

Udo Kuckartz

Realizing Mixed-Methods Approaches with MAXQDA

Prof. Dr. Udo Kuckartz, Department of Education,

Philipps-Universität Marburg, Wilhelm-Roepke-Str. 6 B, 35032 Marburg/Germany;

Email: kuckartz@staff.uni-marburg.de;

Website: www.methoden-evaluation.de

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Methodological Background

Many social issues require mixed methods approaches to fully understand the problems and help to find solutions. The suggestion to integrate qualitative and quantitative data has become more and more popular in the last years. The debate between the qualitative and the quantitative paradigm that dominated since the 1970ies the methodological debate seems to be more balanced today, even some scholars remain convinced that the only legitimate methods are quantitative. Equally, there remain plenty of qualitative researchers who reject core assumptions of the quantitative paradigm. Almost all postmodernist qualitative researchers take this view, for instance. In the meantime a new movement labeled „third paradigm“ (see Teddlie/Tashakkori 2003) has developed. Generally speaking „Mixed methods“ or „combination of methods means“ means that both kinds of data are combined in a research project in a meaningful way. The reasons to do that may be as well methodological ones as also a result of the particular research questions. For instance there are researcher mainly interested in the subject of their research, their particular research question, and decide that they need different perspectives, different types of data - probably they even would not name their kind of research „mixed methods research“. For instances, I am involved in a major research programme of the German Federal Ministry of Education and Science on „socio-ecological research“ and here there are many projects of that type not reflecting the methods they use as „mixed methods“. On the other hand, projects may be found coming more from the methodological perspective and choose a type of explicit mixed-methods design – just because they think this is the up-to-date way to do research.

In the history of social research many projects can be found where combination or integration of methods was used almost natural without emphasizing this as a special methodological approach. For instance the well known Marienthal research project, which was conducted by an Austrian research group guided by Paul Lazarsfeld and Marie Jahoda, used qualitative interviews, quantitative and qualitative observation, document analysis and a variety of quantitative and qualitative methods in the same project.

In the current discussion about the combination of qualitative and quantitative methods three different approaches (or should we say three different manners of speaking?) can be identified:

- (a) Triangulation,
- (b) Mixed Methods and
- (c) Methodological Integration

The „Triangulation approach“ as well as the „Mixed Methods approach“ are more oriented towards practical research designs. On the other side, the „Methodological Integration“ approach is more conceptual and theoretical and more oriented to a new *methodological* program.

The „Triangulation approach“ was first developed by Norman Denzin (1978: 291) who defined triangulation as "the combination of methodologies in the study of the same

phenomenon“. The metaphor “triangulation“ uses a term from trigonometry/geometry. It is the process of determining the location of an object by measuring angles to it from known points.

Denzin, whose position was discussed by many scholars (e.g. Erzberger/Prein 1997, Erzberger/Kelle 2003, Flick 2007, Kelle 2004, 2007), recommends triangulation as a strategy to arrive at a deeper understanding of the phenomenon under observation. In the process of triangulation methods of the same paradigm („within method triangulation“), can be used as well as methods of both paradigms („between method triangulation“).

The second approach dealing with the combination of QUAL and QUANT has been discussed under the label “Mixed Methods“. Since a number of years, this approach becomes more and more popular, particularly in the US. It shares its pragmatic orientation with the triangulation approach. Moreover the protagonists of Mixed Methods, like Tashakkori, Teddlie, Creswell and others are claiming for a new “third paradigm“ that overcomes the limits of the “older paradigms“ (QUANT = 1st paradigm and QUAL= 2nd paradigm)¹. The core of this new paradigm is a detailed description of different types of research designs that combine different methods in sophisticated ways.

John Creswell (2003) differentiates different types of mixed methods design based on the combination of four criteria:

- (a) implementation, that means the sequence of qualitative and quantitative data collection, whether one starts with QUANT, QUAL or with both methods at the same time
- (b) priority, that means which methods is given priority in the researcher’s eyes
- (c) integration, that means at which point the integration of data and results takes place
- (d) role of theoretical perspective, that means if theory is rather implicit or if theory plays an explicit role from the starting point of the research project and gives a theoretical framework to all kinds of data collection.

¹ Nigel Fielding gave the following important comment to the sequence of the paradigms: „Historically, the first paradigm was qualitative. If one examines the very first issues of the American Journal of Sociology, from the late 1880s and 1890s, there was very little numerical analysis (I use this term deliberately, rather than statistical analysis). Both sociology and psychology mostly used fieldwork methods in the earliest days of the discipline (and quite surprisingly, there was considerable use of visual methods - they worked a lot with photographs). Even Durkheim's quantitative work was largely simple numerical tabulations, not even cross-tabulation. There is a view that statistical analysis did not emerge until about 1915, when tests for statistical significance were developed.“

The following table shows a scheme of these four criteria:

Options for choosing a Mixed Methods Research Strategy			
Implementation	Priority	Integration	Theoretical Perspective
No sequence, parallel	equal	During data collection	explicit
sequential: qualitative first	qualitative	During data analysis	
sequential: quantitative first	quantitative	With data combination	implicit
		With some combinations	

Table 1: *Different Mixed Methods Design Types (Creswell 2003: 211)*

The third approach “Methodological Integration” has been formulated by Udo Kelle (2007). Here the combination of different methods is mainly established from the perspective of methodology and philosophy of science (and not from the problems of research practice). Kelle continues the tradition of the debate on explanation and understanding that has taken place between the humanities and natural sciences since the beginning of the 20th century. Kelle’s position is based on a modern concept of causality. This new way of thinking splits up the one-dimensional term “cause” into multiple causalities. It refers to the INUS concept of the Australian philosopher John Mackie. INUS is an abbreviation for an **I**nsufficient but **N**ecessary part of a condition that itself is **U**nnecessary but **S**ufficient to cause an effect. The result of Mackie’s reasoning is that the traditional way of logical causality (“if p then q”) that is linked to the quantitative paradigm (see Kelle 2007: 159) is replaced by a model that deals with multiple causes and multiple background conditions. Kelle tries to formulate – based on this INUS-logic – a methodological framework that gives orientation for the selection of methods and techniques of data collection and analysis: “What kind of research questions rather require qualitative methods, and what kind require rather quantitative? Which kind of methodological problems are the result of particular research objects and questions? How can we combine the strength of both methodological tradition to solve these problems? (Kelle 2007:15)

The difference between Kelle’s approach and the other ones discussed above is that here it is not always necessary (and not always the best) to use both methods and try to mix them up. It is the research question that determines the choice of methods. “The methodological integration approach can also mean to work with a mono-method design as long as it can be assumed that the method chosen is sufficient to answer the research question and that information that are results of the other methodological tradition are taken into account. (Kelle 2007: 263)

Features and Procedures for Data Integration in MAXQDA

All three positions described above can be supported by CAQDAS. There are only a few programs on the market that pay special attention to the mixed methods approach. Mostly, this is done by MAXQDA, QDA Miner and NVivo. All three programs are neutral and can support any of the three approaches. The following chapters will focus on MAXQDA.

MAXQDA offers support for all three approaches of combination of qualitative and quantitative data. The different types of triangulation in the sense of Denzin can also be realized as Cresswell's and Tashakkori's design types and Kelle's models of integrating data.

The particular strength of using the software can be seen in the following points

Data Triangulation – Different qualitative data – collected at different locations and different time – can be managed by MAXQDA as different document groups and can be analyzed separately or together.

Investigator Triangulation - Multiple researchers can take part of an investigation and analyze the same data – or parts of the same data – independently. MAXQDA allows the secondary analysis of the same qualitative or mixed data and is also able to hide codes and codings in order to enable collaborative working styles.

Theory Triangulation – By use of different coding schemes at the same time or by designing different visual models with MAX Maps the interpretation of social phenomena can be undertaken with more than one theoretical scheme.

Methodological triangulation- This is the strongest argument for using the software. Qualitative and quantitative methods can be used to gather data (e.g. questionnaires, expert interview, documents, observation protocols etc.) and the data can be linked, coded and memos can be written and linked to all "objects", wherever the user likes. Qualitative data can be classified and transformed into quantitative data. Visual representations of code distributions and co-occurrences can be obtained and these "secondary" data can be exported to statistics software.

The following chapters describe some of the different features that MAXQDA offers for combining and mixing data.

Qualitative and quantitative data types: Text and Document Variables (Attributes)

All qualitative data to be analyzed with MAXQDA are managed in MAXQDA's document system. If different methods have been used, e.g. open interviews, observations, focus groups, the corresponding data may be arranged in different folders ("document groups") of the document system.

For managing quantitative data it is essential if the data belongs either to the *entire* document or to *parts* of the document. According to this relation MAXQDA differentiates between

- a) *document variables* (also called "attributes") and

b) code variables (also called “profile variables”)

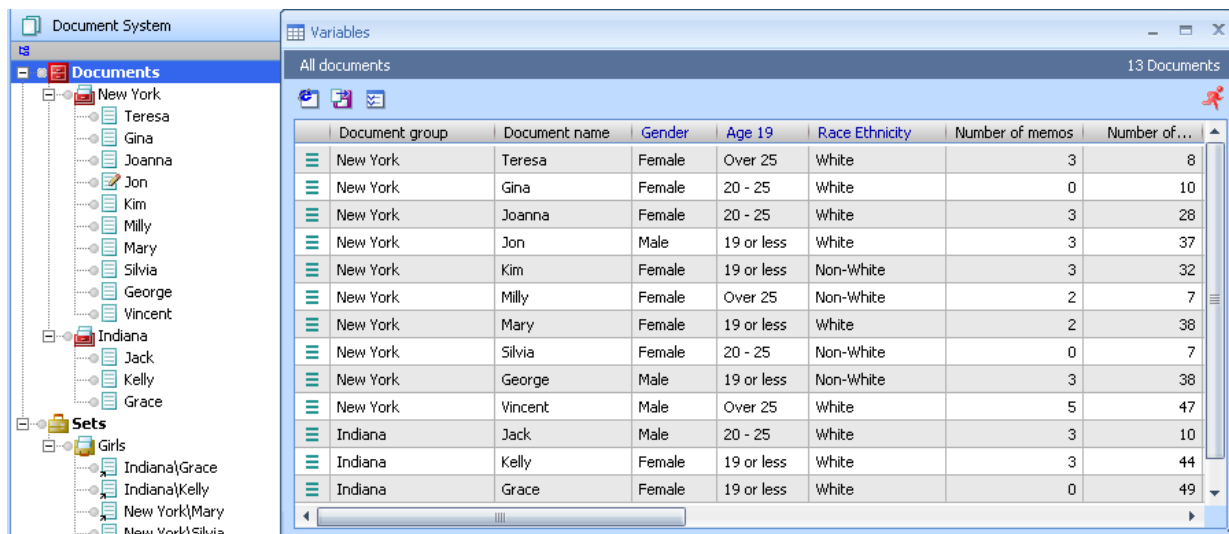
A typical example for *document variables* is a study with open interviews and with a standardized questionnaire too. For instance, the same persons have filled out a questionnaire with socio-demographic data and were then being interviewed about status passages in their biography. In this case the data for each person would consist of the transcription of the interview and a vector of numbers according to the codebook of the standardized questionnaire. Thus, document variables are on the level of the case(s), therefore one could also name them “case variables”.

The data of a focus group may be taken as a typical example for *code variables*. Different persons are attending a focus group that is usually transcribed verbatim. The data itself consists of only one text file with different speakers. In this case, the document variables are no longer useful for storing characteristics of the participants since we have more than only one person. The code variables offers a way to store data for multiple units of a text file provided that the contributions of the different speakers have been coded with their name.

Both types of variables are alike statistical variables in software like SPSS, SAS or SYSTAT.

Document Variables (Attributes)

MAXQDA offers to associate a set of quantitative data with every document in MAXQDA's document system. The link between the document and its variables (in the terminology of MAXQDA “attributes”) in the quantitative data matrix is created by the *document name* (in MAXQDA 2007 “text name”) and the name of the *document group* (in the older version MAXQDA 2007 “text group”).



Document group	Document name	Gender	Age 19	Race Ethnicity	Number of memos	Number of...
New York	Teresa	Female	Over 25	White	3	8
New York	Gina	Female	20 - 25	White	0	10
New York	Joanna	Female	20 - 25	White	3	28
New York	Jon	Male	19 or less	White	3	37
New York	Kim	Female	19 or less	Non-White	3	32
New York	Milly	Female	Over 25	Non-White	2	7
New York	Mary	Female	19 or less	White	2	38
New York	Silvia	Female	20 - 25	Non-White	0	7
New York	George	Male	19 or less	Non-White	3	38
New York	Vincent	Male	Over 25	White	5	47
Indiana	Jack	Male	20 - 25	White	3	10
Indiana	Kelly	Female	19 or less	White	3	44
Indiana	Grace	Female	19 or less	White	0	49

Fig. 1 Linking documents (text) and quantitative data

The definition of the document variables and the entry of variable values can be done in a way that is quite similar to statistics software. In MAXQDA's „Attributes“ feature the user can

switch between “data view” and “list of attributes”. Fig. 1 shows the data view, a rectangular data matrix that has as many rows as documents are listed in the document system. The columns are setup by the variables, here „Text group“, „Text name“, „Gender“, “Age 19” etc.

The other view „List of Attributes“ offers the variable list in order to define new variables or delete existing variables.

ID	Variable	Variable type	To be displayed	Source
2	Document group	Integer	<input checked="" type="checkbox"/>	System
6	Document name	String	<input checked="" type="checkbox"/>	System
7	Creation date	Date/Time	<input checked="" type="checkbox"/>	System
8	Number of cod...	Integer	<input checked="" type="checkbox"/>	System
9	Number of memos	Integer	<input checked="" type="checkbox"/>	System
11	Author	String	<input checked="" type="checkbox"/>	System
12	Bytes	Integer	<input checked="" type="checkbox"/>	System
100000013	Gender	String	<input checked="" type="checkbox"/>	User
100000014	Age 19	String	<input checked="" type="checkbox"/>	User
100000015	Race Ethnicity	String	<input checked="" type="checkbox"/>	User
100000016	DM Approach	String	<input checked="" type="checkbox"/>	User
100000017	career path	Integer	<input checked="" type="checkbox"/>	User
100000018	Emotions	Integer	<input checked="" type="checkbox"/>	Code
100000019	Education	Integer	<input checked="" type="checkbox"/>	Code

Fig. 2 The List of Document Attributes in MAXQDA

Code Variables (Profile variables)

In some cases it may be useful to associate a set of variables not with the entire text but with parts of it. For instance, a transcript of a focus group or group discussion may contain different speakers and it may be useful to associate a set of variables with each one. This wouldn't be possible with variables on the text level since only one set of variable values would be allowed per text.

MAXQDA 10 offers a new type of variables named “code variables” or “profile variables” that are associated with parts of a text that have been coded previously. Let's take the following example, a discussion with the Canadian media theorist Marshal McLuhan.

Seldes: On one side we're all trying to find out what is the nature of the new communications. What is the special nature of each one of the media such as say the moving picture or broadcasting? What is the nature of all of them, all of the mass media as we call them put together, and I think that from that, almost everybody, deciding what is the essence? We're not prejudiced. I think we all then want to say what do all the media do to us, and then I put my own specialty in - what do we do about them? And I don't think I differ too much from you, Mr. McLuhan?

McLuhan: No, I've learned a great deal from your own work, Mr. Seldes, and you were in this field before any of us. And we've toiled along in your footsteps, as it were.

Seldes: (...)
McLuhan: (...)
Seldes: Then he went on...the simple example that after print came in, the whole feudal system broke. And what I'm worried about, and he didn't live long enough to predict any of this, is what is going to break, where is the shift of power going to be in present time?
McLuhan: (...)
Dale: Why won't he look good? Why not?
McLuhan: The nature of this medium which calls for so much participation does not give you a completed package, a completed image. You have to make your image as you go. Therefore, if the person who comes in front of the T.V. camera is already a very complete and classifiable type of person - a politician, a highly obvious doctor type, lawyer type - the medium rejects him because there's nothing left for the audience to do or to complete and they say this guy's a phony. There's something wrong with this guy.
Tyler: I'd like to have you react to this notion that since the founding of our country, we have the balance of power progressively go from a very small group that we're building you know, and have property rights and so on, gradually spread to a larger and larger group. Now how does television fit into this? We have practically universal television as far as it being in the homes of...Does this mean that the power more and more is flowing really to the popular group?
McLuhan: Yes. Literally the participation of the whole population in the political process becomes very deep. And whereas it's no longer a question of assessing arguments, platforms, regional planks and so on - everybody is with it, all age groups. Yes the issues are no longer given to you on single planes and single platforms, they are total.
Tyler: You think you are with reality but really you are having prepared for you on television, those aspects they want you to see which gives you a feeling of participation.

Fig. 3 Example of a Text File with Different Speakers

Five speakers are taken part of the discussion: Seldes, McLuhan, Dale and Tyler. To make use of the profile variables and to be able to retrieve all contributions of a particular speaker the text segments have to be coded with the name of the speaker. In MAXQDA a code "speaker" and the subcodes "Seldes", "McLuhan", "Dale" and "Tyler" have to be defined. The coded text then looks as follows:

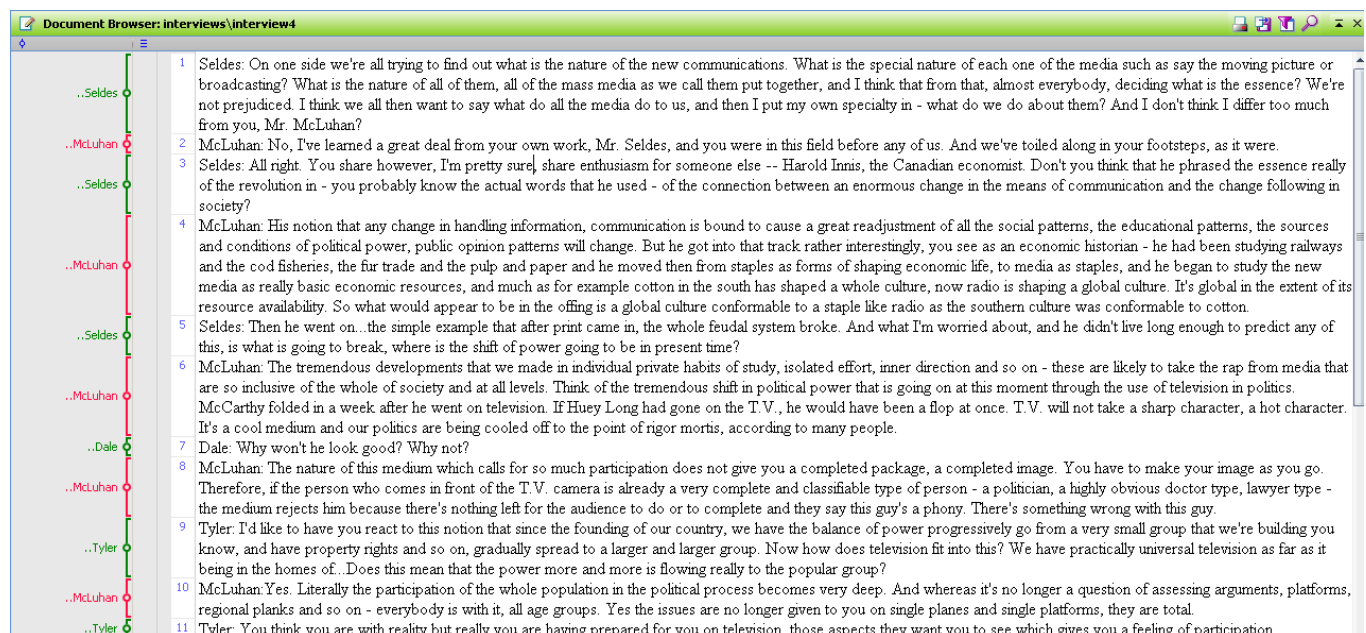


Fig. 3 Focus Groups transcript coded with the speakers

The new feature *code variables* enables the user to define attributes on the speakers levels, e.g. variables like age, sex etc. Now the contributions of those speakers of a certain age or with certain characteristics can be retrieved. The way code variables are defined is the same as with document variables. MAXQDA offers two different views for the code variables, a list view and a data view. The list view displays the list of code variables and their types. Here new code variables can be added or existing code variables may be removed. The data view is used to add and modify variable values which are in this example attributes of the different speakers of the discussion.

Statistical analysis of the quantitative data. Export and import of the data matrix

Statistical procedures are not offered by MAXQDA but an easy-to-use interface allows exporting of the entire data matrix in tab-delimited format. The matrix contains the variable names in the first row. So after seconds the statistical analysis can start with the software like SYSTAT or SPSS.

The exported data file can also be dragged into Excel and statistics and diagrams can be made with this standard software.

An existing data matrix can also be imported into MAXQDA in order to use it in combination with the qualitative data. It is necessary that the file contains the variables textgroup and text name and that these variables correspond to the appropriate text.

Connecting text and variables in selective retrievals

Selective retrievals enable the user to bring together text and variable values. The function „Activation by variables“ allows to formulate selection criterias as „Gender = male“ and all cases are checked and activated if they fulfill the logical condition.

It is possible to formulate quite complex criteria like „gender =male“ AND „ Age over 24“ and „income > 2.500€.

The selected cases can be saved as a *text set* in order to analyze this special selection in detail

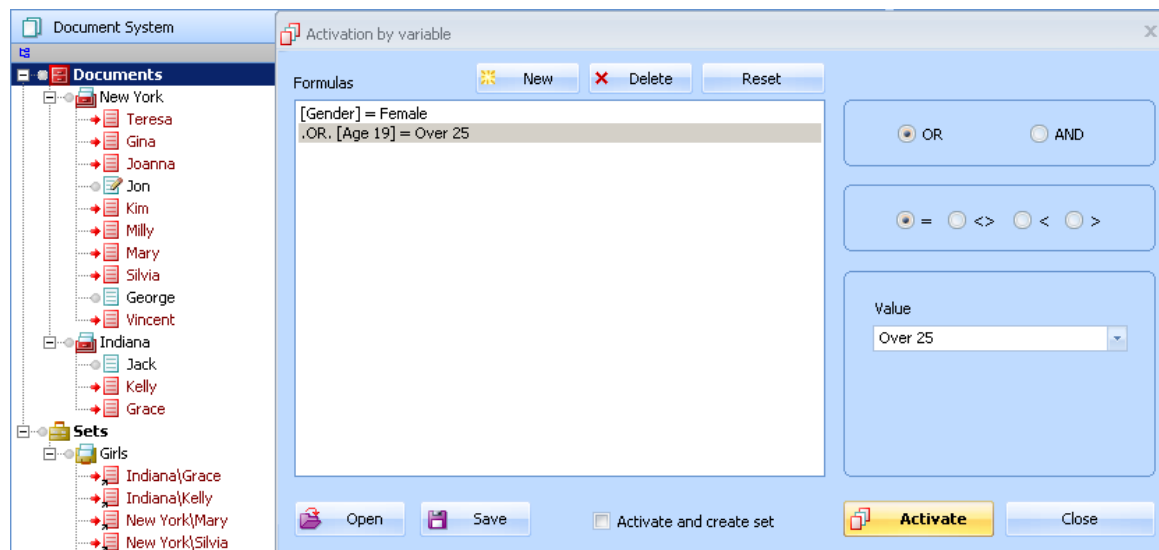


Fig. 4 Activation by Attributes: Formulating Selection Criteria

Quantitative Aspects of qualitative coding

MAXQDA counts automatically how often a code is attached to text segments and how many text segments of particular texts have been coded. The Code System and the Document System automatically display this information.

Documents	355	Code System	355
New York	252	Day-to-Day Issues	2
George	38	Emotions	25
Joanna	28	Education	19
Jon	37	Interests	15
Teresa	8	Hunches	0
Gina	10	Money and Financial Issues	6
Vincent	47	Damn	0
Kim	32	Religion and Spirituality	7
Milly	7	Significantly Positive	30

Fig. 5 The Statistics of Coded Segments in the Document System and Code System

This statistics can also be obtained in the overviews that are available on the level of, text, text groups or on the project level. For instance, the 24 segments that have been coded with the category "emotions" are presented in figure 5 as a table.

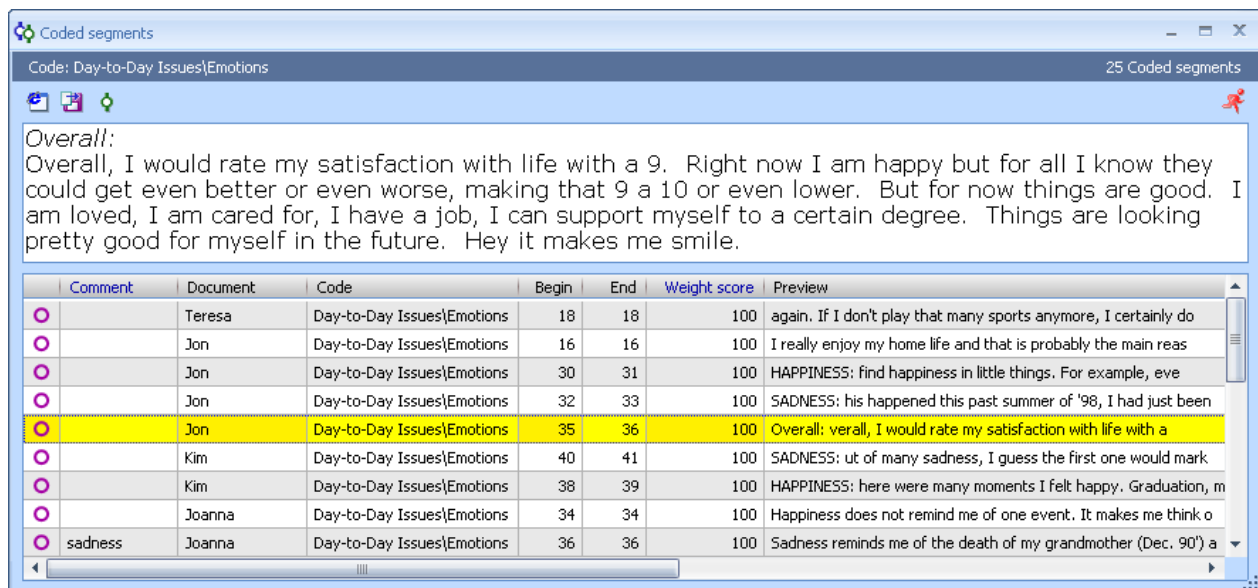


Fig. 6 *The Selection of Particular Segments*

From codes to quantitative information

The Code-Matrix-Browser

The code matrix browser is a useful tool to see at one glance the codes of different texts. Figure shows for six different texts (George, Joanna etc.) how often the different subcodes of the category „Day-to-Day Issues” have been applied.

The type of display can be switched to numbers in order to see the exact counts for different codes. When comparing figure 6 with figure 7 it is obvious that the visual display is much faster to understand than the numerical one.

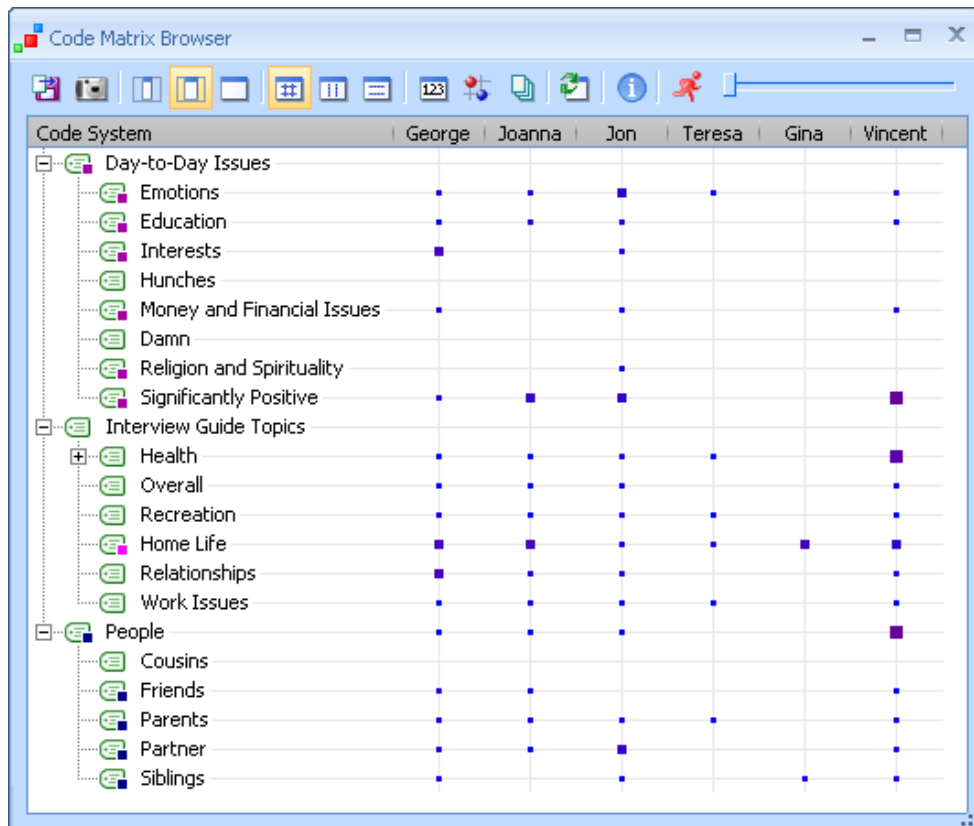
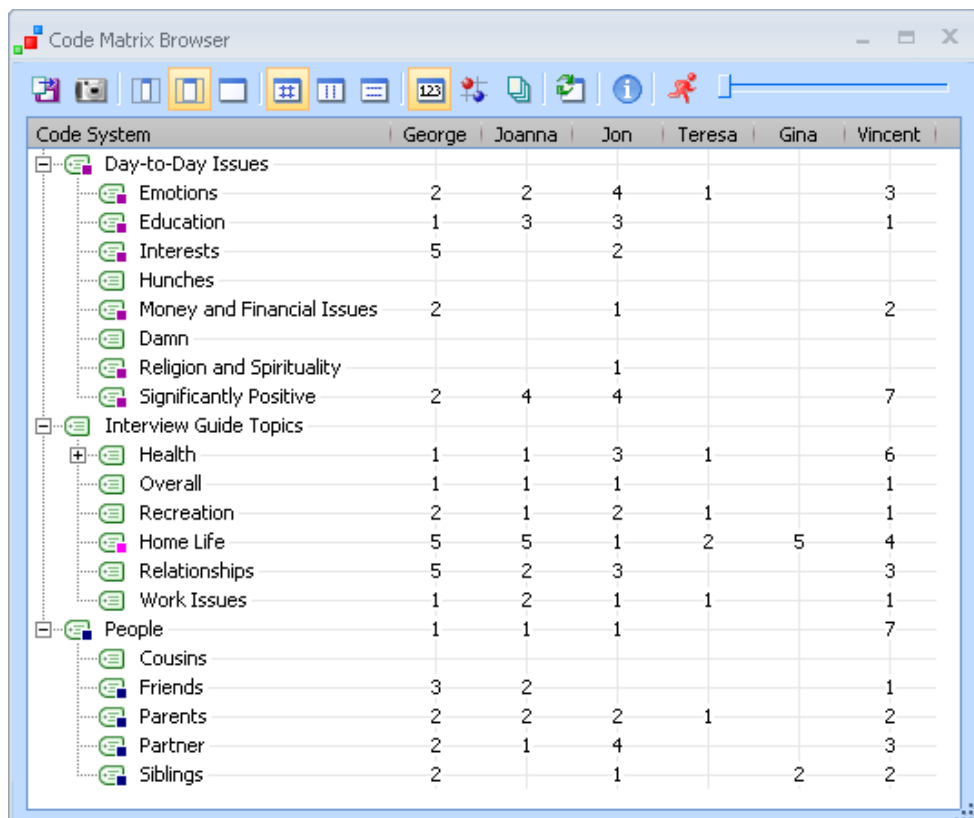


Fig. 7 (above) and Fig. 8 (below) *The Code Matrix Browser with symbols and numbers.*



Transforming codes into variables

The option to transform any code into a variable creates a strong connection between qualitative and quantitative analysis. Figure 8 show that 24 segments have been coded with the code “Day-to-Day Issues > Emotions”. By use of the Code Matrix Browser a visual display of the occurrences of this code could be obtained. To transform this code into a variable means that a new variable “emotions” will be created as part of the (quantitative) data matrix. Then for each case (person) the number of segments coded with “emotion” is counted and stored in the data matrix. Fig. 8 shows that George and Joanna (from New York) both have two segments whereas Gina has not a single one.

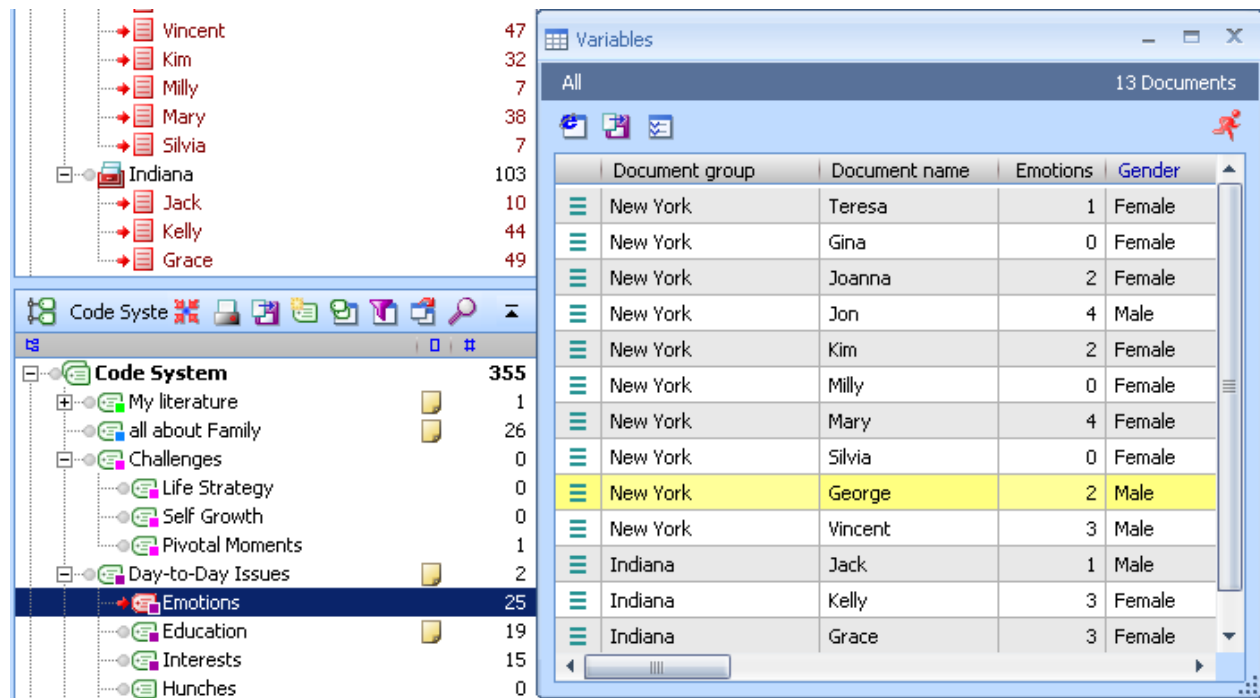


Fig. 9 Transform codes into attributes

Transforming codes (with subcodes) into categorical variables

Often coding is done in two steps: first a theme like “self-confidence” is coded whenever it appears in an interview. In the second step a more detailed coding of the already coded segments occurs. For instance, one would differentiate between different levels of self-confidence (“lack of self-confidence”, “medium degree”, “high degree of self-confidence”) and then recode all the segments with these new subcodes. The procedure “Transform code into categorical variable” creates a new variable in the set of document variables, in this case with three different categorical values. Every document and its segment coded with self-confidence is checked and the value of the new variable is given according to the subcodes that has been applied most frequently. If two subcodes appear with the same frequency, than the value of the variable is set to “undefined” and the user has to check the segments once again and decide which subcode would be the right one.

Joint Displays of themes and variables

Crosstabs

Crosstabs is a tool for the comparison of different groups, for instance men and women, or people with different personal background, etc. The grouping is done according to the values of attributes (variables). All variables from MAXQDA's variable list can be used to form a group. Groups may also be setup by a combination of different attributes.

The procedure produces a table with themes (codes) on the Y-axis and the values of a variable on the x-axis (in the columns). The table gives information on an aggregated level, for instance how many segments concerning the theme "lack of self-confidence" have been coded in the interviews with females and how many in the interviews with men. Different options allow to display percentages like row and column percentages. Crosstabs is an interactive procedure, clicking on a particular cell brings the underlying text segments into the *Retrieved Segments* window, in order to better understand the quantitative results.

Quote Matrix

The *Quote Matrix* is based on the same idea as the *Crosstabs* procedure, i.e. to create a joint display of themes and quantitative variables. Quote Matrix does this on a more detailed and not on the aggregated level. Here the coded segments itself are listed in the cells of the matrix and not only the number of coded segments for that particular cell. Quote Matrix should be used carefully at least the print out of the matrix since a huge amount of paper may be needed.

Code	Family status not married (doc variable category)	Family status single (doc variable category)
emotions	<p>Happiness does not remind me of one event. It makes me think of my life. Even though there are bad times, overall I am very happy with the way I turned out as a human being. and I like were my life is headed.</p> <p>(New York/Joanna, 34-35)</p> <p>Sadness reminds me of the death of my grandmother (Dec. 90') and my grandfather (June 96'). Their deaths effected my life greatly. They were like my second parents. These two times were definately the worst times of my life</p> <p>(New York/GINA, 12)</p>	<p>I feel as if I am very healthy and I know that I have a firm background on what being healthy means because of my interest in Nutrition and Exercise. I always to try to eat better and make the right choices and exercise on a regular basis. I really think that those two components contribute highly to health. But, health also means emotionally, mentally and even spiritually. I feel like my spiritual life really contributes to the rest of my health because I take care of my body because God tells us to in the Bible and everything else falls into place.</p> <p>(New York/Milly, 11)</p>
education	<p>My career now is college. I am graduating this weekend from my Community Health Undergraduate program at Hofstra University. I am continuing my undergraduate studies at CW Post in the fall to get a BS in nutrition. Getting my RD is my major career choice. My satisfaction level on my career is only a 7 because I am not looking forward to going back to undergrad college but it is the only way I can</p>	<p>My major is Dietetics and I am planning on working with children at either a center or a Children's Hospital and do meal plan counseling for children that need special diets because of sickness, or whatever the case may be.</p> <p>I know that will not be happy in my occupation unless I work with children. I have a heart for kids and I found this out by working a summer</p>

<p>achieve a license.</p> <p>(New York/GINA, 17)</p> <p>Overall I am pretty happy with my mental, social and physical health. I would like to improve my dedication to working out. I am the type of person who will work out 5 times a week for a month straight and then it slowly turns into less days a week until it is none. I get distracted by school work, my job or just being tired.</p> <p>(New York/Silvia, 42)</p>	<p>camp for kids for the past 2 summers.</p> <p>I started taking a Nutrition class last year and decided that it interested me and found out what kind of jobs that I could get involved with by talking with my counselor and it all worked out great.</p> <p>(...)</p> <p>(New York/vincent, 12)</p>
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Fig. 10 Quote Matrix for singles and married persons

Typology Table

To understand what a Typology table is useful for, let's look at the following figure which is taken from Creswell and Plano's book "Designing and conducting mixed methods research". Here, the rows contain different variables divided into two sections: "Sociodemographic characteristics" and "Psychological status". The table starts with age, which is obviously a metric variable. The next row lists the number and the percentage of women, a category in the categorical variable "sex". The third row gives a number and also the percentage for the African Americans, also a category of a categorical variable. The next row also gives information about a categorical variable "education less than high school". The next three rows after the heading "Psychological status" all deal with metric variables. Let's go into more detail:

The first column of the table "characteristics" contains the name of the variable. The second column "Physician rated patient depressed n=27" gives aggregated information for 27 patients: on average, they are 73 years old with a standard deviation of 5.3 years. 21 of the 27 persons are female, which is equal to 79%.

The third column "Physician rated patient not depressed n=21" gives aggregated information for another group of patients. With an average of 77.1 they are older than the first group. The standard deviation (5.3 years) is exactly the same as the other group. 15 of them are female (71%), slightly less than in the first group. The fourth column gives a probability for a significant difference based on the comparison of group data.

Characteristics	Physician Rated Patient Depressed n = 27	Physician Rated Patient Not Depressed n = 21	P Value
Sociodemographic characteristics			
Age, mean, No. (SD)	73.0 (5.3)	77.1 (5.3)	.012
Women, No. (%)*	21 (79)	15 (71)	.623
African American, No. (%)*	10 (39)	12 (57)	.173
Education less than high school, No. (%)*	8 (30)	10 (48)	.210
Psychological status			
CES-D score, mean (SD)	18.3 (13.5)	15.6 (10.0)	.450
BAI score, mean (SD)	10.0 (9.2)	11.8 (8.5)	.498
BHS score, mean (SD)	5.5 (4.1)	4.8 (3.7)	.607

In terms of MAXQDA's terminology, the rows are setup by either metric or categorical (document) variables. It's up to the user which categories are to be included in the table. In this case for the variable "sex" only the category "women" has been included but it could also include the second category "men" as well.

The columns of the table are setup by a categorical variable (here "depressed", "not depressed").

To be able to setup a typology table MAXQDA needs to know if a variable is categorical or metric. In case of the variable types "date", "floating point" and "string", there can be no doubt, but for integer variables it's not clear at all. Therefore it is necessary to indicate in MAXQDA's variable list if an integer variable is categorical.

Transform into categorical variable

The typology table function is closely related to the function "transform into categorical variable", which can be applied to any code with subcodes. Imagine the following situation: You defined a code "self-confidence" and three subcodes "high", "medium", "low" and coded all text passages with the appropriate subcodes (e.g. "high"). If you then select "transform into categorical attribute" MAXQDA evaluates each case (i.e. each document in the Document System) based on the self-confidence codes. At the same time a variable "self confidence" is created as a document variable. If a person has five segments coded with "high" and one with "low", for instance, the value "high" is given. If the person has three "medium", two with "high" and one with "low", "medium" is given. If the situation is ambiguous (e.g. one segment with "medium", one with "high"), then the value "undefined" is attached, and the user has to examine the case and make a decision. The function "transform into categorical variable" is dynamic, which means that if codes are modified or more segments are coded, it is checked if the attached value is appropriate. If not it will be updated.

The name Typology Table refers to a type of analysis that is often done with qualitative data. First data are coded concerning particular themes, and then a typology is created (in

the example above the three types of self-confidence). The Typology table offers a comparison of the different groups with regard to selected characteristics.

Integration of Content Analysis Functions

A particular strength of MAXQDA is the option to combine strategies for qualitative data analysis with techniques of content analysis. Traditional content analysis software only tries to transform text into a quantitative data matrix by use of a dictionary. This way of automatic text analysis is not very helpful for the interpretation of data. In MAXQDA this way of dictionary-based automatic coding can also be performed but the more powerful option is to integrate these steps as a heuristic tool into qualitative analysis and to use the dictionary and search words in analytic strategies of serendipity.

All content analysis options are collected in the MAXdictio module. It contains a Word Frequency Analyzer, a Stop-List- and Go-List Manager, a Dictionary Builder and a tool for Automatic Coding. The resulting data matrix can be exported easily to statistics software.

Word	Word length	Frequency	%
life	4	179	1,85
time	4	98	1,02
friends	7	76	0,79
career	6	71	0,74
satisfied	9	70	0,73
people	6	68	0,70
feel	4	67	0,69
section	7	66	0,68
home	4	61	0,63
school	6	60	0,62
good	4	55	0,57
know	4	54	0,56
happy	5	48	0,50
health	6	48	0,50
satisfaction	12	47	0,49
family	6	45	0,47
year	4	41	0,43
live	4	41	0,43
want	4	40	0,41
scale	5	40	0,41
high	4	39	0,40
job	3	39	0,40
recreation	10	37	0,38
work	4	36	0,37

Fig. 11 Output of the Word Frequencies Procedure

MAXdictio and its integration into MAXQDA support to play with the data and find out relations that have not been searched for (“Serendipity”). For instance, Fig. 9 displays that the word “health” was found 48 times in the data. An index can be created and all these occurrences can be displayed one after the other in its context or as a keyword-in-context table. It is also possible to code all 48 “hits” or a selection of them with a new code and use this code in combination with the qualitative codes. It would also be possible to transform this code into a variable and filter only those cases that mentioned the term “health” in their interviews for qualitative analysis.

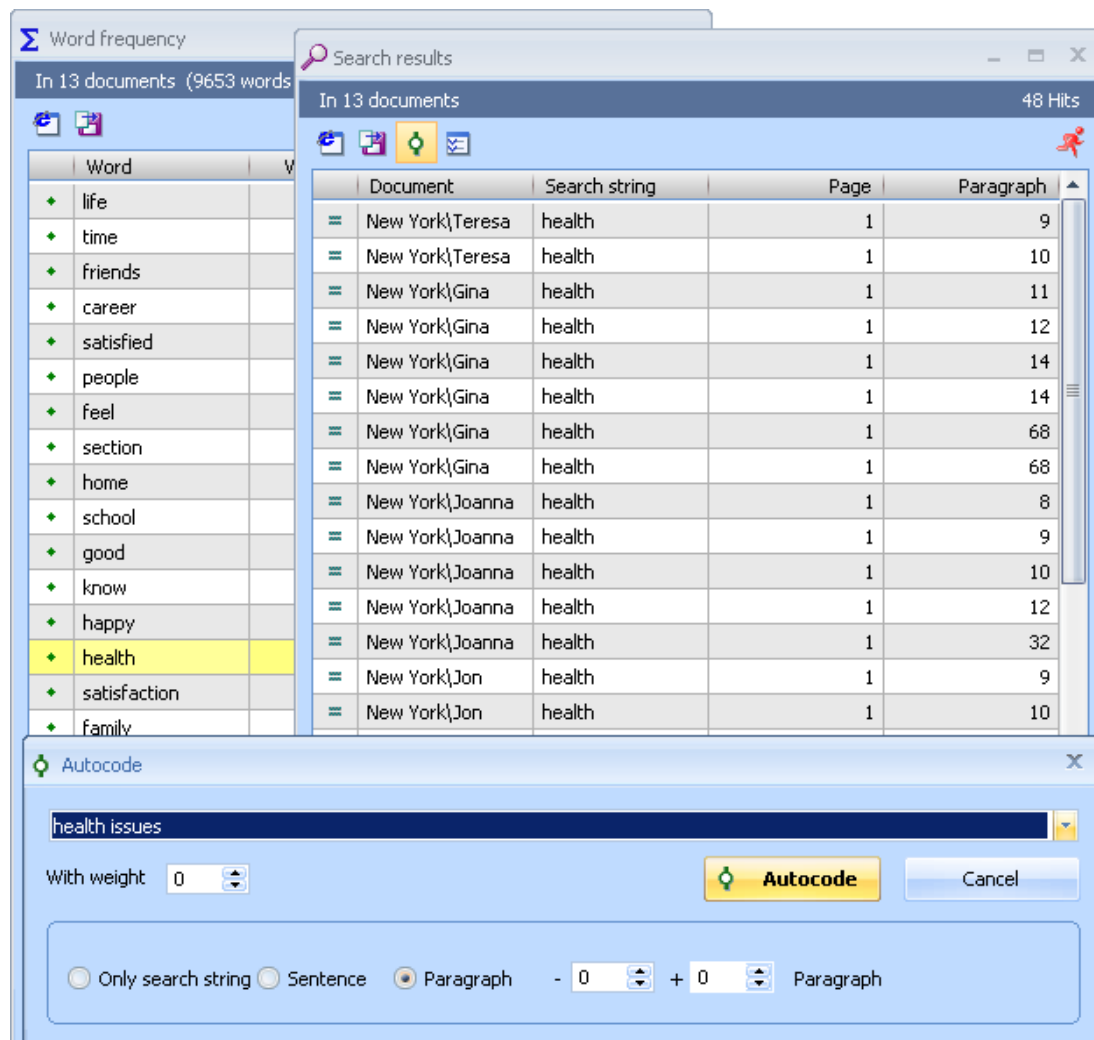


Fig. 12 Automatic coding of text containing the word “health”

The user-friendly way of integration of quantitative and qualitative research techniques offered by MAXQDA supports mixed-method research effectively. New approaches to the management and analysis of mixed can be tried. The software offers a variety of tools can be used in innovative ways.

Merging variables and the results of automatic dictionary-based coding

The new version 0 of MAXQDA allows merging the code matrix that results from the Content Analysis performed by MAXdictio with the quantitative data in MAXQDA.

In MAXQDA's next major updates a link between the categories of the dictionary and the codes in MAXQDA's code system will be implemented. This helps to define words or word combinations as indicators for a particular code or concept and to search for these words easily.

Conclusion

For a long time CAQDAS development did not pay special attention to mixed methods approaches. This has changed tremendously during the last years. The article shows that MAXQDA provides a variety of procedures and tools that can be very helpful for mixed methods data analysis on different stages of the analysis. The support for Mixed Methods is particularly strong in case of having collected as well qualitative as quantitative data for the same people. Then a true mixed type of analysis can be performed, for instance the occurrence of codes as well as their frequencies may be transformed to categorical variables. A relation of codes and attributes derived from the quantitative part of the mixed methods design may be found out – even in terms of statistical correlations. Also the quantitative data may be used as a selection criteria for the qualitative data, this type of analysis results in matrix display of (qualitative) themes and topics and other types of joint displays.

Mixed methods data analysis can also take place within the qualitative data by making use of the classification and even quantification that takes place during the coding process – no matter if the researcher is aware of it or not. The Code Matrix Browser for instance, displays and compares the characteristics of selected texts in terms of their codes – either dichotomous or using the code frequencies. A typical joint display in MAXQDA are the crosstabs, where aggregated information about codes are combined with attributes (variables) of the quantitative data matrix.

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