QUALITATIVE RESEARCH METHODS IN SCIENCE AND HIGHER EDUCATION

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ABSTRACT

The research possibilities of a qualitative approach have a long tradition in the social sciences and humanities, including different perspectives on theoretical foundations, research strategies, techniques, and data collection and analysis methods. The qualitative methodology first developed in cultural anthropology and ethnology, where the anthropological works of Malinowski, Strauss, Boas, and others marked the foundations of the field method of collecting data and conducting ethnographic studies. However, to date, there is no single definition of qualitative methodology, just as there are no studies that do not require the dimensions of different approaches. Starting from the observation that the question of the compatibility of qualitative and quantitative research methods is still a source of disagreement among researchers, arising from academic criticism of the quality and reliability of qualitative research, this study aims to highlight the role and importance of qualitative research in the scientific and educational process. Through the theoretical analysis of the relevant sources of methodological studies, the authors present some fundamental principles of the qualitative approach and its leading research strategies, illustrating the theoretical aspects with the most important constructs in this methodological area. The findings of this article show that despite the diversity of scientific literature and research on defining the value of qualitative research, a systematic and in-depth study of qualitative methodological issues is still needed to contribute to the improvement of the literature and increase the value of this approach in scientific and educational research practice. Accordingly, although the authors sustain a mixed research approach, they also emphasize the importance of qualitative methods, which should not be viewed separately from the research process.

Keywords: methodology, qualitative approach, research, science, education

INTRODUCTORY CONSIDERATIONS: HIGHER EDUCATION AND CONTEMPORARY SOCIETY

Today's higher education represents the organizational activity of learning, training, and teaching. It is the tertiary level of the entire educational process, which is realized at universities or higher education institutions and their sub-organizational units - faculties. This type of education includes conventional higher education institutions - humanistic, social, natural, and specialized higher

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education institutions - in the field of engineering, science, technology, agriculture, medicine, etc.

The type of education is defined by the curriculum and work program of the organizational units of the higher education institution and determined by legal and framework acts that specify the ways, forms, and conditions of the realization of the educational process. Standards and norms for the performance of higher education activities are fundamental acts at the local level that define all procedures in higher education. Thus, the Standards and norms for the performance of higher education activities in the area of Sarajevo Canton, Bosnia, and Herzegovina, determine the criteria "the fulfillment of which is necessary for the performance of higher education activities." (Sarajevo Canton, 2019) Initially, higher education was reserved exclusively for the privileged class of society, those social individuals who held the conditions and means for schooling. However, by changing the paradigm and realizing the importance of higher education, by democratizing society, efforts were made to make higher education available to everyone. Higher education and science represent a remarkably complex symbiosis that is an element of democracy and openness in every society. The development of information and communication technologies in modern society has made knowledge one of the most important components of social development and of the processes that lead to individual and collective well-being. Today we rightly speak of the knowledge society, which is becoming one of the foundations of society, its economic development, and prosperity. Therefore, within the framework of higher education and education in general, significant investments are beginning. Under these conditions, as Racic (2013) asserts, higher education "is part of the continuity, and no longer the top level of the education system. Through a series of documents, education enters the center of political interest. Educational strategies have been developed and areas needing improvement have been defined." (Racic, 2013: 88) The knowledge society as an expression is determined and clarified by documents that were made as a necessity to shape and define the Bologna Process. At the same time, the knowledge society in the complete sense represents a challenge for the whole of higher education and all its actors. According to Coffey (2001), "education deals with ways of transferring various forms and types of knowledge (...) and teachers are on the front line of educational policy and change." (Coffey, 2001: 85) In the knowledge society, constant education, and training, i.e. acquisition of knowledge and skills is a central component. At the same time, theoretical knowledge and insights are upgraded

through the individual development of practical knowledge, skills, and competencies with the intention of active participation of the individual in the development of society and social processes. Learning is a dynamic process of acquiring knowledge and competencies. Area-specific competencies are closely related to a particular area and are also referred to as academic competencies. These competencies form the core of the training and are included in every educational cycle. That is why they are called academic or area competencies. Generic competencies are a set of knowledge, skills, and values that are widely used in different fields of work and allow flexible adaptation to the requirements of different highly specialized jobs. (Vizek-Vidovic, 2009: 34) Focusing on higher education, it can be concluded that this level requires advanced knowledge and learning, but also one that includes critical thinking and understanding for participation in research work. Skills at this level are advanced, they include innovation in solving complex issues and unpredictable problems, i.e. creating new knowledge. If knowledge is the totality of facts, information, and skills acquired through education and experience, then competencies for putting into practice everything learned or adopted can only be a step forward into the practical and real. Therefore, these competencies should include the ability to analyze and synthesize, the ability to learn independently, solve problems and apply knowledge in practice, the ability to adapt to new situations, information management skills, and the ability to work independently and in a team. (Loncar-Vickovic & Dolacek-Aiduk, 2009: 24) For higher education to be able to respond to all social, political, and economic changes in the modern knowledge society, the individual must be actively educated through various forms of formal and informal education. At the same time, continuous investment must be made in the educational process to improve it. All participants in the educational process of the tertiary type to a lesser or greater extent, that is, at a lower or higher level, continuously conduct research using research methods. The main purpose of this research is to arrive at new knowledge or clarification of existing ones, improvements, and discoveries in certain scientific fields, disciplines, etc. Most of the previous studies in the field of methodology primarily focus on the complex constructs of scientific research without emphasizing the importance of a qualitative approach. Therefore, the goal of this research is to identify certain attributes of the qualitative approach that contribute to more effective research in science and thus also in higher education. A special goal is to contribute to bridging the "knowledge gap" about qualitative

methods that are less effectively known. After selecting relevant literature, we try to analyze articles published in magazines, as well as other publications by renowned researchers, following the formulation of the set issue. Our research question is the following: What are the key values of the qualitative approach in scientific-educational research and why do we conduct this type of research?

QUALITATIVE RESEARCH AND QUALITATIVE METHODS

The classification of research in the basic and general sense is done according to the collected data, that is, according to the methods of their collection. Before synthesizing, that is, collecting, these data were collected and then analyzed using a clearly defined methodology and precise methods. According to the collected data, the research was divided into two groups. The first of them is quantitative research, which, to put it simply, "focuses on numbers". The second is qualitative research that "considers words". However, although there are many reasons why a researcher might choose one method or another, this does not mean that one is better than the other.

McKay (2006) thinks that in quantitative research, data is analyzed using software and presented through numbers, and percentages, and begins with a written hypothesis that needs to be tested. On the other hand, "qualitative studies start with the assumption that the research topic must be understood 'holistically'." (McKay, 2006: 6) This implies that the center of the research and the method itself is the participant - the individual. Qualitative research and qualitative methods are directed towards the individual himself, his view, and his opinion about a certain problem, phenomenon, or occurrence. At the same time, these researches as well as the methods that follow them represent a very specific challenge for the researcher, that is, the one who interprets the obtained results. Also, qualitative research enables an in-depth approach to a problem or phenomenon. The obtained data are therefore deeper, more detailed, and richer precisely because of the so-called unstructured research strategies. Sliskovic (2017) explains that during qualitative research, that is, with qualitative methods in education and in general in scientific disciplines, the idiographic approach is nurtured - "focus on the experience and perspective of the individual (as opposed to nomoethics - focus on general laws, averages, differences between groups)." (Sliskovic, 2017) Therefore, from the researcher's perspective, it is important to successfully set boundaries in such a way that the research becomes completely meaningful and

feasible. In this context, it is inevitable to make many narrowing perspective choices. At the same time, such research emphasizes the individual, under the assumption that knowledge is based on experience, and that social reality is an "individual construct... (...) and they are aimed at the creation and development of theories and concepts." (Sliskovic, 2017) The close relationship between the researcher and the participant in the research process means that the data abounds with individual segments of the participant's life, his biographical elements, and lived experiences on which it is based. For Cilic (2020), qualitative research is empirical research that is oriented towards examining the possibility of direct access and starts by asking questions. In qualitative research, research questions are asked to which specific answers are sought. The goal of qualitative research is to describe and interpret experiences, gather new knowledge, and gain knowledge and understanding without starting assumptions. It is important to point out that qualitative research starts from intuitive knowledge, is aimed at a deeper understanding of the investigated phenomenon, and has more subjectivity. (Cilic, 2020: 42) This further implies that the researcher in qualitative research, among other things, has clear ideas and opinions about the research topic and can discuss them with others. Moreover, he must speak critically about his solutions and possible mistakes, which will not diminish the value of his research but will increase it. In this sense, therefore, qualitative research methods in education include a subjective process of analysis and evaluation of educational phenomena. For Cilic (2020), this research is descriptive "and the data collected by it have the form of words or pictures, not numbers. The data includes correspondence, footnotes, photographs, videotapes, personal documents, memos, and other official records. (...) Thus, qualitative research collects and works with non-numerical data and tries to interpret the meaning from these data that help to understand social life through the study of the target population or place." (Cilic, 2020: 43) Therefore, there is a different approach to processing, but also to interpret the obtained results. Thus, qualitative research relies heavily on the analysis and interpretation of social experiences and concepts through the participant's own experiences and concepts. Creswell (2009) also states that by using this approach, "researchers and practitioners seek to understand, describe, interpret, and develop innovative ideas about context." (Creswell, 2009: 21) Bozkurt & Öztürk (2022) discuss how the realist nature of qualitative research and methods aims to describe how people behave "and what represents and gives meaning to what they do"

(Bozkurt & Öztürk, 2022: 248). Consequently, such research produces an interpretation by the researcher of the reality sought which must be justified. In many disciplines, mostly in the social sciences and humanities, they developed and applied qualitative research. Halmi (2013) states that in these sciences and related disciplines, "there is a different range of plans (blueprints) and goals of the research. Each method is based on a specific understanding of the research subject. [Therefore] qualitative methods cannot be observed separately from the research process and the research object." (Halmi, 2013: 203) Therefore, the specificity of the discipline or science determines the choice of methodology and methods that researchers will use to solve the research problem. At the same time, the accurate positioning of the research problem and its scope also affects the choice of research methods. To Creswell (2009) "qualitative research is a means of exploring and understanding the meaning that individuals or groups attribute to a social or human problem". (Creswell, 2009: 41) Some reasons make qualitative research very diverse. Thus, some researchers are particularly interested in the use of language as a tool for communication and discourse analysis, while others want to understand how people make sense of their lives by focusing on the interpretation of human behavior and human experiences (eg, ethnographic research, narrative analysis, participatory research, theory of research-based approaches, case studies). Marguerite, Dean & Katherine (2006) studied the characteristics of qualitative research and came to the following conclusions: Studies are conducted in a naturalistic environment. Researchers ask broad research questions designed to explore, interpret, or understand the social context. Participants are selected by non-random methods based on whether individuals have information vital to the questions being asked. Data collection techniques include observation and interviewing which brings the researcher into close contact with the participants. The researcher is likely to take on an interactive role in which she or he gets to know the participants and the social context in which they live. Hypotheses are formed after the researcher begins data collection and are modified throughout the study as new data are collected and analyzed. The study provides data in narrative form. (Marguerite, Dean, & Katherine, 2006: 21). In other words, this type of research is aimed at an in-depth analysis of a specific topic.

He usually tries to get to know the subject of research in detail, so that he can later conduct other, for example, quantitative ones. It follows from the presented content that qualitative research gives the researcher more discretionary freedom. However, to avoid subjectivity, two conditions must be met: saturation and validity. Saturation occurs when the data collected during the previous research are replicated or are already known, while the validation of the findings enables the "verification" of qualitative research findings. In this context, to confirm the results of the research, it is possible to use another sample, or other cases or analyze the data with other researchers, etc.

ABOUT QUALITATIVE METHODS IN HIGHER EDUCATION

Qualitative methods are also used when examining very complex problems, precisely because they provide a broader, more comprehensive, and diverse view of a problem and phenomenon. The data obtained by these methods are non-numerical, and the methods are based on the researcher's empathic relationship with the members of the studied group. According to Hasanbegovic, in their research process, scientists try to quantify knowledge, to single out quality knowledge that can serve humanity. However, such requires the constant discovery of new knowledge and the setting of precise goals for scientific research. Thus, based on the quantification of knowledge, quantitative measurement methods were developed, and about the need to explain new knowledge and its comprehensibility, qualitative methods of knowledge measurement were developed, resulting in scientific observation. (Hasanbegovic, 2016: 55) Qualitative methods can be said to increase our understanding of the problem because the level of analysis is much more detailed and deeper than that usually covered by traditional research methods. Moreover, qualitative analysis can not only deepen our knowledge of the studied phenomenon but shed completely new light on it, that is, point to what is hidden by subjective experiences inaccessible by other means. (Croatian professional nomenclature, n.d.) The intention of their implementation in the context of education is not only about the nature of the discipline being studied, but also about the improvement of the educational process itself.

Students, e.g. can, through qualitative methods, get very precise data on whether they are satisfied with a certain course, the way the educational process is implemented, and similar parameters, and based on the data obtained, policies can be worked on that will improve the quality of education itself and ways of acquiring knowledge. Problematizing qualitative methods in general, but also placing them in the context of education, Snape and Spencer (2003) state that qualitative methods are a very broad term and that it can be applied to research that has its theoretical origins in many disciplines including anthropology, sociology, philosophy, social psychology, and linguistics. Although diversity is observed in these species, it is possible to define their set of common fundamental characteristics:
■ goals aimed at providing an in-depth and interpreted understanding of the social world of research participants by learning about their social and material circumstances, their experiences,

perspectives, and their history;
■ small-scale samples were intentionally selected based on highlighted criteria;
■ data collection methods that usually involve close contact between the researcher and research participants are interactive and often indicate urgent questions that need to be investigated;
■ data that is very detailed, rich in information and extensive;
■ an analysis that is open to new concepts and ideas and that can produce detailed description and classification, identify patterns of association or develop typologies and explanations;
■ results that tend to focus on interpretations of social meaning through mapping and 're-presenting' the participants' social world. (Snape & Spencer, 2003: 5)
For illustrative purposes, we present a set of basic characteristics of qualitative methods in the following diagram.
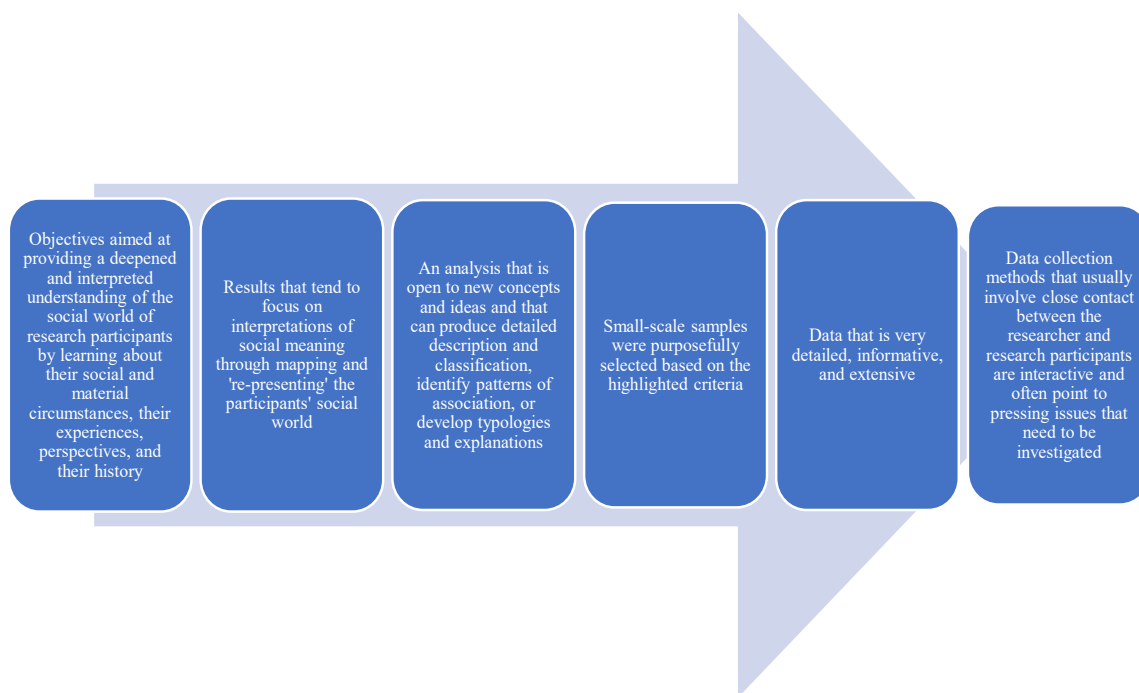
Diagram 1. A set of common basic characteristics of several disciplines in qualitative research [Created by the authors]. (According to Snape & Spencer, 2003: 5)

Qualitative research creates a deep understanding of the attitudes, behaviors, interactions, events, and social processes that make up everyday life. In this way, it helps social scientists to understand how day-to-day life affects the broad layers of society, its structure, order, and all kinds of social types. This collection of methods has flexibility and adaptability to changes in the research environment and can be

implemented in most cases with minimal costs. However, the range of these methods is quite limited, since the results are not always sufficient. Researchers must be exceedingly wary of these methods to ensure that they do not influence the data in a way that significantly alters them by introducing, for example, personal biases into the interpretation of the results.

Halmi (2013), states that qualitative research in education is defined by three interrelated generic activities - ontology, epistemology, and methodology. Ontology as a philosophical discipline asks questions about the nature of the reality we seek to know, epistemology as a theory of scientific knowledge asks questions about the nature of our knowledge, and methodology as a logical discipline asks questions about the logical framework of scientific knowledge, but also about the ways and means of how to reach that knowledge. (Halmi, 2013: 204) So, ontology in philosophy means the study of being, that is, what exists and how it is, while epistemology means the science of the foundations of knowledge, that is, the study of different assumptions about the world that will affect how knowledge can be produced. Epistemological assumptions include the basis of knowledge, how knowledge is acquired, its modality, and its nature. The stance that researchers take in this debate affects how research and findings are identified, and the answers to epistemological questions depend on the answers to ontological questions. It should be emphasized that any research, theoretical and empirical, must begin with an ontological understanding, which means that it must begin with the discovery of the parts of the world that need to be explored to obtain knowledge relevant to the formulation of the research problem. Therefore, ontological understanding is the showing of what we experience as 'real'. (Sonne-Ragans, 2019) Alnaim (2018) thinks that various scientists indicate that qualitative research in education, especially in special education, "is a positive motivation towards the development of the education sector. (...) Analyzes prove that qualitative research methods provide coherent, descriptive knowledge, help researchers to find the causes of certain phenomena, to efficiently structure the obtained data and plan further actions." (Alnaim, 2018: 302) . So, in setting the goal of understanding and describing a given reality, a qualitative approach in research proves to be the most appropriate for a better understanding of the subtleties of the phenomenon being studied, while methodological rigor enables the choice of a coherent theoretical framework and methodology, thus ensuring the quality of the obtained results and constructed data.

Speaking about qualitative research in education, Halmi (2013) states that "the logical sequence includes five interconnected phases: 1. the researcher as a multicultural subject; 2. main paradigms and interpretation perspectives; 3. research strategies; 4. methods of collecting and analyzing empirical material; and 5. thart of interpretation, evaluation, and

presentation of research findings." (Halmi, 2013: 205) Qualitative methods are represented in the educational process, especially in those disciplines and sciences that are directed toward the individual (psychology, anthropology, sociology, etc.). Regardless of the chosen method, qualitative research includes:
- research topic,
- research questions,
- review of previous research and
- research methodology.

Also, the methodology includes problems, participants, data collection instruments, data collection methods, data analysis, limitations, results, conclusions, and literature. Sliskovic (2017) problematizes how qualitative methods in education and research, in general, are subject to the principles of the constructivist nature of science.

"Science is a social construct set up/imposed by people - who actually cannot directly perceive the real world." (Sliskovic, 2017) . She is the author of the position that qualitative methods are closely related to social constructivism, where "knowledge is maintained by social processes (knowledge is constructed people through their interactions, so our version of knowledge is largely a product of language in the form of conversation)" (Sliskovic, 2017) and critical realism where "critical realists do not deny that there is a real world, but they believe that the researcher cannot directly investigate reality." (Sliskovic, 2017) The researcher observes the empirical domain, but the domains of the real and the real are not necessarily known to him and do not depend only on observation. What separates critical realists from positivists is the fact that, while the latter seeks universal laws that explain phenomena, the former admits that all observations are fallible and can be wrong. Therefore, theories are not fixed, because they can change. (Positivism & Post-Positivism, n.d.)

In a historical overview of qualitative research in education, Halmi (2013) states that qualitative methods have long been used in psychology, along with descriptive methods. As he further states, they appear as monographic studies that are focused on so-called case-study research. In American sociology, biographical methods, case and community studies, as well as many other monographs that described the daily life of people in local communities were central research strategies that significantly influenced the development of the Chicago School of Urban Sociology in the 1930s and 1940s. century. In the late 1970s and early 1980s, numerous techniques were developed for the collection and analysis of empirical

material, among which the following stand out in-depth interviews and participant observation, and among analytical procedures, the development of objective hermeneutics, phenomenological analysis, discursive analysis, and qualitative analysis stand out. content. (Halmi, 2013: 205) The most frequently applied qualitative methods, that is, ways of obtaining research data that are represented in the educational process, are focus groups, interviews, observation, and ethnography. A focus group represents a qualitative research method that is applied in education and includes a smaller group of people who answer defined questions in a moderated environment. The group was selected in a targeted manner according to pre-defined parameters, and the questions were designed in such a way as to bring concrete clarification of the problem. For Paradzik, Jukic, Karapetric Bolfan (2018), "the key task of a focus group is to know the deeper motive behind the rational evaluation of a certain topic and to contribute to a better understanding of the basis of individual and group attitudes, opinions and beliefs." (Paradzik, Jukic & Karapetric Bolfan, 2018: 442) However, although focus groups in qualitative research can provide more accurate feedback than individual interviews, they cannot be a representative sample. There are two fundamental purposes for which we conduct research with the use of a focus group, namely: substantive purposes and methodological purposes. The use of a focus group for substantive purposes is suitable for situations when we cannot reach certain knowledge through the classic way, such as, for example, to investigate the attitudes of individuals who are different from the majority, attitudes that we cannot reach with questionnaires, or the answers to the questionnaires are frivolous or insincere. then when we want to discover much more complex behaviors and motivations, or phenomena. (Paradzik, Jukic & Karapetric Bolfan, 2018: 447) On the other hand, (in-depth) interviews represent a conversation with one person (respondent) whose purpose is to "investigate the beliefs, attitudes, behaviors, experiences, and motivations of the respondents. Unlike other qualitative market research techniques, in-depth interviews are used for sensitive and private research topics that require extensive analysis)." (Coric, 2021: 1) However, interviews can be classified based on very different characteristics, taking into account, among other things, interview structure, interview standardization; whether the interview is conducted with one or more interviewees, and whether the interviewee is a participant expressing an opinion on the topic in question or an expert in his field. They can be unstructured, semi-structured, and structured, and which method of interviewing will be chosen, as well as the number of interviews, depends on the purpose of the research, including research questions, analytical design, collected data, and personal background of the researcher. Qualitative methods are thus applied in the scientific-educational process to describe events, processes, and situations of theoretical importance. These methods often come from psycholinguistics, anthropology, or sociology. Ethnography is also used in these disciplines as a qualitative method and is one of the leading research methods in sociology and cultural anthropology. Sliskovic (2017) states that ethnography includes active participation in group activities, "collection of life histories of group members, direct observation, group discussions and self-analysis of the researcher." (Sliskovic, 2017) In conducting ethnographic research, reflexivity is crucial, that is, the understanding that the researcher is part of the social world he is studying and that he is influenced by it. He can never step out of this world and be an observer (Atkinson 1990). Ethnographic interviews and conversations with tellers during observation considerably contribute to the ethnographer's knowledge, where it is also possible for the research subjects themselves to provide an interpretation of what is happening. In this way, ethnographers add validity to their observations and the research as a whole (Hammersley & Atkinson 1983: 105-107), analyzing the data from the formulation of the research problem to the end of writing the report. According to some researchers, the case study is considered a qualitative method under certain conditions and implies a method that focuses on a precise entity. It can be an organization, an individual, a specific event, etc. Focusing on the context of a specific case - an individual in his social environment, requires the study of as many role holders, interactions, connections, situations, processes, and information that can be defined. Although case studies are a form of qualitative research, they are not limited to field research. In a case study, different forms of data collection are possible, of which the most common are three qualitative methods: documentary research, participant observation, and in-depth interview. Strauss & Corbin (1900) think that the broader definition of qualitative methods in education represents "any type of research where the results were not obtained using statistical procedures or other means of quantification." (Strauss & Corbin, 1990: 129). According to these authors, for researchers using qualitative methods, "the concept of educational equity is not only a question of the distribution of educational material

resources but also a question of the background of the social system of education. In the existing context of the institutional background, cultural issues related to the field of education have always existed" (Strauss & Corbin, 1990: 129). Li (2019) indicates that with the development of society, more and more attention is paid to the education of females, and qualitative research was conducted to evaluate this concept. "Many scholars have used precisely qualitative methods to conduct effective research on a range of issues related to women's educational opportunities, women's educational content, gender differences, curriculum selection, academic evaluation, and future career expectations" (Li, 2019: 11). What is necessary for the entire research process, regardless of which method is represented, i.e. used, is that the collected data must be accurate, that is, they must be realistic so that the research is reliable and relevant. When it comes to qualitative data, is defined through the following categories: Observation (and notes) - represents a qualitative method of data collection. It is mainly carried out with a semi-structured assessment tool, based on asking the respondent questions about what is being observed. It is essential that the interviewee is not quoted and the answers are not suggested. Semi-structured interviews – tools for qualitative data collection that allow researchers to ask respondents questions about a series of predefined topics, but in a way that permits open-ended answers. Open survey - tools for measuring qualitative data that aim to examine how perceptions change over time or serve to gather information about key experiences of respondents. Surveys can use ranked scales such as "always, sometimes, never" or ranked scales from "strongly agree" to "strongly disagree". Videos and recordings - qualitative data, especially those used for narrative or discourse analysis. They arise as part of already created videos, films, recorded interviews, etc. They are essential in those disciplines and education where other observations, such as body language, environmental analysis, etc., are carried out through the consideration of the key topic. Other methods and tools for collecting qualitative data include respondents' diaries, evidence portfolios, and conceptual maps, and some researchers also define case studies as qualitative methods. All these data have an important role in research. At the same time, qualitative research is significant

in educational research because it helps to generate new questions, which leads to the questioning of assumptions and finally, broadening our frames of reference. "In short, qualitative research enhances the critical and intellectual dimension of human thinking and allows researchers to see themselves about the wider world" (Edson, 2005: 42). Halmi (2013) states that quantitative researchers in education must be independent of the subject of research, control research situations, and be objective, and that in this sense qualitative methods are 'value-engaged' means that the educator is an active participant in the curriculum that takes place within a certain social-political context. (...) Qualitative research uses a 'naturalistic language' that arises in the everyday speech, actions, and interactions of participants who are actively involved in a specific evaluation program. This language refers to the understanding and interpretation of the sense and meaning of the actor's everyday life situations. The language of the qualitative researcher in education is free and informal and is based on definitions that are formed during the duration of the study (Halmi, 2013: 126). Therefore, the application of qualitative methods in higher education, regardless of which method it is, is a very frequent case, which is aimed at the very goals of the research and what is being problematized. At the same time, qualitative methods represent an element of research when it comes to improving the educational process and scientific teaching quality. For this study, the authors consider it worth emphasizing that in the analysis of the characteristics of qualitative and quantitative research, the difference appears either in the selection of categorical variation (diversity) or in gradual variation (gradation). In other words, between the categorical and gradual interpretation of values. At the same time, it is irrelevant whether the values themselves are represented by numbers or words, or whether respondents consider metric or categorical values (Sandelowski & Barroso, 2003: 12). It is needful to note that in quantitative analysis, multidimensional (or multivariate) description is achieved by grouping variables (items) into scales and subscales based on statistical correlations between variables. These correlations are explored by factor analysis and/or by examining item-total correlations in a "reliability" program in SPSS or other software. (Seale, Gobo, Gubrium, & Silverman (Eds.), 2004: 3)

Table 1. A simple hypothetical example of a coded data matrix with four cases and three dichotomous dimensions (Source: Seale, Gobo, Gubrium, & Silverman (Eds.), 2004: 4)

	dimensions		
cases	D1	D2	D3
1	x	x	n
2	n	n	x
3	n	x	x
4	x	x	n

An analysis focused on the row comparison case will look like below. The combinations of properties by rows are xxn (cases 1 and 4), nnx (case 2), and nxx (case 3). So, there are three clusters of identical cases.

Furthermore, the analysis oriented to the dimensions, i.e. comparing the columns, is given in table 2 below.

Table 2. Dimension-oriented analysis [author's creation]

	x D2 n		x D3 n			x D3 n	
x D1	2	1	0	2	x D2	2	2
n	1	1	2	0	n	1	0
I			II			III		

I: $D1 \times D2$: low positive correlation.
Probability Condition: If $D1 = x$, D2 is more likely to be x (if we compare with condition $D1 = n$.)
II: $D2 \times D3$: perfect negative correlation.
Sufficient conditioning: If $D1 = x, D2 = n$; if $D1 = n, D3 = x, D1x$ is a sufficient condition for $D3n$.
III: $D2 \times D3$: strong negative correlation.

Necessary conditioning: $D3x$ is a necessary condition for $D2n$.
It is clear, therefore, that the data included in the qualitative sample cannot be statistically generalized due to the unknown numerical distribution in the population. Therefore, to increase the coverage, it may be a good idea to consider selecting dimensions and categories. (Schwandt, 1997: 18)

CONCLUDING CONSIDERATIONS WITH RECOMMENDATION

The origin of qualitative research goes back to distant Greek and Latin culture, while some of its various aspects are known in the works of Herodotus and Aristotle. It is clear that this approach enables the analysis of a phenomenon that differs from a quantitatively observed phenomenon, but its advantage should be emphasized, which is essentially finding the same facts from a deeper perspective and understanding issues and problems in their natural context. Despite constant controversies and disagreements about methodological issues and sharp criticism of the quality and usefulness of the qualitative approach, most researchers support the idea of connecting qualitative and

quantitative methodologies, refusing to oppose them. The values of this approach are primarily in its hermeneutic dimensions, which call for the inner logic, deeper meaning, and purpose of human activities and social phenomena, questioning those who experience them or participate in them. For this purpose, it focuses less on cause-and-effect relationships between phenomena and more on values, meanings, attitudes, beliefs, etc. Since the qualitative approach is one of the best ways to discover the characteristics and patterns that shape social situations and problems, we believe that a better understanding of qualitative methods and their clarification can only improve any range of research in the scientific-teaching process. Controversial questions, such as what are the strengths and weaknesses of qualitative methods, how they affect the search for meaning, and whether they are inconsistent with quantitative methods, should have no place in science. Both approaches are certainly important and complementary to each other, and it is necessary to use them based on the nature of the problem and the question asked. At the same time, one should not underestimate the fact that the qualitative approach is one of the two pillars that support science and education, and that instead of highlighting the differences between qualitative and quantitative methods, one should discuss their connection. Because only in this way is it possible to identify gaps or areas of ambiguity in science and the educational process and thereby open up new research opportunities and perspectives.

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