

# PEDAGOGICAL RESEARCH FROM THE FUTURE TEACHERS' PERSPECTIVE: BETWEEN QUANTITY AND QUALITY

Ecaterina Sarah FRĂSINEANU<sup>1</sup>, Vali ILIE<sup>2</sup>

## **Abstract**

*The material we present proposes a brief review of the pedagogical research methodology, advocating, in the case of the students preparing to become teachers and familiarizing with this aspect, for the action research. By the way of constructing the article we wanted to emphasize the complementarity between the quantitative and the qualitative approach and, from the point of view of the results of our micro-research, we were able to find out what the methodological preferences of the beginner students are, if they practice designing certain studies. As a consequence we have identified a definite correlation between the students' specialization and the choice of the research approach. The most accessible method for them was the observation, and the less used is the biographical method. We conclude that, from the perspective of the future teachers, accomplishing the research is a constructive activity, and this is determined by the correct understanding of the specificity of the educational field and the role that the pedagogical research has.*

**Key words:** *Pedagogical research, Teachers, Quantitative methods, Qualitative methods.*

## **1. The specificity of the research accomplished by future teachers**

Starting from the idea that "The methodology of pedagogical research is the theory and practice of the pedagogical research methods and procedures, the science that studies the essence, the nature, the definition, the status, the classification and the requirements for their valorisation" (Bocoş, 2003, p. 53), we consider that the research methodology extends to all stages of the research, there being need of a research design methodology, a proper research methodology (in data collection, verification, analysis and interpretation) and a methodology for the development of the research results (to capitalize and improve the research), the whole process undertaken being a complex, recurrent, continuous process.

As an answer to the question of how future teachers can make methodological and scientific research, we will present, in summary, the research phases formulated (accepted) by most authors of specialized literature and discussed with master students from specializations that happen to correlate with the origins of quantitative

---

<sup>1</sup> Associate Professor, Ph.D., Teacher Training Department, University of Craiova, Romania, email address: sarah.frasineanu@yahoo.com, corresponding author.

<sup>2</sup> Associate Professor, Ph.D., Teacher Training Department, University of Craiova, Romania, email address: Brainstorming71@yahoo.com.

and qualitative approaches: on one hand, students from the Faculties of Science; Automatics, Computer Science and Electronics; Mechanics; Electrical Engineering; Horticulture; Agronomy and on the other hand, students from the Faculties of Social Sciences; Theology; Public Administration.

We note that each researcher must shape and carry out the research in his/her own, creative way, each stage requiring certain fundamental criteria of accomplishment. The educational research typically has the following succession:

- the preconstative phase, during which the elaboration, verification and improvement of the working tools that will be used in the observation phase, as well as the obtaining of some indicative start-up data on the studied phenomenon take place;

- the constative (preexperimental) phase - focused on obtaining quantitative or qualitative data on the research issue;

- the experimental phase during which the independent variables proposed by the hypotheses of the research are introduced or manipulated and their effects on the dependent variables are tracked;

- the post-test phase: based on the same evaluation tools, comparisons are made in order to determine the statistical relevance of the obtained data;

- the retest phase, of remote verification of the relevance and stability over time of the independent variable effects.

In carrying out the research it is recommended to follow certain ethical norms that establish a correct reporting of the researcher student both to his/her own research and other human factors involved in the research or that will use the results of the research. Thus, it is necessary:

- mentioning the sources of documentation;
- respecting the truth in communicating the obtained results;
- taking responsibility for the content of the research, by being able to prove every statement;

- avoiding actions that could negatively affect the subjects, their physical and mental condition, their dignity;

- obtaining the agreement of the subjects for their participation in the research (a difficulty in applying some methods, such as observation) and ensuring the anonymity over the identity of the subjects;

- the appropriate (neutral) relationship with the participants.

A modern model is the action-research, which involves self-reflective approaches and small-scale interventions in the functioning of the educational environment, in connection with certain practical problems identified by the teachers, as educational practitioners.

L. Ciolan (2011, p. 63) showed that "For the accomplishment of the action-research in education some aspects are important: establishing a common goal; collecting and sharing information about that goal; the collective decision for action in order to achieve the goal "and" The areas of application may be of a large variety: curriculum design and implementation, teacher training/continuing professional

development, the development of (micro) educational policies, the improvement of classroom methodologies, etc." (idem).

According to Elena Joița (2000, p. 178): the researcher's competence profile includes: general characteristics of personality, the intellectual capacities and the necessary skills at the level of each stage of the research. The specific competencies are:

- a) to identify deficiencies and to identify their causes;
- b) to build an improvement project;
- c) to capitalize on the domain experiences;
- d) to formulate objectives and hypotheses that will advance solutions to be verified;
- e) to build and apply research methods and tools;
- f) to organize and conduct research;
- g) to interpret (quantitatively and qualitatively) the results;
- h) to formulate some useful conclusions and suggestions for improving the educational practice.

The contribution of the future researcher teacher can materialize in a methodical way, in the optimization of the educational process, the research process summing up a series of actions that are constantly carried out, both during the actual research and after it, for a continuous improvement.

## **2. The pedagogical research - a quantitative or qualitative approach?**

Quantitative research, based on the positive science model, was initiated in sociology by A. Comte (1842, apud Tremblay, 2002), who proposed the study of social facts by means of identical or analogous to those in the natural sciences methods, thus making the transition from the speculation about man and society in its effective research.

We work with causal schemes, with statistical, quantifiable methods, following the way some phenomena determine influences/changes on others.

Qualitative research is an approach attributed to N. Denzin and Y. Lincoln in the 60's (apud Paillé, 1996), with the following characteristics:

- a) it is largely conceived from a comprehensive perspective;
- b) the subject of the study is addressed in an open and ample manner;
- c) it includes a data collection, performed with qualitative methods, that is methods that do not involve, at the time of collection, any quantification or processing;
- d) it brings about a qualitative analysis of the data, in which the words are analyzed directly by means of other words, without passing them through a numerical operation, and
- e) it ends with a story or a theory.

In the pedagogical research, the specificity of the field raises problems related to finding scientific methods, the intervention-effect relationship, the reduction of the influences of the incidental factors, the elimination of the effects presupposed by human variability as a subject of the research. Even though it is a special type of

scientific research, which also uses the methodology of other sciences, it captures a number of educational practices and ways to improve them.

The purpose of the practitioner teachers' research is generally an applicative-ameliorative one. Compared to the professional researchers, the research teachers encounter the disadvantage of the lack of time, the impossibility of generalizing the results obtained by their own research, but they have the advantage of being in contact with the educational reality.

The necessity of the research accomplished by the teachers is justified by the fact that, this way, the educational phenomena can be better known and interpreted, the discovery of innovative theories and practices are facilitated and the discovered educational ideas and practices are popularized.

Chelcea (2001, p. 48) showed that "By method (...) we understand the way of research, the system of rules and principles of knowledge and transformation of objective reality." In order to establish the research methodology, the researcher identifies research paths that he will use to collect a sufficient amount of concrete data, whose analysis and subsequent interpretation can lead to scientific responses or solutions, to viable conclusions.

During a research several investigative methods can be used. This proposal of the research methodology is correlated with other components, which will be detailed in the progress of the research: the sample; the necessary resources; the duration of research; the place; the research strategy (longitudinal, transversal); the type of research (inductive or deductive); the identification of the independent and dependent variables, of the parasite variables; the proposed activities; the possibilities of processing and capitalizing on data; the expected results and the initial proposals.

From a methodological point of view, the quantitative approach is based on structured, standardized methods and techniques (experiment, questionnaire survey, structured interview, etc.), while the qualitative approach uses unstructured methods and techniques (participatory observation, group interview, intensive interview, case study or biography analysis, etc.).

In fact, according to their purpose, the research methods can be grouped into: methods of data collection, methods of measurement and quantification, methods of mathematical-statistical processing and interpretation of these data.

The collection of data can be done by using the following methods: observation, that is, the pursuit of the phenomenon under its usual conditions of manifestation; the biographical method that uses the story of life; the questionnaire - structured according to a series of questions, to record opinions or attitudes; the analysis of school or curriculum documents; the analysis of the activity products as an appreciation of the achieved product, but also of the process by which it has been reached; the case study, which identifies typical or, on the contrary, exceptional situations, analyzes and proposes solutions that can be generalized.

Also, another research tool is the test, as a standardized sample of content and terms of application, with exact answers and precise criteria for evaluating the results. The experiment is used to verify the hypotheses or to apply the ameliorative measures.

During the research, data on the dependent variables are registered, influenced by the proposed measures, the parasite variables of the research, represented by factors that cannot be controlled but which alter the effects, the existing or created conditions, the performance and the results of the subjects, the attitudes, their opinions, their difficulties and the formulated solutions.

The collected data will be ordered, classified, systematized and correlated in order to obtain partial or final conclusions. Mathematical, statistical, probabilistic and various types of graphical techniques can be used.

The presentation, processing and interpretation of data can be done either quantitatively, qualitatively or combined, depending on the objectives and hypotheses formulated.

For processing and interpretation (Novak, 1988, Rateau, 2004) there are:

a) Quantitative methods:

- counting, classifying, ordering, comparing;
- calculating percentages;
- methods of determining some statistical indices: average, median, module, amplitude, variation, dispersion etc.;
- mathematical, statistical methods for studying the relationships between phenomena: the correlation coefficient, the T test;
- the use of graphical representations: diagrams, histograms, distribution graphs.

b) Qualitative interpretation methods:

- the method of differences (between posttest and pretest);
- the method of simultaneous variation (establishing the relationship between each measure and its effects, then among all of them);
- the method of concordance (establishing common causes);
- the method of remainings (identify what is left) and so on.

Scârnci (2006, p. 22) shows that "there are only quantitative methods (the experiment and the investigation) and methods that can be either qualitative or quantitative depending on the techniques used (the interview and the observation)". Moreover, some methods are complementary, for example, the role of the focus-group as a qualitative research method is to complement the data obtained through the questionnaire method (Krueger and Casey, 2005).

A comparison between the quantitative or qualitative research (Illuț, 1997) highlights the coexistence of the two approaches:

**Table no. 1. A comparison between the quantitative and qualitative approach in scientific research**

Criteria of comparison	Quantitative Approach	Qualitative Approach
1. The purpose	- explanatory	- comprehensive
2. The level to which it applies	- macrosocial	- microsocial

3. The specificity in the achievement	- is statistical	- is procedural
4. The research perspective	- researcher's point of view, from the outside	- the point of view of the subjects of research, from the inside
5. The role	- of verification	- of emergence of theories
6. The type of sample used	- a part of the population, the established sample	- the whole population, a theoretical sample
7. The period of accomplishment	- a short period of time	- a long period of time
8. The research methods	- the experiment, the standardized questionnaire survey, the quantitative analysis of the documents, the external observation	- the participatory observation, the interview, the autobiographical method, the qualitative analysis of the documents
9. The specification of the results	- the fidelity or consistency of the results	- the complexity or the results in-depth
10. The research report	- in the form of figures, tables, charts	- in metaphorical language, with interpretations, comments

There is a complementarity relationship between the quantitative and qualitative, and this is all the more necessary today with the evolution of scientific knowledge when it is useful to identify more and more connections and interrelations, when talking about global research, systemic approach, interdisciplinarity and even transdisciplinary.

It is important for our research that the effective ways are properly applied, if they are critically analyzed, if the results allow for interpretations, abstractions, generalizations, so that new valid theoretical and applied constructions are generated, for pertinent and relevant models. That is why it is important to carry out rigorous research in education, in both coordinates: qualitative and quantitative, for knowing the educational reality as objectively and scientifically as possible, as well as for its improvement.

The new constructivist paradigms imposed the necessity to promote (self) reflexive practices based on self-planning, self-observation, self-analysis, self-assessment, self-evaluation, self-criticism, self-regulation.

### **3. The students' options in designing their research. Preferred methods**

As part of their psycho-pedagogical training, the Methodology of Educational Research course, taught to first year students, second level of psycho-pedagogical training, aims to develop the following competences:

- the deep knowledge of the concepts and theories concerning the curriculum;
- the critical analysis of the curriculum documents and the application of correct criteria which to underlie making constructive decisions for their selection in

order to ensure the quality of instructional and educational activities in high school and post-secondary education;

- the use of adequate strategies in order to solve new practical situations, specific to high school and post-secondary education;

-the knowledge and deep understanding of the advanced concepts, theories and methods of IAC;

- the enunciation of some value judgments on the integration of information and communication technology in education;

- the elaboration of professional and/ or research projects, by using innovatively a wide range of specific methods meant to facilitate the management reporting to the real context.

Of the above-mentioned components, the development of professional and/ or research projects, by using innovatively a wide range of specific methods meant to facilitate the management reporting to the real context, was the main competency for a natural sample of 76 students. Although there have always been combined several methods, the choices made by our subjects have indicated a certain prioritization trend, options that have been represented in tables no. 2 and 3.

**Table no. 2. The students' choice of the priority approach for the methods of collecting research data**

The method of collecting data primarily selected	The choice percentage	The rank
1. The observation	84%	1
2. The questionnaire survey	79%	3
3. The conversation	17%	9
4. The focus group	12%	10
5. The psycho-pedagogical experiment	71%	4
6. The test	81%	2
7. The case Study	38%	7
8. The sociometric methods (the test, the sociogram, the sociomatrix)	22%	8
9. The biographical method	4%	11
10. The analysis/ study of school documents	40%	6
11. The analysis of the activity	59%	5

**Table no. 3. The students' choice of the priority approach for the methods of processing research data**

The method primarily selected	The choice percentage
A.quantitative methods: counting, classifying, ordering, comparing;	68%
<ul style="list-style-type: none"> <li>• calculating percentages;</li> <li>• methods of determining some statistical indices: media</li> </ul>	

- the use of graphical representations: diagrams, histograms, distribution charts;

B.qualitative interpretation methods: 32%

- the method of differences (between posttest and pretest);
- the method of concomitant variation (establishing the relationship between each measure and its effects, then among all of them);

For data collection, the students' answers indicated a diversified choice, with more importance on the qualitative guidance, while for the processing of results, clear choices are made in favor of the quantitative approach.

Correlation is a descriptive indicator, which shows the link between the variables, but not their causality (Labăr, 2008). The Pearson correlation is used for parametric data (with ordinal scales, of interval, or report), and Kendall and Spearman correlations are used for the categorial, ordinal variables, or when data deviates from their normal distribution. By using data processing in SPSS, we tried to find out to what extent the specialization of the students (exact sciences or socio-human sciences) correlates or does not correlate with the choice of the type of research approach (quantitative methodology or qualitative methodology).

**Table no. 4. The correlation between the students' specialization and their choice of research approach**

The Pearson Correlation	The Students' Specialization	Choosing the type of research approach
The students' specialization	1.000	.317*
Choosing the type of research approach	.317*	1.000
The number	76	76

\* The correlation is significant at the level of 0.01.

The correlation obtained is considered significant, so we can say that there is a connection between the two aspects.

As a whole, given the specificity of pedagogy as a science, but also the fact that the students who build the research are novices in this field, we can see that their choices focus more on a qualitative analysis.

Mucchielli (2002) synthesizes the following evaluation criteria of the qualitative research: internal acceptance, internal coherence, external confirmation, completeness and saturation.

The combination of quantitative and qualitative is also the proposal of our students: in the case of researching phenomena or difficult educational issues, the use of quantitative techniques (such as the questionnaire) can be preceded by a preparatory study, by qualitative analyzes (for example, document analyzes). As it is beneficial for the research that, after applying the questionnaire, the information

should be completed by elements obtained through the use of intensive-qualitative methods (the interview).

#### **4. Possibilities of training in the field of research methodology**

The training practices in the case of training in the methodology of educational research derive from the characteristics of modern education, and it accepts that reality is first subjective, then it becomes objective. As a result, the one who wants to know must participate in this process, therefore, the methodological investigation involves its own search, understanding and interpretation.

Each student has an active role in the design of research projects, since the central focus of teaching professionalization is the pedagogical competence, which refers to a person's ability to achieve, at a certain level of performance, all the tasks specific to the teaching profession; it involves technical and vocational training, but also initiative, responsibility, team spirit.

The University diffuses culture, and culture is diverse, and interdisciplinarity being also desirable for research; student education is viewed both from a social and an individual perspective, which requires differentiated, individualized treatment for the formation of competences at the level of each student.

Because each research content is special, students can get information from multiple sources (especially with the help of the Internet); and cross-dominant, actional research strategies are applied in a group or independently.

Modern training includes a qualitative, continuous, progress assessment, which is concerned with the acquisition of skills. This means that the role of the future teacher is to participate in making decisions, in several variants, to cooperate with other colleagues, partners, so, as the students have indicated, it is useful to train them in a flexible manner, so that they can choose, according to their specialization, the approaches they appropriate consider for the initiation of productive research.

#### **REFERENCES**

1. Bocoș, M. (2003). *Teoria și practica cercetării pedagogice*. Cluj-Napoca: Casa Cărții de Știință Publishing House.
2. Chelcea, S. (2001). *Metodologia cercetării sociologice: metode cantitative și calitative*. București: Economică Publishing House.
3. Ciolan, L. (coord.), Sfîngu, M., Carpea, M. (2011). *Repere în cercetarea educațională*. Retrieved at [https://www.academia.edu/4785596/REPERE\\_%C3%8EN\\_CERCETAREA\\_EDUCA%C5%A2IONAL%C4%82](https://www.academia.edu/4785596/REPERE_%C3%8EN_CERCETAREA_EDUCA%C5%A2IONAL%C4%82) [online, 03.03.2019].
4. Iluț, P. (1997). *Abordarea calitativă a socioumanului*. Iași: Polirom Publishing House.
5. Joița, E. (2000). *Management educațional. Profesorul – manager: roluri și metodologie*. Iași: Polirom Publishing House.
6. Krueger, R.A., Casey, M.A. (2005). *Metoda Focus Grup: ghid practic pentru cercetarea aplicată*. Iași: Polirom Publishing House.

7. Labăr, A.V. (2008). *SPSS pentru științele educației: metodologia analizei datelor în cercetarea pedagogică*. Iași: Polirom Publishing House.
8. Mucchielli, A. (coord.) (2002). *Dicționar al metodelor calitative în științele umane și sociale*. Iași: Polirom Publishing House.
9. Novak, A. (1977). *Metode statistice în pedagogie și psihologie*. București: Didactică și Pedagogică Publishing House.
10. Paillé, P. (1996). Qualitative (analyse). In A. Mucchielli (Ed.). *Dictionnaire des méthodes qualitatives en sciences humaines et sociales*. Paris: Armand Colin, pp.180-184.
11. Rateau, P. (2004). *Metodele și statisticile experimentale în științele umane*. Iași: Polirom Publishing House.
12. Scârnci, F. (2006). *Îndrumar de cercetare calitativă în științele socio-umane*. Retrieved at [https://www.academia.edu/6431869/%C3%8Eendrumar\\_de\\_cercetare\\_calitativ\\_%C4%83\\_%C3%AEen\\_%C5%9Ftiin%C5%A3ele\\_socio-umane](https://www.academia.edu/6431869/%C3%8Eendrumar_de_cercetare_calitativ_%C4%83_%C3%AEen_%C5%9Ftiin%C5%A3ele_socio-umane) [online, 03.03.2019].
13. Tremblay, J. M. (2002). *Auguste COMTE (1842), Discours sur l'esprit positif*. Retrieved at <http://www.anthropomada.com/bibliotheque/COMTE-Auguste-Discours-sur-lEsprit-positif.pdf> [online, 27.03.2019].