The OSCAR PUBLISHING Services
International Journal of Pedagogics

VOLUME Vol.05 Issue06 2025
PAGE NO. 285-289
DOI 10.37547/ijp/Volume05Issue06-77

The Methodology for Organizing and Implementing Experimental Activities Aimed at Enhancing Information Processing Competencies of Prospective Teachers

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Received: 25 April 2025; **Accepted:** 21 May 2025; **Published:** 23 June 2025

Abstract: This article presents the stages, objectives, methods, and tasks of an experimental study aimed at enhancing information management skills among students in the field of pedagogical education.

Keywords: Interview, conversation, modeling, questionnaire, expert evaluation, information management, reflective approach.

Introduction: It is well known that information management skills play a vital role in the professional activities of students, faculty members, and all educators engaged in pedagogical work. In today's information age, the ability to work effectively with information has become more important than ever. Organizing this process consciously and based on analysis and synthesis contributes to both the meaningfulness and effectiveness of information use. The reflective approach, in turn, fosters an individual's ability to critically analyze information during the communication process and to draw well-founded conclusions based on that analysis.

Enhancing prospective teachers' information management skills through a reflective approach is considered one of the key aspects of their future pedagogical activity. It is characterized by their understanding of the didactic potential of working with information, as well as their conscious efforts to search for, diagnose, enrich, and apply information in order to achieve educational objectives.

The experimental work conducted to enhance prospective teachers' information management skills through a reflective approach is organized on the basis of the following principles:

-the accuracy of the conducted experimental studies has been ensured;

-the experimental work has been organized with a clear focus, consistency, systematic approach, and internal coherence;

-theoretical materials and practical developments have been effectively integrated and mutually reinforced;

-student respondents have been provided with opportunities to freely express their thoughts and attitudes;

-favorable pedagogical environment has been created to achieve the primary objective of the experimental work.

The success of the experimental work aimed at improving prospective teachers' information management skills through a reflective approach is ensured by creating the following pedagogical conditions:

-the experimental tools and content were selected based on the objectives of the research;

-didactic tools, forms, techniques, and methods suitable for the experimental materials were appropriately chosen;

-opportunities were created to establish effective interaction with the student-respondents during the implementation of the experiment;

-the results of the experimental work were regularly summarized and analyzed;

-mathematical and statistical methods were identified to allow reanalysis of the obtained results.

One of the key aspects of empirical experimental

research is the selection of experimental sites. Another essential element for the experiment is determining the number of respondents involved in the study.

It is well known that pedagogical and methodological research typically involves two groups — an experimental group and a control group. The reason for this is to evaluate the practical value and appropriateness of the specially developed program aimed at improving information management skills through a reflective approach for prospective teachers being tested in the experimental group and to assess its compatibility with the educational process.

The effectiveness of pedagogical and methodological experimental work is assessed through the analysis and statistical evaluation of the results recorded in both the experimental and control groups. This, in turn, requires determining the number of respondents assigned to each group.

The experimental study is conducted in three stages, and its content is reflected in Table 1:

Table 1

Stages, Objectives, Methods, and Tasks of the Experimental Study

Stages of the Experimental Study	Description of the Objectives, Methods, and Tasks of the Experimental
Phase 1 Preparatory (Justification) Stage	**Objective** – to examine the pre-experimental state of prospective teachers' information management skills based on a reflective approach and to identify effective measures to address the deficiencies revealed during the study.
	Methods: observation, interview, questionnaire, expert evaluation, analysis of activity outcomes, structured interview, pedagogical experiment, mathematical-statistical methods.
	Tasks :To determine the readiness level of prospective teachers to enhance their information management skills through a reflective approach; -to clarify the criteria, levels, and indicators for assessment; -to refine the research model; -to specify the content of the methodology; -to select experimental sites and determine the number of respondents; -to define the experimental and control groups.
Phase 2 – Formative Stage	**Objectives:** to conduct the formative stage of the experimental study; to refine and test the scientific hypothesis of the research; to pilot the proposed methodology in practice.
	Methods: observation, interview, questionnaire, expert evaluation, analysis of activity outcomes, structured interview, pedagogical experiment, author-developed methods.

	Tasks: to develop and pilot a methodology aimed at improving prospective teachers' information management skills through a reflective approach; to establish specific guidelines for implementing the methodology in practice; to test the proposed methodological developments; to analyze the results of the process; to draw conclusions; to make necessary adjustments in case any shortcomings are identified.
3-Phase 3 – Summative Stage	**Objective** – to determine the effectiveness of the proposed methodology and to analyze the results.
	Methods: questionnaire, generalization, systematization, mathematical-statistical data processing, and visual presentation of results..
	Tasks: to process and objectively systematize the obtained results; to summarize the findings and develop recommendations based on them; to implement the recommendations into practical activities; to assess the effectiveness of the proposed methodology based on the developed criteria, indicators, and levels; to conduct statistical analysis of the results.

The following methods were employed to ensure the representativeness of the data obtained during the course of the research:

-theoretical research methods (induction-deduction, analysis-synthesis, comparison-generalization, etc.);

-empirical research methods (observation, interview, questionnaire, expert evaluation, analysis of activity outcomes, pedagogical experiment, etc.);

-mathematical and statistical data processing methods.

The practical application of these methods was aimed at utilizing their didactic potential to achieve the overall objective of the research. In particular:

1.The questionnaire method was used to study the development of prospective teachers' information management skills based on a reflective approach, both before and after the experimental intervention. Each questionnaire consisted of ten questions and was specifically designed for two distinct groups: students involved in the experiment and practicing teachers.

2.The interview method was conducted with respondents from the experimental groups selected for the study. The content of these interviews focused on topics related to the reflective approach, information management skills, and the processes involved in acquiring those skills. The discussions were organized around themes such as:

-Factors influencing the development of information management skills

-Reflective approach – the key to personal growth

-The role of information management within the reflective approach in shaping professional competence

-Do you understand the informational content presented in the "Pedagogical Mastery" course?

-Do you believe that you possess information management skills based on a reflective approach?

3. The interview method was employed to explore the use of teaching methods and technologies aimed at improving prospective teachers' information management skills through a reflective approach. The purpose was to assess how such methods are applied in the educational process and to understand their significance from the students' perspective. The interviews were structured around questions such as: "Which method did you enjoy working with the most?" "The interviews also included the following questions:

"Did you find working on problem-based tasks interesting?"

"Did the A.A.A. method help you develop your information management skills?"

"Do you consider the 'Perception' method effective in improving information management skills based on a reflective approach?"

"Tell us, do you plan to use the 'Information Analysis' method in your future professional activities?"

4. The test method is considered an approach in today's education system that helps determine students' knowledge, skills, and competencies in a particular field or discipline and allows for their assessment. In the course of this research, the responses of participants to test tasks developed based on the content of the Pedagogical Mastery course were analyzed.

5. The modeling method is utilized during the organization of pedagogical experimental-research work to design the process. Moreover, throughout the experimental phase, a model for improving prospective teachers' information processing skills based on a reflective approach is also developed in harmony with the obtained results and theoretical analysis ideas.

6. The expert evaluation method is increasingly being applied in today's educational process. This method is used to assess the didactic significance of learning tasks and author-developed methods aimed at improving prospective teachers' information processing skills based on a reflective approach.

Thus, the proper organizational and methodological implementation of the experimental work lays the foundation for positively addressing the research problem. Therefore, it is essential to clearly define the aim of the experimental study and focus on selecting educational objectives and effective methods that ensure the achievement of that aim. A well-structured organizational and methodological setup of the experimental work, along with the creation of necessary pedagogical conditions, facilitates the effective application of the recommended methodology in educational practice.

Therefore, in higher education, information processing should not be limited to mere searching or retrieving. Rather, it should involve the ability to identify the problem embedded within the information, construct a scientific hypothesis, ask relevant questions, observe, conduct experiments, reach well-grounded conclusions, and define and classify key concepts—all of which constitute essential components of academic inquiry.

The outcome of project-based learning lies in the creation, formal documentation, and academic defense of a tangible product. The implementation of the principle of connecting education with real-life contexts evokes emotional engagement in students during the process of working with information through a reflective approach. "The outcomes of the project-based activity revealed that prospective teachers possess a reflective approach." [1]

In higher education institutions, special attention is given to the ability of students in the field of pedagogical education to solve tasks within academic projects as a means of improving their information processing skills through a reflective approach. During the formative experimental phase, practical measures are organized to meet this requirement.

During the process of working on instructional tasks aimed at improving prospective teachers' information processing skills through a reflective approach, small groups demonstrate greater effectiveness when utilizing the following strategies:

-engaging with information and analyzing it through a reflective lens; writing down key concepts and definitions, and identifying the core ideas presented;

-providing written commentary on the given information;

-ponducting a collaborative group analysis of the content;

-formulating questions based on the content;

-summarizing the material in order to interpret information studied within the "Pedagogical Mastery" course;

-identifying diverse perspectives toward the information;

-xamining how the author's viewpoint is substantiated;

-comparing several sources related to the same information to resolve the issue at hand.

Analyzing the cause-and-effect principle through a reflective approach.

To study and assess the level of prospective teachers' proficiency in working with information through a reflective approach, the following methods can also be employed: interactive techniques, instructional case

studies, and graphic organizers[2].

In pedagogical research, the effectiveness of the proposed methodology is evaluated by analyzing the differences between the outcomes of the formative and summative stages of the experimental work. Therefore, during the summative phase, it is necessary to examine the extent to which the academic performance of respondent-students assigned to the experimental and control groups corresponds to the criteria and indicators outlined in the previous section. Moreover, the level of improvement in prospective teachers' information-handling skills based on a reflective approach, as well as the overall effectiveness of this process, must be assessed in accordance with the stated goals and objectives [5].

In conclusion, it can be stated that the proper organizational and methodological design of the experimental study provides a solid foundation for effectively addressing the research problem. Therefore, it is essential to clearly define the objective of the experimental work and to specify the educational tasks that ensure the achievement of this objective.

In this regard, primary attention should be paid to clearly defining the objectives and tasks of the experimental study, as well as selecting effective methods. A well-structured organizational and methodological framework for the experimental work, along with the creation of necessary pedagogical conditions, enables the successful implementation of the proposed methodology in educational practice.

Proper organizational and methodological structuring of the experimental work conducted within the scope of the research creates a foundation for effectively addressing the identified research problem. Therefore, it is of particular importance to clearly define the aim of the experimental study and to specify the educational objectives that ensure the achievement of this aim.

In this regard, primary attention should be directed toward clearly identifying the objectives and tasks of the experimental study, as well as selecting effective methods. Careful organizational and methodological planning of the experimental process and the creation of the necessary pedagogical conditions provide a basis for the successful implementation of the recommended methodology in educational practice.

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