**Abstrakt:** Celem artykułu jest ukazanie, w jaki sposób można wykorzystać narzędzia komputerowego wspomaganie analizy danych jakościowych w praktyce badawczej. Na przykładzie konkretnego projektu badawczego staram się przybliżyć, jak realizować badania zgodnie z procedurami metodologii teorii ugruntowanej, korzystając z programu NVivo. W ten sposób ukazany zostaje warsztat badacza jakościowego stosującego na co dzień oprogramowanie komputerowe wspomagające proces badawczy. Jednocześnie wskazuję na istniejące udogodnienia, ale także konsekwencje i potencjalne trudności związane ze stosowaniem programu komputerowego w badaniach jakościowych. Artykuł ma charakter poglądowy i edukacyjny, który ma za zadanie zapoznać czytelników z możliwościami narzędzia należącego do rodziny CAQDAS oraz jego faktycznym zastosowaniem w realizacji projektu badawczego opartego na wybranej metodzie badawczej.

**Słowa kluczowe:** komputerowa analiza danych jakościowych, NVivo, metodologia teorii ugruntowanej (MTU), badania nad sportem osób niepełnosprawnych