FOCUS ON RESEARCH OF SPECIAL EDUCATION IN THE CZECH REPUBLIC

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Abstract

Special education is the independent and modern scientific discipline which deals with quality of life of people with disabilities. Research of special education consists of deliberate, targeted and controlled professional activities. Empirical methods of special educational research explore contexts, relations, interactions and other manifestations of research phenomena. The main subject of special educational research is essentially the original human being, the person with a certain degree of special needs and also different methods of treatment. This paper presents selected basic facts of qualitatively and quantitatively used strategies in special educational research in the Czech Republic and points out its limits and possibilities. The suitability of using qualitative and quantitative research depends exclusively on aim of research and its objectives. It is important to apply research to the field of education of people with special needs, to their different perceptions, behavior, thinking and psychological processes as well as to their socialization and inclusion into social cultures, which are also the essences of special educational goals in general.

Keywords: *mental disability, multiple disabilities, autism spectrum disorders, specifics of education, information and communication technologies, interactive whiteboard, educational programs*

1. INTRODUCTION

Special education, as with all scientific disciplines, predicts by its subjects and issues a certain need for research, deepening and providing information about its phenomena and structures in the context of a person with disabilities. The field as such moves and improves precisely with the help of generalized and detailed research outputs, which is the essence of solving the situation of the quality of life of people with limits in society-wide relations.

Special educational research differs from the educational one mainly in different subject aim. The object of the study of special educational research is mainly persons (individuals) with a certain degree of need for support, persons with different types of health disabilities. However, in the context of special educational research, the choice of methods differs only slightly from the standard procedures of classic qualitative or quantitative educational research. Research in special education, as well as in education, or as the case maybe psychology, lies in controlled and intentional professional activities, in which empirical methods explore contexts, interactions, dependences and other similar phenomena and phenomena occurring within the whole field of special education. Ethical rules and their observance are an important part of each research.

2. QUANTITATIVE VERSUS QUALITATIVE RESEARCH IN SPECIAL EDUCATION

The researcher in a special educational conceptual plan is faced with a series of key dilemmas, touching upon subject, procedural, content, conceptual and other relevance. Application of methods, techniques and already implemented processes becomes, in rare cases, disputable. All research is original in its global nature and its path to the goal is unique. The application of methods and techniques itself is not a questionable factor among the judges of special education designed research intentions (Kaleja, 2015).

Researchers are increasingly using combinations of qualitative and quantitative research methods in a single research project. We are talking about a mixed research strategy. In qualitative procedures, results are generally not obtained through statistical procedures, as in quantitative research. If we were to set out the basic principles that help us to differentiate both approaches, then we would characterize

the special educational research by the so-called *nomothetical approach*, i.e. the search for the general, while in the field of qualitative research we would rather talk about the so-called **idiographic approach**, i.e. the search for the unique. By the **idiothetic** approach we mean a combination of the above. The following table attempts to identify further differences between the two approaches (see Hendl, 2008; Svoboda, 2012).

Level of comparison	Quantitative approach	Qualitative approach
Basic assumptions (axioms)	Positivist paradigm	Phenomonological paradigm
Siginificance of values	Research is independent	Research is dependent
Reality	Can be divided and examined separately	Has a holistic character, cannot be examined separately
Relationship between the subject and the subject examined	Is independent	Is dependent
Causal relationships	Causes can be separated from consequences	It is impossible to recognize what is the cause and effect
Structure of research plan	Usually accurate and invariable process of procedures	Usually less precise and flexible process of procedures
Nature of data	Primarily numbers	Primarily words
Generalization	Generalization can be realized	Generalization can be realized only contextually
Ethics	Emphasis on the right to know, limitation of individual rights of an individual - it is the researcher, or alternatively an institution, who has responsibility	Science and researcher have a responsibility to themselves and to society for what they discover. They must carefully consider the consequences

Table 1. Dichotomy of qualitative and quantitative research

Svoboda, (2012)

Miovský (2006) presents notes on both approaches:

The main objections to qualitative approach

a) the inclusion of a wider context means the impossibility of systematic description and processing;

b) the inability to distinguish between the significant and the insignificant;

c) great potential to discover conflicting and controversial areas without the ability to solve them;

d) the prevalence of intuition over a systematic analytical approach.

The main objections to the quantitative approach

a) Perfect control of variables, but without the ability to situate the result in a wider context;

b) low potential to address practical problems and conflicts;

c) low productivity of original ideas.

3. QUALITATIVE RESEARCH IN SPECIAL EDUCATION

Exploration of special education rules has been increasing very intensively in recent years through strategies and procedures of qualitatively focused research. Qualitative research and exploration have been coming to the fore owing to the new desire of society to look at the phenomena given, a new need to clarify the unclear and the uncharacteristic (Habermas, 1996), and owing to the increasingly apt need to individualize the way people live, biographical patterns (Beck, 1992) abandoning old patterns and models due to the diversity of the environment, subculture, lifestyle and way of life (see Habermas, 1996 in Flick, 2010; Beck, 1992 in Flick, 2010) Rapid social change and the subsequent diversification of life environment and style increasingly confront researchers with new social contexts and perspectives. These are so new to us that traditional deductive methodology, which we use in quantitative research - deriving research questions and hypotheses from theoretical models and testing them based on empirical evidence - fails due to the difference in structure of objects. That is why it is increasingly necessary for research to use induction strategies. Instead of building on the theories and testing them, the so-called sensitizing concept of research is required to achieve results on social contexts. Contrary to the classic procedure, research is not overly influenced by previous theoretical knowledge. Here, theories are developed on the basis of empirical qualitatively obtained data. (Geertz, 2000).

The question of choosing qualitative research in special education was addressed by Brantlinger (et al, 2005), who argues that qualitative research in special education has played a role that leads to the development of the whole subject. Special education research leads to radical and far-reaching changes in social policy and is the beginning of the modification of many teaching practices and strategies in the education of pupils with special educational needs. But why use qualitative and not quantitative methods? Is qualitative research more suitable for research in special education? Can special educators overcome the inherent disadvantages of qualitative research? The answer is certainly yes, there are many ways in which special educators can overcome the challenges and limitations of qualitative research and its methodology. However, the suitability of using qualitative research depends exclusively on the research objectives. This does not, however, mean that special educators cannot use qualitative research. Nevertheless, it also depends on qualitative research methods and tools which will serve to advance special education as the field of science.

In view of the subject of special education, the above mentioned input and definition of qualitative research can be applied to the field of educating persons with special needs, to their different reality of perception, behaviour, thinking and psychological processes as well as to their socialization and penetration into social cultures, which is also the essence of special educational goals in general. Qualitative research in the field of special education has some peculiarities which concern different perception of reality and adaptation to social levels, and are therefore related mainly to the secondary consequences of disability that we apply to values, standards, development processes, self-realization and different needs of quality of life. The methodological attachment of qualitative research to special education should be applied within the theoretical knowledge of people with disabilities and, as it is evident, the heterogeneity and originality of each individual must be taken into account. As noted by Kaleja (2014), simplified declarations of entity, based on anthropological features, behavioral models of behaviour, patterns and styles, cannot be accepted in research, otherwise classical stereotyping would occur and the researchers would be led to the wrong conclusions.

Definitions and specifications which characterize qualitatively oriented research are also addressed by a number of world-class experts. The distinctiveness of qualitative research or its recognition by the scientific community is no longer a problem today. However, there is still a certain terminological disunity in defining the term qualitative research. Some authors define qualitative research on the basis of methods and tools used, or on the basis of different data collection (from interviews, observations and documents), others emphasize a different method of induction-based methodology, unlike deductive, logical deductive or hypothetical deductive strategies of quantitative research, and others on the way of data analysis. (see Šváříček, Šeďová, 2014; Průcha, 2014)

Qualitative research means, according to Svaříček and Šeďová (2014), the process of exploring phenomena and problems in an authentic environment in order to obtain a complex picture of these

phenomena based on deep data and the specific relationship between the researcher and the participant of the research. The intention of a researcher carrying out qualitative research is to unravel and represent the way people understand, experience and create a social reality using a variety of procedures and methods. Qualitative research is research, the results of which are not achieved through statistical procedures or other methods of quantification. It may be research into the lives of people, stories, behavior, but also the running of organizations, social movements or mutual relationships. (Strauss, Corbin, 1999, p. 10)

The process of qualitative research and a broad range of different research objectives and issues are needed to move the boundary of special educational reality and create new, clear and valid strategies. We approach qualitative research as a strategy whose aim is to describe and explain the phenomena and their uniqueness with revealing the specific features which are not perceptible by the quantitative analysis of mass phenomena. Průcha (2014), together with Pelikán (1998) and Chráska (1994) see a significant difference in the function of paradigm of qualitative research, which, among other things, serves to create new questions for exploring the given situation, phenomenon or process.

The initial philosophy for qualitative research is phenomenology¹ (Hendl, 2016; Průcha, 2014). Characteristics of qualitative research form a certain line, the nature of which each researcher should know. Silverman (2016, 2014) points out the wrong and correct reflections on the essence of qualitative research as follows.

It is not true that:

- qualitative research is a matter of learning several techniques and therefore research methods are independent of theoretical information;
- qualitative research competes with quantitative research;
- qualitative research is only about understanding how people experience life
- everything in qualitative research is possible (is not strictly rigorous).

It is true that:

- qualitative research is a theoretically controlled process;
- it complements quantitative research in particular by entering the so-called *black box*, revealing secrecy, and dealing with how social phenomena are shaped in real time;
- qualitative research is also about common social practices as new experience of people;
- qualitative research is, or should be, credible and critical.

Trainor and Leko (2014) have been analyzing articles on qualitative research in special education for the last decade (2004 - 2014), and have found some proportional changes, a tendency to more frequent presenting qualitative research in special education as opposed to the quantitative research. Transformations have been examined by these authors through the analysis of scientific articles in the ten most frequently read and reviewed journals on social and pedagogical sciences and have found a significant shift in research from the quantitative to the qualitative, which probably corresponds to the nature of the issue being studied and the subject of special education. However, we critically point out that the conclusion of this research may also be related to the variety of qualitative research, which is often an interesting basis for large quantitative procedures, and may not correspond to the realization and present existence of research intentions.

¹ **Phenomenology** (from Greek fainomai, I show), means in general an exact examination of phenomena. Instead of exploring the essence and the facts of themselves, it deals with experiences by things showing by themselves to the people in their own consciousness.

3.1. Paradigms of qualitative research

The paradigm is a kind of steady system of opinions and procedures, which is accepted by the community of scientists, and is the exercised choice in carrying out research and research interpretations. Basic paradigms are exercised consistently in research in most humanities and related subjects. Typical paradigms include a certain characteristic of research procedures - qualitative, quantitative and mixed. With regard to the essence of this text, we will first comment on the advantages and disadvantages of qualitative research (below in the Table under the abbreviation of KV), which are also addressed by a number of authors (see Průcha (2014), Hendl (2016), Ferjenčík (2000), etc.).

The most critical discussion is **the usability of data and outcomes** following qualitative research. In today's special education, qualitatively oriented procedures compete with quantitative research with a logical conclusion, i.e. individual peculiarities of individuals, relationships and processes which are the essence and aim of special education as a scientific discipline. It is clear that new theories on the original heterogeneity of the population of people with special needs and limits can become apparent owing to the detailed exploration, analysis and unravelling the given situation. *Qualitatively oriented research helps future special educators in the practical concept of the different realities of people, which is affected and modified by the researchers' influence.*

3.2. The subject of qualitative research in special education

The crucial role of any scientific research is to clarify the question of what its subject, i.e. the aim of research is. In the case of special educational research we can rely on the following pillars of aims:

- a person with special needs their ontogenetic peculiarities and characteristics based on a particular disability;
- human environment and its agents family, social and school environment;
- the learning process and its determinants;
- the methods and techniques related to personality development the application of various specific approaches, therapies, individually designed activities, their use and effectiveness;
- the possibilities of self-fulfilment and personality growth focusing on the leisure time of an individual with disabilities, on his or her interests and the possibilities of further activities;
- human interaction with the limit in society behavioural patterns grasped in the context of a different reality;
- the productive age of a person with disabilities in connection with employment, relationships, partnerships and starting a family.

Special educational research, due to its multidisciplinarity and comprehensiveness, is one of the most complex researches. One of the features that makes it so demanding is the variability of the special needs of the surveyed respondents. (see Odom et al, 2005)

4. QUANTITATIVE RESEARCH IN SPECIAL PEDAGOGY

The philosophical basis of quantitatively oriented research in pedagogy, according to Chráska (2007), is *positivism*, or *neopositivism* respectively. This type of research is meant by F. N. Kerlinger (1972), when he states: 'Scientific research is a systematic, controlled, empirical and critical examination of hypothetical statements about supposed relationships among natural phenomena.' Gavora (2000) adds that the basis of quantitative research is the existence of an objective reality, an outside world that does not depend on our feelings and convictions.

According to Disman (2001), quantitative research focuses on detecting and identifying relationships between two or more variables. Its main aim is to verify the validity of individual theories when applying hypothesis testing derived from the subject theories. In quantitative research, reality is perceived as independent of the personality of the researcher and from this point of view human behaviour is predictable and measurable as it is considered determined. The methodology of quantitative research uses statistical methods and is clearly structured.

The use of quantitative research mainly involves:

- if generalization of findings on the population of individuals is needed;
- if our intention is to test hypotheses;
- if we are able to identify which variables are important for the research issue and that we have not omitted any of them

Hendl (2008) defines the advantages and disadvantages of quantitative research:

Advantages of quantitative research	Disadvantages of quantitative research
testing and validation of theories;can be generalized to the population;	• categories and theories used by the researcher may not match local
• the researcher can construct situations by eliminating the effects of interfering variables and demonstrate the cause-effect relationship;	 peculiarities; researcher may omit phenomena; because it focuses only on a certain theory and its testing and not on the
 relatively fast and straightforward data collection; provides accurate, numerical data; relatively fast data analysis (use of computers); the results are relatively independent of the 	 the acquired knowledge can be too abstract and general for direct application in local conditions;
 increasing are relatively independent of the researcher; is useful for examining large groups. 	• researcher is limited by a reductive way of obtaining data.

Table 2. Advantages and disadvantages of quantitative research

The research project addresses one or more related issues. As stated by Chráska (2007), the solution to the scientific issue then presents a number of mutually interconnected and dependent actions and activities. The basic scheme of the procedure for quantitative research can be as follows:

- issue determination
- studying available information
- determination and formulation of the hypothesis
- data collection and hypothesis testing
- interpretation of partial conclusions
- reaching a conclusion

In determining the issue, we usually begin by analyzing the information already available and getting to know the current state of knowledge in the examined area. Issue determination can be also achieved by means of the so-called *hypothetical statements*. Under this term we understand the observations and various information which will lead us to the question and decision to carry out our own research. In order to avoid unnecessary resolution of the issue which was resolved in the past, it is advisable or

even necessary to study as many information sources and databases as possible. An ideal tool can be one of good quality internet search engines.

When formulating the issue, the following recommendations are appropriate according to Chráska (2007):

- the issue should be formulated in a concrete, unambiguous and, if possible, interrogative form;
- the issue must imply empirical verification. Issues which are not empirically verifiable cannot be examined in scientific research;
- the issue should express the relationship between two or more variables.

4.1. Rules for hypothesis formulation

Hypotheses form the basis of classical quantitative research. When hypotheses are formulated, three basic requirements, sometimes referred to as *golden rules of the hypothesis* (Gavora, 2000), must be observed:

- The hypothesis is a statement which is expressed by an indicative sentence (it is advisable to express the research issue, on the contrary, by an interrogative sentence).
- The hypothesis must express the relationship between two variables (unless it is the expression of relationships, it is not possible to speak of a scientific hypothesis). Therefore, the hypothesis must always be formulated as a statement of *differences*, *relationships* or *consequences*.
- The hypothesis must be empirically validated. Variables which appear in the hypothesis must be measurable (albeit e.g. only on the basis of categorization).

Therefore, each hypothesis should contain variables whose mutual relationship may be validated in subsequent testing. It is also recommended that its formulation is actually a statement made by an indicative sentence. By the variable, we designate an element of examination which can acquire different values. According to Chráska (2016), the variable is a "*pedagogical phenomenon or property that changes in research*". The variable may be the age or gender of an individual, the classification of the pupils in a particular subject, the mental level, etc. These variables are divided into two groups:

- *measurable* we can determine the number or measure of a certain phenomenon or property (for example, popularity of the subject can be expressed on a scale). Thus they acquire different values within a certain range (more-less, better-worse, etc.)
- *categorical* can be categorized, cannot be quantified. The simple categorical variable has two values (e.g. gender male, female). Such variables are called dichotomous.

We can further divide variables into the so-called *independent variable*, which is a property that is the cause or condition of another property, and the *dependent variable*. The dependent variable is then the property that is the result or alternatively consequence of effect of the independent variable. For example, a child's negative behaviour at school (dependent variable) may be caused by conflicting relationships between his parents (independent variable) (Gavora, 2010).

Verifying or validating hypotheses is primarily about deciding whether or not we can accept a formulated hypothesis. Chráska (2007) states that we can decide on accepting a hypothesis in quantitative research based on extensive data collection, its sorting, processing and evaluation. Based on the results of the hypothesis verification, we express the conclusions reached by the research. We state the *acceptance* (verification) or *rejection* (falsification) of hypotheses, interpret the achieved results, compare them with the existing results of science, justify possible differences. In some cases and under certain circumstances, always based on the results found, we can deduce further conditioned statements about relations between variables. These statements can become hypotheses for possible further research (see Chráska 2007, 2016; Hendl, 2008).

4.2. Measurement in special educational research and its characteristics

The quality of measurement is determined by three basic characteristics, such as validity, reliability and practicality.

Validity

The validity of a research or a research tool means that concrete research actually finds out what is to be examined. According to Svoboda (2012), the measurement is valid if we achieve similar or totally identical results with a completely different procedure or measurement. Validity can be divided into:

- *Content* We evaluate whether the measuring tool covers both the content and the properties of the examined phenomenon.
- *Criterion* We monitor the degree of concurrence between the results of the research tool and the results of other measurements.
- *Constructive* here we measure the extent to which the results of a measurement are influenced by a factor (construct).
- *Predictive* We evaluate the extent to which the measurements made indicate the future development of the object.

Reliability

Reliability means the accuracy and one's ability to relyon a research tool, it is an indicator of the stability of a survey or measurement. The measurement is reliable if we achieve similar or totally identical results in repeated measurements. In practical life, repeating the measurement is occasionally appropriate. The degree of reliability is measured by the so-called reliability coefficient and can be determined in many ways (*by the repeated measurement method, the parallel measurement method, by the Kuder-Richardson formula, the halving method and the Cronbach alpha coefficient*).

Practicality

For the practicality of the measurements, features such as simplicity, economy, efficiency, easy feasibility, low time consumption, objectivity, etc. are of great importance (see Gavora 2000, Chráska 2007, Svoboda 2012, Průcha 2014)

4.3. Selected methods of collecting data in quantitative research

We obtain data in research using methods that are collectively referred to as empirical methods (e.g. a questionnaire, pedagogical observation, scales, an interview, different types of tests, sociometry, Q-methodology, semantic differential, etc.). The research method is a generic name for the procedure used in the research, and has certain properties which need to be followed in its use - *validity*, *reliability* and *practicality*. Today, a variety of research tools are available which already exist and are ready for use. These tools have their own methodological manuals which describe all their essential features and ways of using them. However, for many research intentions or projects, the existing tools are not suitable and therefore the researchers adapt them to their needs or alternatively create new tools. In the following text we will briefly give an insight into selected quantitatively oriented research methods that can be used in special educational research.

Questionnaire

The questionnaire is a very frequent method of collecting data also in special educational research. It is primarily intended for mass gathering of data from a large number of respondents. Therefore, the questionnaire is considered to be a very economical research tool to obtain a great deal of information with a relatively small amount of time investment. Gavora (2000) defines the questionnaire as 'a *method of asking questions in writing and obtaining written answers.* 'This is a set of pre-formulated written questions, to which the respondent also responds in writing. The questionnaire can be distributed by post, e-mail or in person to a selected sample of respondents. Personal handover and collection of questionnaires currently seems to be ideal; the rate of return may be up to 100%. In the case of mail or email distribution, the rate of return will probably be just about 10-20%.

Observation in pedagogical research

Pedagogical observation is the oldest and most certainly the most widely used method of obtaining data in pedagogical reality. Scientific observation has the character of systematic collection of empirical material. It differs in purpose, organization and planning from common observation. The objective of the observation is a description of an issue and its consequent interpretation. In quantitative research, the observer already knows exactly what he/she will observe before the beginning of the observation and sets out the kinds of phenomena he/she will focus on. In order to maximize making the subject of observation concrete, the so-called categorization of the observation must be carried out and the problem of degree to detail solved. The category serves us for the precise characterization and limitation of what we want to observe. By determining the observation units, we consequently determine the degree of detail.

The Charles Osgood Semantic Differential

The semantic differential is Osgood's method of determining and measuring the meaning of an individual's concepts and attitudes, based on the evaluation of a given term on several different verbal dimensions (Hartl, 2000, p. 113). The issue of semantic differentials was described by C. Osgood and his colleagues in The Measurement of Meaning (1957). It's a standardized method but we can modify it as needed. The original semantic differential consists of 50 bipolar seven-stage scales for the evaluation of concepts.

Sociometry in pedagogical research

According to Svoboda (2012), sociometry is a relatively extensive area of special educational research, which deals with the measurement of the intensity and direction of informal interpersonal relationships. This measurement is tailored for small social groups, so it is especially suited to analyzing relationships in classrooms of school teams. Sociometry as a research method can be used in a variety of environments, e.g. in schools, children's homes, youth clubs, and so on. Its importance is particularly noticeable in assessing the impact of pupils' integration with a certain amount of need of support measures in ordinary primary school teams, or else addressing the issue of bullying in these schools. Sociometry uses sociometric tests for data collection, sociometric matrices and sociograms for clear processing of outcome, and sociometric indexes for edumetric quantitative measuring of social groups.

Q-methodology

The name of Q-methodology is used for the group of psychometric and statistical procedures developed in the 1950s by William Stephenson. Q-methodology helps us to find out how examined individuals evaluate certain objects, individual statements or other pedagogical phenomena. According to Chráska (2016), the method is advantageous in research in which we have to determine how a certain group of respondents evaluates a certain set of objects, where the number of these objects is large. In the Q-Methodology, most frequently a number of cards with images or statements are presented to the examined persons. Individual cards are referred to as Q-types. These Q-types are then categorized by the person concerned into certain categories that differ by their rating. The number of cards that are submitted for sorting is usually quite high (as optimal, 60-120 is recommended).

5. CONCLUSION

Special educational research, or the solution of many special educational issues, often requires the use of relatively complicated procedures. Due to its multidisciplinarity and comprehensiveness, this area of research is considered one of the most complex. One of the features that makes it so demanding is the variability of the special needs of the examined respondents. Nevertheless, it is important to ensure that the basic scheme of the succession of individual partial actions is maintained. The researcher in a special educationally conceptual plan is currently facing a number of key dilemmas concerning factual, procedural, content, conceptual and other relevance. The application of methods, techniques and already implemented processes becomes in rare cases questionable. However, it must be emphasized that every piece of research in special education is original in its global nature and its path to the goal is unique.

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