

METHODOLOGICAL ASPECTS REGARDING THE EXERCISING OF THE RESEARCH COMPETENCE OF A PRE-SERVICE TEACHER

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Abstract

One of the key responsibilities of a teacher is to initiate and carry out pedagogical research so as to make their own teaching activity more efficient, improve it and, implicitly, the students' learning. The research competence plays an important role in the teacher's competence profile, enhancing the latter. We believe that the Pre-service Teacher Training Programme should maximise opportunities for exercising this competence. The subjects in the curriculum, both for Level 1 training, but especially for Level 2, create such opportunities.

The study aims to investigate the effectiveness of some of the ways in which this competence is exercised by Master's students, within the discipline of Methodology of Educational Research, which is part of the curriculum of the Teacher Training Programme - Level 2.

The research methods used were the survey, based on questionnaire, and the pedagogical content knowledge test, the appropriate tools being the pedagogical content knowledge test and questionnaire.

The sample of subjects was made up of 83 1st year Master's students of the Faculty of Letters, (in Romanian, English, French, translation, communication, music, acting), enrolled in the Teacher Training Programme - Level 2.

The results obtained have made it possible to identify the pre-service teachers' level of training, and the development of the competence to design pedagogical research.

Key words: *Pedagogical research, Research design competence, Research design.*

1. Introduction

Research is not only a pre-requisite for proving the status of science of a field, but also a guarantee of the evolution of that science, of innovation. At the macro-educational level, pedagogical research is accountable for the continuous improvement of educational and pedagogical theories, for the validation of training models, the checking of the relevance of the changes brought about by the reform, the drafting of educational policies, etc.

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At the micro-educational level, it is a necessity for each teacher, facilitating the improvement of the teaching style, of the teaching methodologies, of the efficiency of evaluation, of the design activity, of the implementation and evaluation of the curriculum, as well as the optimisation of the communication and interaction with the students, with the other partners and beneficiaries of the educational act, while also diversifying the ways of adapting the educational process to the needs, interests and possibilities of each student.

In this context, we believe that teachers are an essential factor in promoting educational research, due to their ability to identify real problems of school practice and to have the right tools to remove/diminish them. The teacher's research competence is transversal in nature, essential to his/her development, being integrated into the general profile of competences, on a par with the didactic, scientific or other transversal competences.

Developing the teacher's research competence should be a priority of the pre- and in-service teacher training system. The analysis of the curriculum of the Pre-service Teacher Training Programme outlines the training opportunities in the field of educational research, both through the corresponding subjects of Level 1, but especially through those of Level 2.

Thus, for Level 1, the subjects of *Psychology of education, Fundamentals of pedagogy, Curriculum theory and methodology, Class management* offer the possibility to study some topics related to pedagogical research (more precisely, *Fundamentals of pedagogy, Curriculum theory and methodology, Class management*), knowledge of methods that can be used in pedagogical research (*Psychology of education, Fundamentals of pedagogy, Curriculum theory and methodology*). The *Teaching practice* discipline enhances the application of the theoretical knowledge of pedagogical research previously acquired, due to the direct contact of the students with the educational reality, to the complex aspects of a class of students, to the challenges involved in designing and conducting some didactic activities.

The disciplines in the curriculum of Level 2 focus on the development of pre-service teacher's research competence. We mention, first of all, the *Methodology of educational research*, but also the *Design and management of educational programmes* or the *Sociology of education*. Through the discipline of *Methodology of educational research*, the Master's students have the possibility of getting knowledge and training in this field. Accordingly, they can familiarize themselves with the specificities of educational research, they acquire knowledge of research approaches, of the research methods that can be used in pedagogical research, the ways of identification and proper capitalisation of sources.

From a praxiological point of view, above all, the discipline offers opportunities to exercise the competences of designing research, achieving a coherent and unitary design, appropriately selecting and capitalising on the research methodology, and writing research.

2. Pedagogical research – characteristic traits

As a particular form of scientific research, pedagogical research is considered a "special type of scientific research, a continuous process aimed at explaining, understanding, optimising, innovating, reforming and exploring education and training in a systemic way, relying on the theoretical and/or applied investigation of the functional and causal relationships between the components and variables of the educational phenomenon" (Bocoş, 2003, p. 7 - our translation). We cannot postulate a common definition of research in the field of education. Over time, there have been and continue to appear different perspectives for defining the concept, this diversity being determined by the particular complexity of the educational phenomenon (Ponce, Pagán-Maldonad, 2015).

According to other authors (Gugiuman, Zeţu, Codreanca, 1993), research is a strategy designed and developed to capture new relationships and facts between the components of educational action and to develop, on this basis, optimal solutions.

Research is considered "a truth-seeking activity which contributes to knowledge, aimed at describing or explaining the world, conducted and governed by those with a high level of proficiency or expertise " (Coryn, 2006, p. 124).

Pedagogical research displays several key features (Bocoş, 2003, pp. 7-8 - our translation):

- it may be of inductive nature - when it is based on an experiment that starts from the accumulation of experimental data that are used to outline the scientific grounds of the action and the theoretical approaches undertaken (practical-applied/empirical research) or of deductive nature - when starting from certain theories, concepts, statements, establishing the possible consequences (theoretical-basic research);
- it has an *ameliorative character*, it is not limited to the simple diagnosis of situations, state of affairs, but it proposes solutions, and pathways;
- it has a *prospective character* - it aims at establishing guidelines, directions of evolution of the society and of shaping the personality, according to them;
- it has a *complex character*, consisting in the possibility of identifying, during the course of research, other problems or aspects that can be investigated;
- it may have an *interdisciplinary, multidisciplinary or transdisciplinary character*, often relying on inter- or transdisciplinary correlations of knowledge transfers between different scientific domains;
- it has a *specific character* in the investigative approach, methods and research tools used;
- it can be *long-term* (depending on its type, research topic, research objectives, etc.);
- it can be conducted not only by scientific researchers, but also by in-service teachers, by pre-service teachers.

In line with the last mentioned feature, we consider teachers to be an important category in initiating pedagogical research (Ştefan, 2013) because of their direct connection with the educational reality, which allows them to identify the obstacles, difficulties, dysfunctions, as well as ways of removing these.

The competence of designing and conducting pedagogical research is essential for any teacher. That is why we consider that its development must and can be achieved during pre-service training, and subsequently developed throughout the teaching career.

The purpose of designing and organising educational research is to improve educational practices, teaching methodologies, evaluation methods and tools, teaching styles, and to develop or put forward educational theories. It also allows for the enrichment of knowledge, the promotion of teachers' practical experience, the promotion of debates on educational policies (Lai, Tessol, 2016). Educational research can provoke and change practice and educational policies (Bourke, Loveridge, 2017).

In this context, we mention some of the research functions (Neculau, Cozma, 1994, quoted in Bocoş, 2003, p. 9 - our translation):

- constructive, explanatory, descriptive, interpreting the various aspects, reporting causes and effects, quantitative and qualitative processing of data, formulating relationships and generalising them;

- praxiological;
- predictive, intuitive and providing models, solutions;
- systematizing, by drawing up models, theories;
- referential - informative - confrontation / debate of educational issues;
- ameliorative / optimising;
- evaluative;
- heuristic.

The qualities of research as highlighted by researchers are: clarity, timeliness, practical relevance, and amenability to action (see Lysenko, Abrami, Bernard, Dagenais, Janosz, 2014, p. 5). The rigour and relevance of research is also signposted by other authors (Reeves, 2011).

The need for change is specific to each field of activity, to each science. At the educational level, there are many changes in the classroom, school, educational policy, focusing on how they are produced (How can we introduce these new ideas in the classroom?), and the need for their production (And why should we actually do this?) (Bjesta, 2010, quoted in Burner, 2018, p. 125). We can detect the link between change and research.

3. Research methodology

The purpose of the investigation was to find out the students' opinion on the importance of competence to design and carry out research in the field of education, as well as on the methodological aspects that ensure the development of this competence.

To this end, we considered the following objectives:

- To know of the students' opinion on the role and importance of pedagogical research in their training as teachers;
- To identify the difficulties faced by students in developing the competence to design pedagogical research;

- To validate the efficiency of some methodological, action-oriented modalities in the development of the pedagogical research competence of pre-service teachers.

The research *hypotheses* were as follows:

1. ***The competence to design and conduct pedagogical research is essential for pre-service teachers.***

2. ***Providing concrete examples and situations for exercising the research competence of pre-service teachers will ensure their optimal development.***

Research methodology

To achieve the objectives and to validate the hypotheses, we used the survey based on the questionnaire and the pedagogical content knowledge test.

Both methods were used in the summative assessment conducted at the end of the semester.

The questionnaire contained 10 items that investigated the views of the subjects on:

- the importance of research competence for a pre-service teacher;
- the need and possibility for a teacher (pre-service teacher) to initiate research in the field of education;
- the aspects that contributed significantly to the development of the competence to carry out research;
- the types of research competencies that we believe they have developed through the discipline of *Methodology of educational research*;
- other competencies related to research, which have been developed;
- the difficulties encountered in preparing for the exam;
- the opportunities of further capitalising on what has been learnt through the discipline.

The pedagogical content knowledge test aimed at identifying the level of research design competence, the typical mistakes, as well as the successful aspects.

The sample of subjects was made up of 83 1st year Master's students of the Faculty of Letters.

4. Results

In what follows, we present the research findings from the perspective of their contribution to the validation of the working hypotheses. Thus, in order to determine the truth value of the first hypothesis, we shall indicate the results of the questionnaire applied to the students.

The first item of the questionnaire was the knowledge of the students' opinion on the importance of the teacher's research competence. The students' responses are presented below (see also Chart 1):

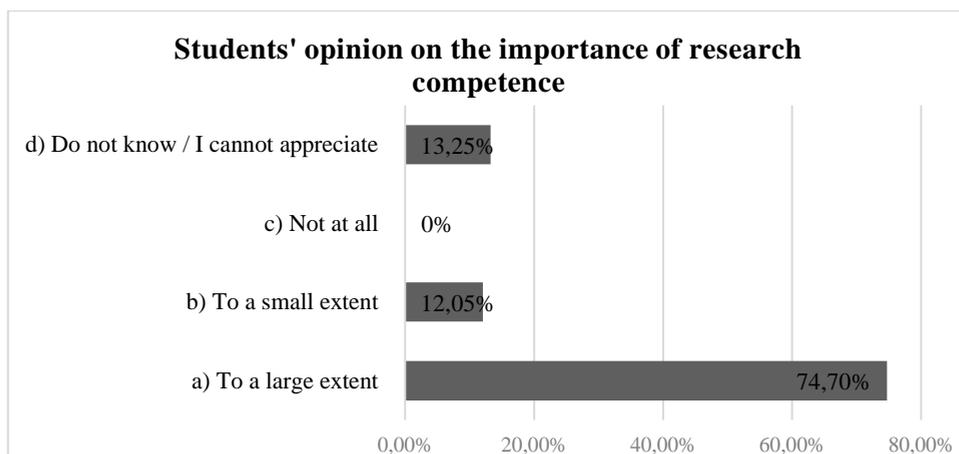


Chart no. 1. Students' opinion on the importance of research competence

As it can be seen, most students believe that this competence is important for a teacher.

The next two items aimed to investigate the subject's opinion on the necessity (item 2) and possibility (item 3) of a teacher's conducting pedagogical research.

Consequently, regarding the necessity of a teacher's conducting pedagogical research, the answers were:

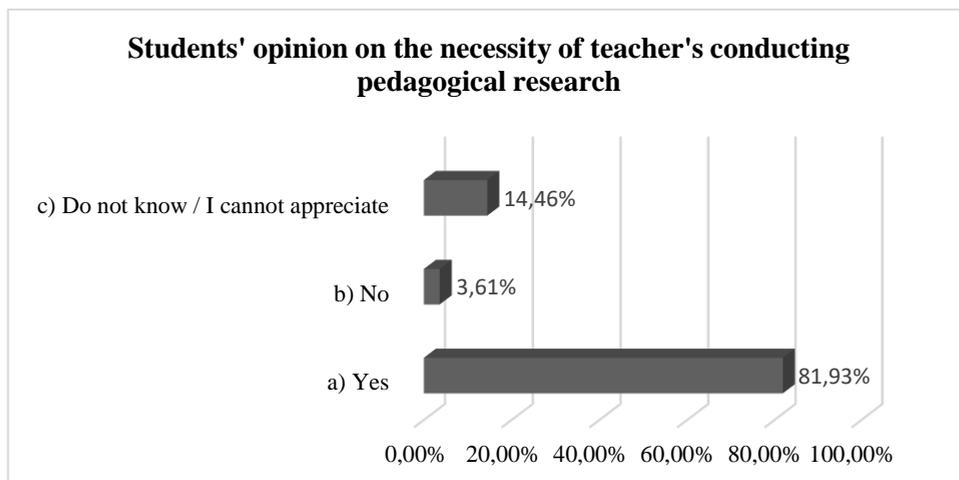


Chart no. 2. Students' opinion on the necessity of teacher's conducting pedagogical research

The subjects' answers to the question of the possibility of a teacher's conducting pedagogical research are very close to those presented in Chart 3.

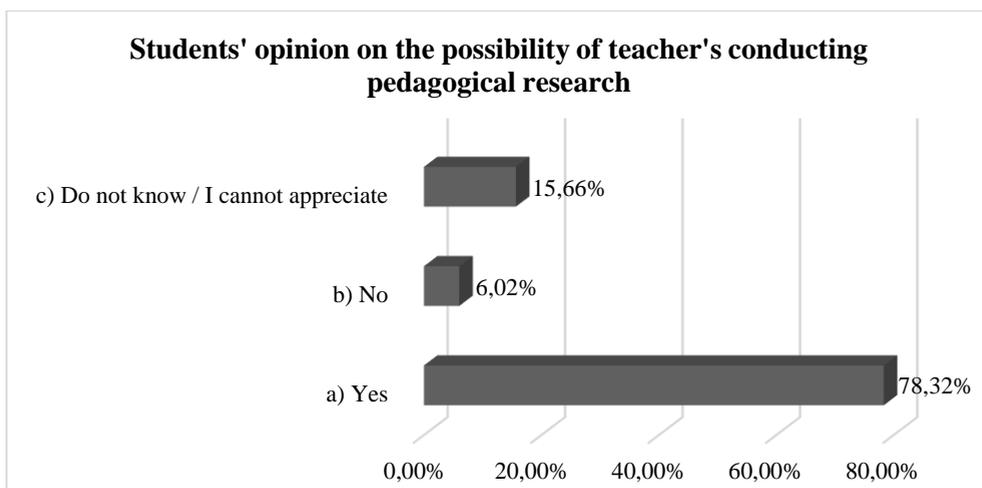


Chart no. 3. Students' opinion on the possibility of teacher's conducting pedagogical research

Regarding the ways that contributed most to the development of the research competence, the students mainly appreciated the practical applications, as well as the examples presented and analysed during the seminars (Chart 4). For *Some other way* variant, the students mentioned the data they found on the Internet.

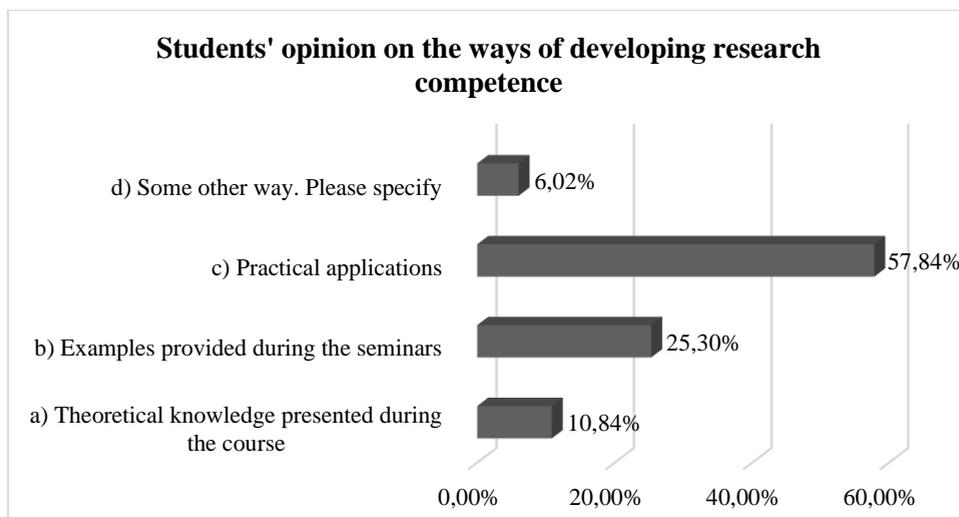


Chart no. 4. Students' opinion on the ways of developing research competence

Students consider designing research and organizing and conducting it as stages with approximately the same degree of difficulty, as seen from the results presented below and from Chart no. 5.

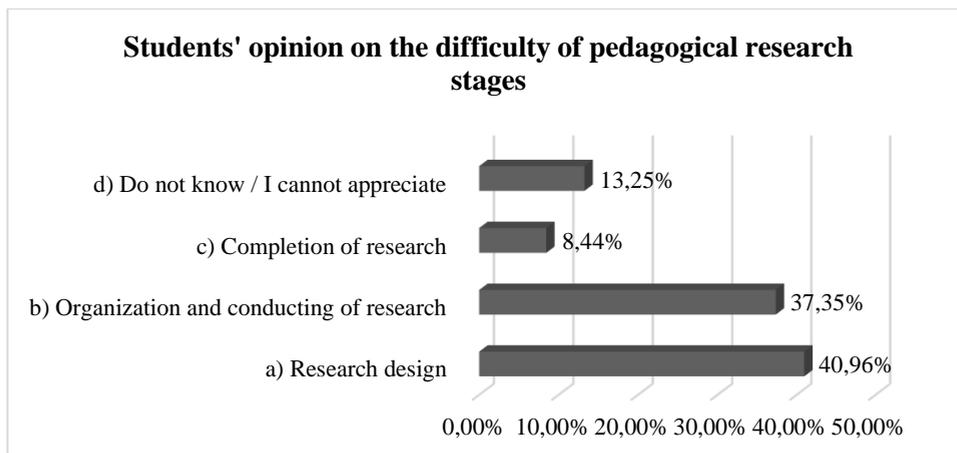


Chart no. 5. Students' opinion on the difficulty of pedagogical research stages

Among the research competence components, the students pointed out research design was the most practised during the course of *Methodology of educational research*.

By interpreting the students' answers, it follows that the above-mentioned course has also contributed to the development of other complementary related skills.

The values attached by students to these skills are shown in Chart 6.

Under variant e), students mentioned *the metacognitive competence*.

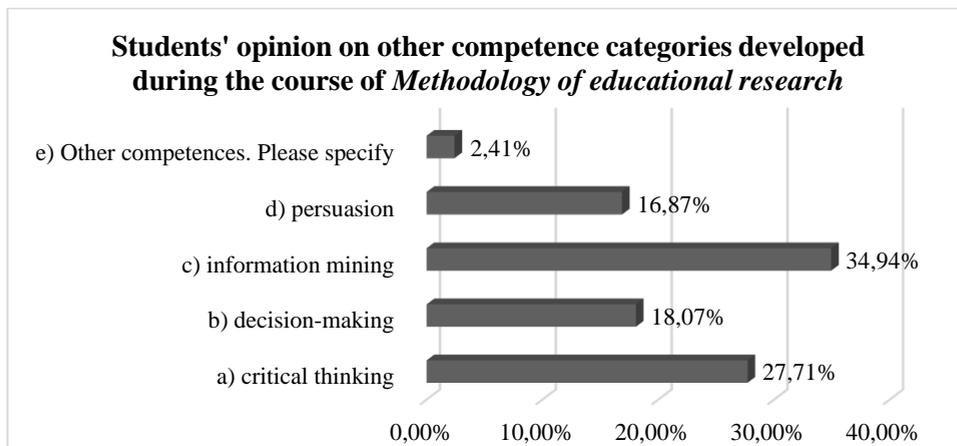


Chart no. 6. Students' opinion on other competence categories developed during the course of *Methodology of educational research*

The last two items of the questionnaire were open-ended ones, and investigated the students' view of the difficulties encountered in preparing for the

exam, as well as the notions that they thought to have assimilated during the course and that they were likely to use future.

Among the difficulties mentioned by the students, we list the following:

• no link with school-based teaching practice, for a better understanding of research issues;

- lack of experience in identifying real and current research topics;
- the abstract character of some research notions;
- lack of bibliography on certain topics;
- the need for detailed, thorough information mining;
- the need to exemplify each stage of a research;
- variety and diversity of research methods and appropriate tools;
- confusion between research methods and more familiar training methods.

The aspects mentioned by students as likely to capitalise on future activities were:

• information mining techniques, of identifying relevant and updated sources for the topic;

- critical analysis of the sources used in the writing up of a paper;
- correct citation of sources in the writing up of a scientific paper;
- identifying problems, mismatches in educational practice;
- developing solutions;
- making adequate decisions;
- argumentation of own ideas or points of view, building a scientific rationale;
- self-evaluation of their own activity and results.

Regarding Hypothesis 2 of the research, *Providing concrete examples and situations for exercising the research competence of pre-service teachers will ensure their optimal development*, the students' answers, presented in Chart confirm that the examples provided, as well as the practice in concrete situations, have ensured the development of research competence.

In addition to the many examples and variants offered, students were given the opportunity to choose a research topic at the beginning of the semester, in relation to which they could exemplify each stage of the pedagogical research project presented during the course/seminar.

The pedagogical content knowledge test applied to students at the end of the semester included items that required the achievement of a part of the design of research on the topic: "The role of metacognitive skills in ensuring the success of high school students"

The requirements were as follows:

- a) Specify 3 key concepts of the topic;
- b) Define the aim and 3 objectives of the research;
- c) Formulate the general hypothesis and 2 particular hypotheses;
- d) Specify the research variables;
- e) Present three research methods that you could use;

f) In maximum one page describe the experiment you could conduct.

Table no. 1 show the students' scores in the content knowledge test, recorded for each item (in percentages).

Table no. 1. Students' scoring in the content knowledge test

Item	Level of achievement %
a) Specify 3 key concepts of the topic.	62%
b) Define the aim and 3 objectives of the research.	57%
c) Formulate the general hypothesis and 2 particular hypotheses.	46%
d) Specify the research variables.	51%
e) Present three research methods that you could use.	74%
f) In maximum one page describe the experiment you could conduct.	52%

As shown, the highest level of achievement was related to the presentation of research methods. Instead, the main difficulties were encountered in the formulation of research hypotheses and research variables, such as the description of the experiment.

5. Discussions

The research tools used in the investigation allowed for results that validated the hypotheses.

Thus, the questionnaire applied to the students highlighted their role in pedagogical research, but also the difficulties they encountered in the development and exercising of specific competences in this field. The course of *Methodology of educational research*, which they took up within the Teacher Training Programme, Level 2, offered the opportunity to develop such competences. At the same time, through this discipline, the students had the opportunity to practise other related skills, such as metacognitive skills, critical thinking, argumentation, information mining, decision making skills.

By means of different categories of items, students were provided the opportunity to express their opinion by choosing the variant (s) they considered to be closer, as well as by formulating their answers in a personal manner in the case of open-ended items. Through these types of items, I managed to identify the difficulties students encountered in preparing for the exam, but also the issues they have mastered and which they thought to be of further use.

The results of the questionnaire were correlated with those of the pedagogical content knowledge test administered to the students at the exam. The results presented above reflect the degree of understanding of the problems and the implementation of the theoretical knowledge acquired.

In addition to the information given in Table 1 and Chart 8, I also present a list of the main difficulties faced by students in solving these requirements:

- identifying key concepts that are topic specific;
- ensuring consistency between the research aim and objectives, and between these and the hypotheses;
- formulating assumptions as probabilistic statements;
- clear delimitation of independent variables from dependent ones;
- selection and proper naming of research methods;
- describing the experiment as a sum of actions or formative activities designed to determine the truth value of hypotheses.

6. Conclusions

This research highlights the importance of pre-service teacher training in the field of educational research, too. Research design, development and conducting are integrated into the general competence profile of the teacher. Although apparently pedagogical research should not be a priority for teachers, especially for beginners, who are overwhelmed by curriculum, training, assessment, the implications of pedagogical research are far more profound. The frequency and accuracy of research impacts on the teacher's activity, increasing students' performance at the same time.

In order to develop the pre-service teachers' educational research competence, teaching methods such as exercises, simulation, role play, and other practical activities were used.

Firstly, emphasis was placed on the practice of designing different research categories, based on various topics. The pedagogical research project is a complex tool that trains the different capacities and competences of the students.

The test results confirmed a good level of competence development.

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