

## Editorial

# Data analysis in qualitative research

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Numerous studies have been published on qualitative data analysis. In these publications, there are common concepts, definitions and approaches, as well as different concepts, definitions and approaches. In this editorial on data analysis in qualitative research, the author tried to explain qualitative data analysis based on his own studies, by defining it reviewing the literature and linked to his own research experiences with examples.

In qualitative research, unlike quantitative research, measurement, evidence and generalization to the population are not essential in the analysis of data. The key is understanding the context, interpreting the content, and analytical generalization.

Therefore, qualitative data can be analyzed in four stages:

1. Thematic analysis
2. Descriptive analysis
3. Content analysis
4. Analytical generalization (Gunbayi, 2019)

The first three analyzes are used in writing the findings section of the research, and each upper stage contains the previous stage. For example, content analysis includes thematic analysis and descriptive analysis.

### Thematic analysis

In the thematic analysis, the transcripts of individual and focus group interviews, documents and observation notes are analyzed by dividing them into categories and sub-themes under the main themes in context. In a way, the mentioned theme, category and sub-themes related to the researched phenomenon are revealed in interview transcripts, documents and observation notes. If desired, a matrix table can be created based on this analysis, and which participant expressed an opinion under which main theme, category and sub-theme, or the documents and observation notes can be given thematically under which main theme, category and sub-theme are related to. In addition, frequencies and percentages can be given for this created matrix table. However, due to the nature of qualitative research, especially in the Anglo-Saxon tradition, since the quantitative content analysis of qualitative data is not favored and it is essential to first understand and then interpret the qualitative data, it is more appropriate not to give frequencies and percentages (George, 1959) and only to give a matrix table if necessary. However, if desired, frequencies and percentages can also be given, provided that further statistical analysis such as chi-square is not performed.

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For example, in the study titled "Vocational high school principals and teachers' opinions on the Leonardo da Vinci project: A case study" (Günbayı & Yassıkaya, 2011), the thematic analysis of the reasons for the participation of the principals and teachers working in the vocational high schools in the Leonardo Da Vinci project, which is the first sub-problem of the research. reasons for joining the main theme, seeing the countries in the European Union, approaching the proposal to take part in the project with tolerance, being involved in such projects before, observing vocational training in a European Union member country, examining the education system of a different country, adapting good examples of European Union member countries to Turkey, knowledge of historical and touristic places, broadening one's horizons as sub-themes were analyzed as follows:

*"1. Reasons for participating in the Leonardo Da Vinci Project*

*In order to find an answer to this sub-problem, the thematic data obtained regarding the reasons for school principals and teachers to participate in the Leonardo Da Vinci project are shown in the Table 1."*

**Table 1.**

*Thematic analysis on the reasons for participating in the Leonardo Da Vinci project*

<b>The reasons for participating</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
Seeing countries in the European Union	√	√						√
Approaching the proposal to take part in the project with tolerance							√	√
Being involved in such projects before			√			√		
Observing vocational training in a European Union member country	√			√				
Examining the education system of a different country		√	√					
Adapting good examples of European Union member countries to Turkey	√							
Knowledge of historical and touristic places						√		
Broadening one's horizons	√							

Adapted from Gunbayı and Yassıkaya (2011:19); Gunbayı (2019:134-135)

As it can be understood from the thematic analysis in Table 1, a matrix table is given regarding the views of the participants on the main theme of the reasons for participating in the Leonardo Da Vinci project according to which participants expressed their views on which sub-themes of seeing the countries in the European Union, approaching the proposal to take part in the project with tolerance, being involved in such projects before, observing vocational training in a European Union member country, examining the education system of a different country, adapting good examples of European Union member countries to Turkey, knowledge of historical and touristic places and broadening one's horizons.

Similarly, in the study titled "The effect of informal learning on teachers' professional development: A case study"(Vezne & Gunbayı, 2016) the thematic analysis for informal learning activities at school environment which is the second sub-problem of the research, informal learning activities as the main theme, talking and chatting, searching on the internet, article, magazine, documentary, observation, observing colleagues and television and radio as sub-themes were analysed as follows:

*"2. Informal learning activities at school*

*Teachers were asked about which informal learning activities took place at school environment. The data can be seen in Table 2."*

**Table 2.**

*Informal learning activities*

<b>Informal learning activities</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
Talking and chatting	√	√	√		√	√	√	√
Searching on the internet	√	√	√	√		√		√
Article, magazine, documentary	√					√		
Observation			√	√				
Observing colleagues	√							√
Television and radio	√						√	

Adapted from (Vezne & Gunbayi, 2016)

As it can be understood from the thematic analysis in Table 2, a matrix table is given regarding the views of the participants on the main theme of informal learning activities at school according to which participants expressed their views on which sub-themes of talking and chatting, searching on the internet, article, magazine, documentary, observation, observing colleagues and television and radio.

In the study titled “Principals' perceptions on school management: A case study with metaphorical analysis” (Gunbayi, 2011), thematic analysis of the metaphors produced by school principals regarding the main theme of school management and management activities. Thematic analysis of 14 metaphors (sub-themes) was carried out under six categories as seen in Table 3.

**Table 3.**

The metaphors produced by school principals on school management

<b>School Management Metaphors</b>		<b>Participants</b>													
<b>Category</b>	<b>Theme</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>	<b>N</b>
Animal	Octopus	√													
	Horse			√											
	Bee		√												
Article	Book				√										
	Seesaw					√									
Job	Boxer						√								
	Football team							√							
Machine	Steam engine								√						
	Clock									√					
	Rocket									√					
Cybernetic Mechanism	Robot											√			
	Computer												√		
Nature	Sun														√
	A garden of trees													√	

Adapted from Gunbayi (2011: 549)

As it can be understood from the thematic analysis regarding the metaphors produced by school principals of the main theme of school management and management activities above, a matrix table is given to show which participant expressed an opinion on which sub-themes (Octopus, Horse, Bee, Book, Seesaw, Boxer, Football team, Steam engine, Clock, Rocket, Robot, Computer, Sun, A garden of trees) under which category (Animal, Object, Occupation, Machine, Cybernetic Mechanism, Nature).

As seen in the examples from three articles related to thematic analysis, the main aim in the thematic analysis is to reveal what the sub-themes related to the main theme are and which participants expressed their views on which sub-theme.

## Descriptive analysis

Descriptive analysis is a continuation of thematic analysis and a more detailed analysis of data. In descriptive analysis, it is essential to understand and present the data related to the problem under the theme, category and sub-theme, with direct quotations from interview transcripts, document texts and observation notes. In a way, it is essential to give who said what on which theme in the interview transcripts without interpreting with direct quotations, and at the same time, it is essential to analyze the participants' views on the relevant theme with direct quotations related to that theme, in a way that will increase the credibility of the research by associating them with the collected documents and observation notes. In short, it is essential to present the data to the reader in a descriptive manner by making direct quotations from the data collected in the research (interview, observation and document). In addition, the data is presented with a descriptive approach, and in addition to this, some formed themes and relationships between themes can be revealed.

For example, in the study titled "Vocational high school principals and teachers' opinions about the Leonardo Da Vinci project: A case study", the descriptive analysis of the reasons for participating in the Leonardo Da Vinci project, which is the first sub-problem of the research, of the principals and teachers working in the vocational high school was carried out as follows.

“As seen in the matrix Table 1, when we look at the reasons for the participation of the principals and teachers working in vocational high schools in the Leonardo Da Vinci Project, it is seen that the desire to see the countries in the European Union is the sub-theme the most stated. The opinions of the participants on this sub-theme are given below:

*Within the scope of this project, I, as a principal of this school, desired some of my colleagues to visit and see European countries. (A1, 1)*

*I participated in the project because I first wanted to know about German education system and then visit and see Germany. (B1, 1)*

*The reason to participate in this project is that we usually carry out those projects as we believe that it would be beneficial to visit and see European countries. An invitation for bilateral agreement reached us and we accepted the invitation and so participated in the project. (H1, 1)”* Günbayi & Yassıkaya (2011: 20-21); Gunbayi (2019:135)

In another study titled " Compulsory school principals' opinions on job stress and stressors: A case study" (Günbayi & Akcan, 2003), the descriptive analysis based on interviews and observations on the theme of work stress originated from the relationships of principals with the parents was carried out as follows:

### “Work stress originated from principals' relationships with parents

*The second source of stress is parent-originated stress. 11 principals state that the tension caused by the parents is not being able to meet their expectations from the school and the teacher, or the tensions they have experienced in their own lives, and the reflection of the problems to the school principal is effective in the stress of the principals.”*

*“Parents generally have an approach that I am always right, I am the parent of the student, everything should be as I want. However, they are not aware that this is an institution and that it is governed by regulations. (A, MY6).”* (Günbayi & Akcan, 2013: 204)

Günbayı & Akcan (2003) supported the interview findings with the observation notes and carried a descriptive analysis of the theme of work stress originated from the relationships of the principals with the parents as follows:

*“As a result of the observation, it was observed that an event caused by the parents and that could cause a stress to the principals of school. The event of the observation took place in the room of FY6 in School A on March 5<sup>th</sup>, 2010 between the times of 13:00 and 13:30. The event took place as follows:*

*“A parent and a student came. The student's parents said they wanted to transfer their child to this school. MY6 asked the parent where they lived. The parent showed the residence document. FY6 looked at the residence document and said that this address was outside its borders and made the necessary explanations about which school the student should be enrolled to. However, the parents said that they wanted to enroll their child in this school and did not want to enrol to the other school. The parent was very insistent. The atmosphere was a little tense. Finally, MY6 said that he couldn't be more helpful in this regard. Parent and his child left (A,MY6).” (Günbayı & Akcan, 2013: 212)*

In another study titled " School principals, teachers, students and their parents' views on e-school implementation in the ministry of national education information management system: A case study " (Günbayı & Turan, 2013), descriptive analysis based on interviews and documents was carried out as follows:

*“It comes to me comfort. There were paper class lists that we used to call sheets. If we made a mistake, we were re-writing again in the new list, since there was no correction with correction fluid. Now, we can click on the e-School and do it more easily whenever we want. (Teacher, 10, F)”*

*“When I think of the e-School Parent Information System, I think of my parents having information about my exam results at school. (Student, 5, F)”*

*“Today, as in every field, all kinds of information in the field of education have been transferred to the electronic environment. e-School is a system where I can see all of my child's school-related information more quickly via the internet. (Parent, F)”*

*“I perceive the e-School Parent Information System as a service where we can learn about our child's absenteeism, course grades, and participation in the classroom when we are not at school. (Parent, 4, M)” (Günbayı & Turan, 2013: 8-9)*

Günbayı & Turan (2013) conducted a descriptive analysis of the e-school implementation theme of the documents based on student drawings, which contradicted the interview findings, as follows:

*“The drawing in the figure showing some teachers making students do the data entry was drawn by the sixth grade girl student numbered two. The painting includes a school and three human figures. The three human figures here actually represent two people, one a teacher and the other a student. In this picture, the teacher gives the course grades on a paper to the student to transfer to the e-School Management Information System. The student also takes these grades and enter them into the system...” (Günbayı & Turan, 2013:13)*



**Figure 1.** Some teachers make students do data entry (Günbayı & Turan, 2013:13)

Günbayı & Turan (2013) also conducted a descriptive analysis of the e-school implementation theme of the documents based on student drawings, which supported the interview findings, as follows:

*“The drawing describing the effect of the e-School parent information system in the figure on student-parent communication was drawn by the sixth grade male student. In the picture, there is a computer on the table, a sofa and two human figures. The two human figures here actually represent two people, one being the student and the other being the parent (father) of the student. The picture is of a home setting. The e-School parent information system is displayed on the computer screen in the picture. The student and his parents smile and hug each other ...”* (Günbayı & Turan, 2013:12)



**Figure 2.** The effect of the e-School parent information system on student-parent communication (Günbayı & Turan, 2013:12)

As can be understood from the descriptive analysis of the three studies above, direct quotations are given without interpreting from the observation notes and documents regarding the opinions of the participants in the first study on the theme of reasons for participating in the Leonardo Da Vinci project, on the theme of work stress originated from the relations of the principals with the parents in the second study, and on the e-school application theme in the third study.. The main thing in descriptive analysis is to reveal which participant said what about any theme as it is, without interpreting. In a way, the interpretation is left to the reader at this stage. Some qualitative studies may give and leave research data at the descriptive analysis level when writing. For example, in the study given above, the researcher can leave the interpretation of *“Some of our teachers at school do not enter data into the system themselves, but make their students do it”* related to Figure 1 and *“Based on all these drawings, we can interpret this picture as follows: When the parent here sees that his child's grades are good on the computer at home, he is happy and hugs his child. The e-School Parent Information System affects a communication positively between parents and students as seen in drawing.”* related to Figure 2 at the descriptive analysis level to the reader without mentioning about it.

### **Content Analysis**

Content analysis is the last step of qualitative data analysis in findings section. Content analysis actually involves thematic and descriptive analysis. In other words, thematic and descriptive analysis are needed to conduct content analysis; because we can say that content analysis is a deeper, comprehensive and complex state of thematic and descriptive analysis. The main purpose in content analysis is the researcher to interpret the data that he or she coded in themes in the first stage and make sense of it in the second stage, by including the researcher's own interpretations in the last stage. In a way, it is the analysis of the research problems and sub-problems by considering them as dependent variables and the other variables affecting these problems as independent variables and by including the researcher's own interpretations in a comparative and in-depth manner. In other words, at this stage, the researcher shows the “invisible underwater part of the iceberg” to the reader by relating what he or she revealed in the thematic and descriptive analysis and adding his or her own interpretation.

In terms of providing a basis for content analysis, the researcher can use themes developed in previous studies or developed based on research data at the coding stage. After selecting the content, the researcher must design a coding or classification system to analyze the content, using appropriate sampling techniques. Sometimes it is desirable to use a coding system developed in previous research. This option saves time and can be used. The use of dictionaries or standard coding categories in content analysis allows the researcher to compare with other studies using the same system. The researcher will have to develop one if he or she is going to contribute theory and knowledge in the field being researched by the research project and he or she cannot find a content analysis dictionary or classification system that fits his or her research to contribute theory and knowledge in the researched field, because it is necessary to define content categories that make sense of the variables specified by the research objectives (Marshall, Rossman, 1989). In addition, it is necessary for content analysis not only to describe qualitative data, but also to draw conclusions from the data about their origin and conditions of influence (Pool, 1959). As it can be understood from these quotations, content analysis is the next stage and supplement of thematic and descriptive analysis.

For example, in the study titled “Vocational high school principals and teachers' opinions on the Leonardo da Vinci project: A case study”, the content analysis regarding the reasons for the participation of principals and teachers, which is the first sub-problem of the research, to the Leonardo Da Vinci project. the reasons for participating in the Leonardo Da Vinci project are taken into account as the dependent variable, the duty of the participants as the independent variable considering A and B as principals and C, D, E, F, G, H as teachers, the interpretation of whether there is a difference in the reasons for participation according to the types of the duty is carried out as follows:

*“When we interpret the views of the principals and teachers on the reasons for participating in the Leonardo Da Vinci project in general, school principals want teachers in their schools to see European countries in terms of organizational effectiveness and sufficiency, to examine the education systems there, to bring good examples to their own schools and to develop their horizons; It is understood from the opinions of the teachers that they have participated in the Leonardo Da Vinci project to get to know a different country, to examine the education system of a different country, and to help the project work.” Gunbayi and Yassıkaya (2011:22)*

In another example in the same study titled “Vocational high school principals and teachers' opinions on the Leonardo da Vinci project: A case study”, the content analysis of the opinions of principals and teachers regarding the preparations made prior to the Leonardo Da Vinci project, which is the second sub-problem of the research, the preparations made before the Leonardo Da Vinci project are taken into account as the dependent variable, the duty of the participants as the independent variable considering A and B as principals and C, D, E, F, G, H as teachers, the interpretation of whether there is a difference in the preparations made prior to the Leonardo Da Vinci project according to the types of the duty is carried out as follows:

*“When we generally interpret the opinions of principals and teachers regarding the preparations made prior to the Leonardo Da Vinci project, school principals and teachers expressed a common opinion about searching the cultural characteristics of the European Union member country on the internet, introducing the Turkish education system by preparing CDs and brochures, and learning the daily spoken language of the European Union member country. School principals expressed their views differently from the teachers stating that in accordance with the responsibility of being a manager and in order for the project to start and continue on time in accordance with its purpose, they made extra preliminary preparations in investigating the education system in the destination country in advance and following the website of the national agency on the internet, where information about the accepted project and the procedures to be carried out were published.” Gunbayi and Yassıkaya (2011:25)*

As it can be understood from the examples of the content analyses above, the opinions of the principals and teachers about the reasons for participating in the Leonardo Da Vinci project and the preparations made prior to the project were considered as the independent variable, the reasons for participation and the preparations made prior to the project as the dependent variables, and the opinions of the principals and teachers were compared and the differences or similarities were interpreted. In the content analysis, it was interpreted by the researcher that while the principals in accordance with the responsibility of being an administrator were concerned about organizational effectiveness, which could be defined as the degree to which the organization achieve its goals by thinking in the institutional level, the teachers participated in the Leonardo Da Vinci project by thinking more in the individual level and having sufficiency anxiety, which could be defined as meeting the needs of the employees. Thus, the views of the participants were interpreted in more detail, revealing the real intentions of the participants that was not understood at first glance.

### **Analytical Generalization**

Analytical generalization is used in the discussion section, which is the section where the research results reached are discussed based on the literature. While the researcher makes an evaluation based on analytical generalization, he or she discusses analytically, taking into account the priority of the findings by focusing on what kind of contribution the researcher's own research has reached in the researches done so far or in the scientific books written on that subject really contributes to the researched phenomenon and what kind of similarities and differences there are between the researches done so far or the scientific books written on that subject and the research done by the researcher.



For example, in the article called “Academic staff’s perceptions on stressors originating from interpersonal relations at work setting: A case study” (Gunbayı, 2009), an analytical generalization about the contribution of the findings to the relevant literature is given in the quotation below.

*“Work stress can have both positive and negative effects. In researches on work stress done so far its negative effects have been tended to focus on (Allen, 1990; Hellriegel et al., 1995). However, PG was against the assumption that work stress is necessarily a bad thing: “If stress is everything that upsets your normal balance, there must be some stress. With your questions, I’m making the assumption that stress is negative. I do not agree with this assumption. You need some stress to teach well. You cannot teach well if you are completely relaxed, and it is also necessary for good performance.” As P3 said, some forms of stress can energize people, stress is not necessarily bad for people, and people need an optimum level of eustress. In addition, if people are completely relaxed, they cannot do their job well, and so stress is essential for a good performance.” (Gunbayı, 2009: 58)*

As can be understood from the above analytical generalization, there are studies in the literature on job stress that mainly reveal the negative effects of job stress on performance (Allen, 1990; Hellriegel et al., 1995). However, in the study conducted by Gunbayı (2009), contrary to the literature, analytical generalization was made to contribute to the stress theory that job stress also has a positive effect on performance. There is a principle that exceptions do not prove the rule in quantitative research. In other words, exceptions are not taken into account in quantitative research, findings based on data are predicted, controlled, measured and proven by considering average scores. However, since there is no generalization to the population in qualitative research, quality cannot be sacrificed to quantity. Even one person's opinion is valuable and taken into account. The person's view is first understood, then interpreted and finally generalized to the theory; that is, it is subjected to analytical generalization.

Additionally, in the same article called “Academic staff’s perceptions on stressors originating from interpersonal relations at work setting: A case study” (Gunbayı, 2009) an analytic generalization based on similarities between the researches done so far on occupational stressors and the research done by the researcher is given in the quotation below.

*“The other finding related to informal relations is those room visits by students and colleagues. Except participant 3 and participant 4, all other informants complained about those visits. For example P1 complained about those visits: ‘Yes, it is if you are supposed to do work, try to concentrate and at that moment getting interrupted by your colleagues, yes, that’s stressful.’ Besides, Participant 6: ‘I have no personal problem with the colleague with whom I share the room. However, when my or his students call in the room to ask something or for group study, we are interrupted and do not study effectively.’ This finding is also consistent with Sutton & Rafaeli’s finding (1987) in their study called ‘A characteristics of work stations as potential occupational stressors’ that at work setting intrusions by others such as interruption by noisy co-workers, ringing telephones and other people walking into and around their work stations can be principal sources of stress. The solution to this problem can be interview rooms where colleagues can welcome their students and other colleagues who want to visit them.” (Gunbayı, 2009: 58)*

In another study by Gunbayı (2014) called “Job stressors and their effects on academic staff: A case study” an analytic generalization based on the similarities between the researches done so far on the effect of stressors and the research done by the researcher is given in the quotation below.

*“The findings related to the effects of stressors showed that the stressors had psychological, social, mental and physiological effect on academic staff. Among the effects of stressors participants mentioned about having ache in a part of body and being calm or no communication with others were in the first rank, need for more social relations, heart beating, not being able to sleep, less time for family, social relations and talks, being angry and arguing with people, complaining and questioning and being indifferent to others second. Those findings*

are supported by Barkhuizen & Rothmann (2008) with the findings in their study showing that stressors were important contributing factors to ill health of academics in higher education institutions. Besides, ill health could result in sickness, absenteeism and early retirements in higher education institutions. Besides, a study by Allen, Herst, Bruck, and Sutton (2000) also showed that stress related to outcomes were those negative symptoms such as poor appetite, nervous tension, blood pressure, depression, cigarette use, heavy drinking and negative feelings at work." (Gunbayi, 2014: 70)

As seen in the articles by Gunbayi (2009) and Gunbayi (2014) analytic generalizations were made based on focusing on the similarities between the researches done so far on occupational stressors of Sutton & Rafaeli's (1987) and the effects of stressors of Barkhuizen & Rothmann (2008), Allen, Herst, Bruck, and Sutton (2000) and the researches done by the researcher.

## Conclusion

As can be understood from the types and stages of qualitative data analysis tried to be explained above, in theme and descriptive analysis, understanding the findings based on context, point of view and opinion of participants, interpretation in content analysis and the first three analyzes are used while writing the findings section of a research, while analytical generalization is used in the discussion section, which is the section where the research results reached are discussed based on the literature in terms of similarities and differences to contribute the related theory in the literature by reviewing the researches done and the scientific books written on that phenomena so far.

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