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**THEORETICAL AND METHODOLOGICAL FRAMEWORK
FOR THE DEVELOPMENT OF FORMATIVE ASSESSMENT
COMPETENCE IN UNIVERSITY ACADEMIC STAFF**

SPECIALITY 531.01 – GENERAL THEORY OF EDUCATION

Abstract of the Doctoral Thesis in Education Sciences

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LIST OF ABBREVIATIONS:

FAC – Formative Assessment Competence

FA – Formative Assessment

CONCEPTUAL FRAMEWORK OF THE RESEARCH

The actuality of the research topic. In the context of postmodern pedagogy, changes in the educational process are evident, aligned with several demands such as student-centered education, the constructivist orientation of the educational relationship between teachers and students, and a focus on the development of competencies manifested in social and professional contexts. The shift in the educational paradigm, marked by the transition from a teacher-centered approach to a student-centered approach and the development of an active partnership between students and teachers, has led to changes in the teaching process, with increased emphasis on formative assessment. It is noted that „currently, assessment must be conceived not only as a control of knowledge or a means of measuring performance but as a comprehensive training strategy, since assessment is a condition for ensuring the effectiveness of the educational process by guiding and correcting teaching and learning” (Cucoş, 2008, p. 13). In this context, we emphasize the importance of formative assessment, which provides the opportunity for the continuous adaptation of the educational process and ensures the improvement of learning quality.

Formative assessment becomes essential in university education due to the multiple advantages it offers: it promotes feedback and supports the learning process; provides teachers with feedback on the effectiveness of the teaching process; motivates and offers students learning contexts in which they can correct their mistakes and address deficiencies; strengthens student learning; clarifies teachers' expectations regarding student learning outcomes; and is „the key to the entire learning process” (Ramsden, 2003).

At the current stage, assessment plays a considerable role in optimizing and improving the learning process, contributing significantly to the adaptation and efficiency of education. Based on these findings, the priority of formative assessment in university education is highlighted, and consequently, it is imperative to develop formative assessment competence among university teachers. As the focus shifts from the assessment of learning to assessment for learning and the student becomes an active partner in the assessment process, the formative assessment competence of the teacher becomes a cornerstone in optimizing the teaching and learning process, facilitating adaptability, continuous feedback, and authentic collaboration between teacher and student.

Description of the situation in the research field and identification of research problem. Interest in the theory and methodology of assessment, in general, and formative assessment, in particular, has been recorded in many studies both internationally and nationally.

In the international context, concerns about assessment and formative assessment have been documented in the valuable works of researchers such as Bloom B. S. (1971), Black P., Wiliam D. (2009), Andrade H., Cizek G. (2010), Scallon G. (2000), Frey N., and Fisher D. (2011) et al.

The strategies of formative assessment, theoretical and methodological aspects of formative assessment have been analyzed by: Nicol D. J., Macfarlane-Dick D. (2006), Allal L. (2013), Panadero E., Andrade H., Brookhart S. (2018), Orsmond P. (2004), Boud D. (2013), McMillan J. H. (2010) et al.

In the Republic of Moldova, the issue of assessment has been approached from multiple aspects: assessment design in higher education, theory and methodology of the university curriculum – Guțu Vl. (2003, 2007); assessment of educational standards – Guțu Vl., Achiri I., Bolboceanu A., Hadîrcă M. (2009) et al. Other valuable research focuses on: assessment in university education – Platon C. (2005); university curriculum management – Gherștega T. (2016); assessment of competencies in primary education – Stratan V. (2020) et al.

Valuable contributions to the issue of assessment in education can be distinguished in the works of authors such as Blândul V.C. (2004); Radu I. (2007); Cucuș C. (2008) et al.

The analysis of the specialized literature allows us to ascertain that the issue of developing formative assessment competence among university teachers is insufficiently reflected in local research. Referring to the lack of theoretical and methodological foundation for developing formative assessment competence among university teachers, we highlight the contradiction between the recognized importance of formative assessment for enhancing the quality of learning and the lack of theoretical and methodological guidelines for developing formative assessment competence in university teachers.

The actuality of the topic and the insufficiency of theoretical approaches in this direction outline the **research problem**, which highlights that, although there are studies related to formative assessment and assessment competence in general, there is still a lack of a comprehensive approach to the scientific foundations regarding the development of formative assessment competence in university teachers.

In this context, **the object of the research** is the process of developing formative assessment competence in academic staff.

The purpose of the research consists in providing theoretical and methodological substantiation of the psychopedagogical model for the development of formative assessment competence in academic staff.

The objectives of the research are:

1. Analyzing the concept of formative assessment;
2. Establishing the epistemological foundations to formative assessment;
3. Determining the structure of formative assessment competence in academic staff;

4. Developing the psychopedagogical model for the development of formative assessment competence in university academic staff;
5. Diagnosing the initial level of development of formative assessment competence in academic staff;
6. Experimental validation of the psychopedagogical model for the development of formative assessment in academic staff.

The research hypothesis. The process of developing formative assessment competence in academic staff will be efficient if:

- a system of conceptual and methodological guidelines for developing formative assessment competence is established;
- a psychopedagogical model for developing formative assessment competence in academic staff is developed and validated.

Synthesis of the research methodology and justification of the chosen research methods. The research methodology was determined by the specific nature of the research field and included the following methods:

a) *theoretical*: scientific documentation, theoretical analysis and synthesis, generalization and systematization, theoretical modeling method.

b) *empirical*: the method of questioning, psychopedagogical experiment (with stages: initial, formative, control), analysis of activity products.

c) *statistical-mathematical*: calculation of Cronbach's alpha coefficient, processing and systematization of statistical data, calculation of descriptive statistical indicators, parametric methods (t-test for dependent samples), Pearson correlation coefficient.

Novelty and scientific originality of the research is objectified through: updating the concept of formative assessment; defining the concept of formative assessment competence; determining the components of formative assessment competence in academic staff, structured around knowledge, skills, values, and attitudes necessary for the effective conduct of the formative assessment process: measurement, appreciation, decision-making through the lens of formative feedback; establishing theoretical approaches related to the development of formative assessment competence from philosophical, psychopedagogical, and cybernetic perspectives; scientifically substantiating the system of principles for developing formative assessment competence in academic staff; developing the psychopedagogical model for the development of formative assessment competence in academic staff.

The achieved research results that contributed to the solution of the scientific problem lies in: developing the psychopedagogical model for the development of formative assessment

competence in academic staff, which has contributed to the efficiency of the continuous training process for academic staff regarding the development of formative assessment competence.

The theoretical research significance consist in: delineating the theoretical approaches to the development of formative assessment competence in academic staff, an aspect that contributes to the efficiency of the teaching and learning process; defining the concept of formative assessment competence, conceptualizing and developing the psychopedagogical model for the development of formative assessment competence in academic staff.

The practical significance of the thesis consists in: providing a conceptual and methodological framework for developing formative assessment competence in academic staff, comprised of: the psychopedagogical model for the development of formative assessment competence in academic staff, the tool and indicators for diagnosing the level of development of formative assessment competence in academic staff.

Approval of research results. The research results are approved and validated through publications in international monographs, scientific journals, and collections of materials from national and international scientific conferences: the National Scientific Conference with International Participation „Integration through Research and Innovation”, Chisinau (2018, 2019, 2020, 2021); the International Scientific Conference „Education from the Perspective of Values”, Alba Iulia, 2018; the International Conference „Education from the Perspective of Values”, Chisinau (2019, 2020, 2021, 2023); the Conference „Contemporary Research and Assessment Methodologies”, Social and Educational Sciences, Chisinau, 2021; the Conference on the topic „Social Emotional Learning and Positive Development” held in Suceava, Romania, 2022; The Sixth International Conference on Adult Education „Education for Peace and Sustainable Development”, 2023, Chisinau, Republic of Moldova.

The structure and volume of the thesis. The thesis includes: an introduction, three chapters, general conclusions and recommendations, a bibliography with 250 sources, 13 appendices, 22 figures, and 23 tables. The thesis contains 147 pages of main text. The research results are published in 16 scientific papers.

Keywords: assessment, formative assessment, formative assessment competence, measurement, evaluation, decision, formative feedback, academic staff.

THESIS CONTENT

The **Introduction** argues the relevance and importance of the research topic; identifies the research problem; formulates the aim, objectives, and hypothesis of the research; presents the research methods; argues the novelty and scientific originality; highlights the obtained results that contribute to solving the scientific problem; and argues the theoretical significance and the practical value of the research.

Chapter 1, *Theoretical Foundations of Formative Assessment in Higher Education*, reflects the conceptual delimitations related to formative assessment and the theoretical approaches to formative assessment.

We consider that assessment represents an integral component of the educational process, interconnected with teaching and learning. Based on this premise, assessment has a formative role, concretized in providing the necessary information and support for decision-making and the overall improvement of educational activities.

In general, formative assessment is the continuous process that ensures the improvement of teaching and learning (Bloom, 1971). This view is extended and complemented by Cabac V., who mentions that formative assessment is a process involving the collection and interpretation of information about learning progress and difficulties, followed by the adaptation of educational activities to optimize learning (Cabac, 2006, p. 49). Highlighting the characteristics of formative assessment as a means of regulation within a training system, the assessment methods adopted by the system always have a regulatory function, although this function can take different forms (Allal, 1979). In the case of formative assessment, regulation is achieved through the „adaptation of teaching and learning activities”, ensuring that „the training means correspond to the characteristics of the person in training” (Platon, 2005, p. 34). In this context, formative assessment „fulfills the role of immediate feedback” by identifying gaps and errors in instruction (Dandara, 2000, p. 37).

The theoretical analysis conducted allowed us to distinguish the complexity of the formative assessment process, which has a multi-faceted approach: formative assessment as content, as purpose, as product, with the majority of researchers approaching formative assessment as a process. From these perspectives, formative assessment represents an important aspect of the educational process, considering that it monitors the progress and development of students' competencies, continuously improving the learning process and thus facilitating an effective and dynamic learning environment.

In university education, formative assessment is an integral part of the teaching process, focused on the continuous improvement of student performance by involving and empowering them in their own learning process. Cizek G. J.'s (2010) perspective on formative assessment

highlights a holistic and complex process that involves active engagement and responsibility from students, a focus on valuable learning outcomes, and strategies for achieving these outcomes. This process also includes self-assessment and constructive feedback, which support and stimulate autonomous learning. In this context, we emphasize that formative assessment enhances learning and contributes to the improvement of learning outcomes (Birnaz & Botezatu, 2019).

We find that the theoretical foundation of the formative assessment process, through **philosophical approaches** (existentialism, pragmatism, progressivism, functionalism), **psychopedagogical approaches** (humanistic theory of personality, behaviorist theory, constructivist theory, mastery learning theory, evidence-centered assessment design theory, curricular theory), and **cybernetic approaches** (cybernetic theory of control through feedback), establishes its effectiveness.

In our research, we focused on philosophical approaches that determine the realization of the formative assessment process by emphasizing the relationship between teacher and student, through the transaction of responsibility from teacher to student, and from thinking to action, extrapolated in an authentic professional context.

With regard to psychopedagogical approaches, these refer to formative assessment as a student-centered process, focusing on the needs and motivation of students involved in improving performance through self-assessment, peer assessment, and co-assessment.

On the other hand, cybernetic approaches view formative assessment through the lens of regulating the educational process related to the design and conduct of teaching activities, based on feedback.

In the context of theoretical approaches, a set of principles has been deduced that ensure the efficiency of the formative assessment process:

- Principles in the context of philosophical approaches: *principle of individualization, principle of variability, principle of learning utility, principle of continuity between individual and social experience, principle of interdependence.*
- Principles in the context of psychopedagogical approaches: *principle of student-centered learning, principle of positivity and success, principle of objectivity, principle of scaffolding, principle of monitoring individual progress, principle of coherence, principle of competency-based assessment.*
- Principles in the context of cybernetic approaches: *principle of the unity between retroactive regulation and interactive regulation.*

Chapter 2, ***Conceptual and Methodological Framework for Developing Formative Assessment Competence in Academic Staff***, reflects the conceptual guidelines of formative

assessment competence and the methodological guidelines for developing formative assessment competence in academic staff.

In our opinion, the design of formative assessment in university education, presented in Figure 2.1, reflects a structured framework of interdependent stages, involving both educational actors, the teacher and the student, in achieving an efficient assessment process, supported by continuous formative feedback.

According to our proposed design, formative assessment represents a continuous and phased process, carried out through the integration of several essential components. Thus, the stages of formative assessment are interconnected and occur cyclically, through the lens of formative feedback, ensuring a dynamic and efficient assessment process.

Thus, *measurement* involves the systematic collection of data about student performance through various assessment methods to identify students' current level of knowledge and skills, highlight progress, and detect any gaps or errors. In the context of formative assessment, *appreciation* represents much more than a simple stage of data interpretation; it is an essential moment of recognition and appreciation of students' potential. According to this argument, appreciation constitutes the issuance of a value judgment, signifying an observable or measurable result within an axiological reference framework (Cucuș, 2008). The *decision* stage involves using data and feedback to ensure continuous and sustainable progress in learning through activities that adapt the instructional process to students' needs.

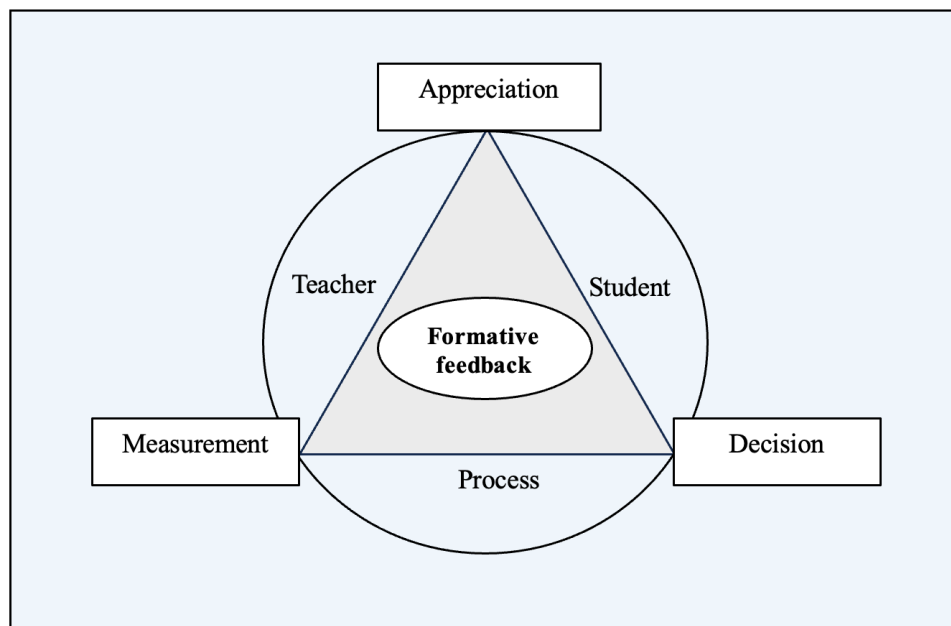


Figure 2.1. Design of Formative Assessment in University Education

Therefore, the design of formative assessment in higher education, as illustrated in Figure 2.1, emphasizes the importance of an integrated and collaborative process, centered on the needs

and progress of students, and on the role of the teacher-student relationship in facilitating continuous and sustainable learning. We also highlight the role of formative feedback in ensuring the unity of the assessment process and determining the efficiency of each stage. Formative feedback is central to the assessment process, being the convergence point of interactions between teacher and student. We consider that the efficiency of formative assessment, according to the proposed framework, is ensured through the development of formative assessment competence in university teachers.

In our view, **formative assessment competence** represents *an integrative system comprised of knowledge about characteristics, tools, and assessment methods; skills in developing and applying assessment tools; and ways of involving students in the assessment process, aimed at remediation and improvement of learning outcomes; values and attitudes expressed through interest, motivation, and openness toward enhancing the quality of learning, reflected in the processes of measurement, appreciation, and decision through the lens of formative feedback.*

Based on the theoretical considerations presented, we outline the configuration of formative assessment competence (Figure 2.2), which includes interconnected components, consisting of a set of knowledge, skills, values, and attitudes corresponding to the stages of the assessment process: measurement, appreciation, decision.

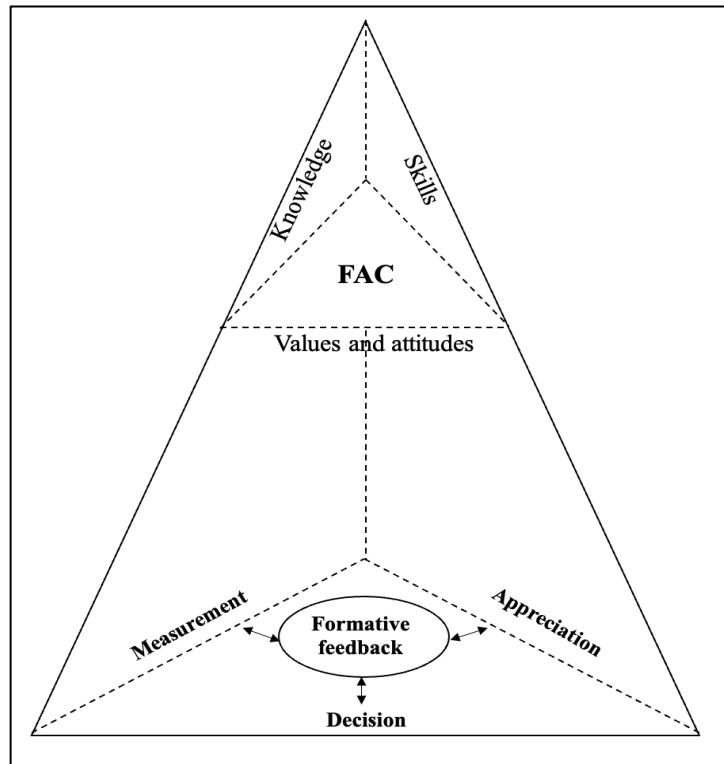


Figure 2.2. Graphic Representation of Formative Assessment Competence

Synchronously, the structure of formative assessment competence is articulated through formative feedback, which provides a dynamic perspective aimed at the continuous improvement of the assessment process.

According to the definition of formative assessment competence, we highlight the synergy among the components of formative assessment competence (Table 2.1). Based on these components, we identified indicators at the levels of knowledge, skills, values, and attitudes for formative assessment competence in university teachers. Formative feedback constitutes the key component in the structure of formative assessment competence for teachers, ensuring functionality and effectiveness in the assessment process through the stages of measurement, appreciation, and decision.

Table 2.1. Synergy of Formative Assessment Competence Components

Measurement stage	
Components of formative assessment competence	Type of feedback <i>Feed-up</i>
<p style="text-align: center;"><i>Knowledge</i></p> <ul style="list-style-type: none"> • identifies the characteristics of measurement; • recognizes measurement tools; • knows the operations of measurement within the formative assessment process; • identifies appropriate ways to involve students in measuring their achievements. 	<ul style="list-style-type: none"> - relates information to students about measurement tools and their use; - communicates various ways students can be involved in measuring their own achievements.
<p style="text-align: center;"><i>Skills</i></p> <ul style="list-style-type: none"> • develops measurement tools for achievements, with the possibility of student participation in the measurement process; • applies measurement operations in the assessment process; • proposes ways to measure student achievements based on student characteristics and context. 	<ul style="list-style-type: none"> - expresses possibilities for involving students in developing measurement tools for achievements; - provides feed-up by clearly explaining objectives, criteria, and assessment tasks, maintaining student interest and motivation toward achieving objectives.
<p style="text-align: center;"><i>Values and attitudes</i></p> <ul style="list-style-type: none"> • openness to applying methods for measuring student achievements to meet their learning needs; • interest in involving students in the process of measuring their own achievements. 	<ul style="list-style-type: none"> - commitment to objective and relevant achievement measurement; - initiative for collaboration between teacher and students, and among students in the measurement process.
Appreciation stage	
Components of formative assessment competence	Type of feedback <i>Feedback</i>
<p style="text-align: center;"><i>Knowledge</i></p> <ul style="list-style-type: none"> • knows the essence of appreciation within formative assessment; • knows ways to involve students in the appreciation of achievements. 	<ul style="list-style-type: none"> - identifies the functionality of feedback in the appreciation of learning outcomes and student potential; - distinguishes types of feedback (on the assessment task, on the process of completing the task, on self-regulation, on student personality).

<p style="text-align: center;"><i>Skills</i></p> <ul style="list-style-type: none"> • estimates the individual progress of the student and their involvement in the learning and assessment process; • identifies learning difficulties and strengths to capitalize on potential; • creates situations for student involvement in self-assessment and/or peer assessment that encourage reflection and self-awareness, essential for developing competencies in an authentic context. 	<ul style="list-style-type: none"> - provides individualized, timely feedback, combining various types of feedback based on context; - offers immediate feedback to identify learning difficulties; - provides specific and positive feedback, aligned with assessment objectives.
<p style="text-align: center;"><i>Values and attitudes</i></p> <ul style="list-style-type: none"> • appreciates the role of appreciation in the assessment process as an essential component in improving student performance; • shows interest in applying appreciation to stimulate student motivation in the learning process; • guides students towards success by offering constructive suggestions. 	<ul style="list-style-type: none"> - oriented towards fairness, objectivity, and relevance in providing feedback; - openness to feedback from students, demonstrating tolerance, constructive criticism, and acceptance of different opinions.
Decision stage	
Components of formative assessment competence	Type of feedback
<p style="text-align: center;"><i>Knowledge</i></p> <ul style="list-style-type: none"> • knows the essence of decision-making in the formative assessment process; • identifies ways of individualized intervention and adapting instruction to specific student needs. 	<p style="text-align: center;"><i>Feed-forward</i></p> <ul style="list-style-type: none"> - proposes specific and personalized strategies that respond to individual learning needs of each student; - distinguishes strategies to help students develop self-regulation skills, including goal-setting, planning, and monitoring learning progress.
<p style="text-align: center;"><i>Skills</i></p> <ul style="list-style-type: none"> • selects remediation methods based on context (correction activities and complementary activities); • applies effective methods to improve learning outcomes. 	<ul style="list-style-type: none"> - offers specific recommendations for students to implement strategies for improving learning outcomes; - provides guidance to students in improving performance and overcoming obstacles.
<p style="text-align: center;"><i>Values and attitudes</i></p> <ul style="list-style-type: none"> • motivation to guide students in achieving learning and assessment objectives; • flexibility in applying optimal methods to enhance student achievements. 	<ul style="list-style-type: none"> - interest in exploring different strategies and personalizing the educational path to maximize student achievements; - commitment to making adjustments and modifications in instruction to optimize student achievements.

Thus, we emphasize that the theoretical and conceptual benchmarks of formative assessment competence constitute the foundation for determining the methodological guidelines for developing formative assessment competence in university teachers.

In this research, we aimed to analyze the junction of theoretical and methodological benchmarks for developing formative assessment competence in university teachers. In these

conditions, the methodological benchmarks, based on epistemological foundations— philosophical, psychopedagogical, and cybernetic approaches – highlight the specific nature of the training process focused on the main components: measurement, appreciation, and decision through the lens of formative feedback in the context of formative assessment.

The system of theoretical and methodological benchmarks provided the foundation for conceptualizing and developing the *Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff*, as reflected in Figure 2.3. The Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff, developed in our research, highlights the main direction in the development of formative assessment competence in university teachers.

The theoretical component of the Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff is comprised of the system of theoretical benchmarks highlighted in the research. These benchmarks, on one hand, guide the effective implementation of formative assessment and, on the other hand, condition the development of formative assessment competence in university teachers.

The methodological component of the *Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff* provides a structured framework through the interconnection of the training components: objectives, content, training technology, and assessment, which ensure the efficiency of the process of developing formative assessment competence in university teachers.

Objectives represent projections of behaviors that include knowledge, aptitudes, skills, and components of formative assessment competence developed through training.

Thus, the objectives for the *measurement* component involve understanding the characteristics of measurement and developing tools for measuring student achievements by involving them in the process of assessing their own achievements.

The objectives for the *appreciation* component involve actions aimed at recognizing and valuing students' potential by highlighting their progress and providing feedback that encourages students to self-assess and reflect on their own learning process.

The objectives for the *decision* component include actions and personalized interventions for improvement and remediation, aimed at the continuous enhancement of the learning process.

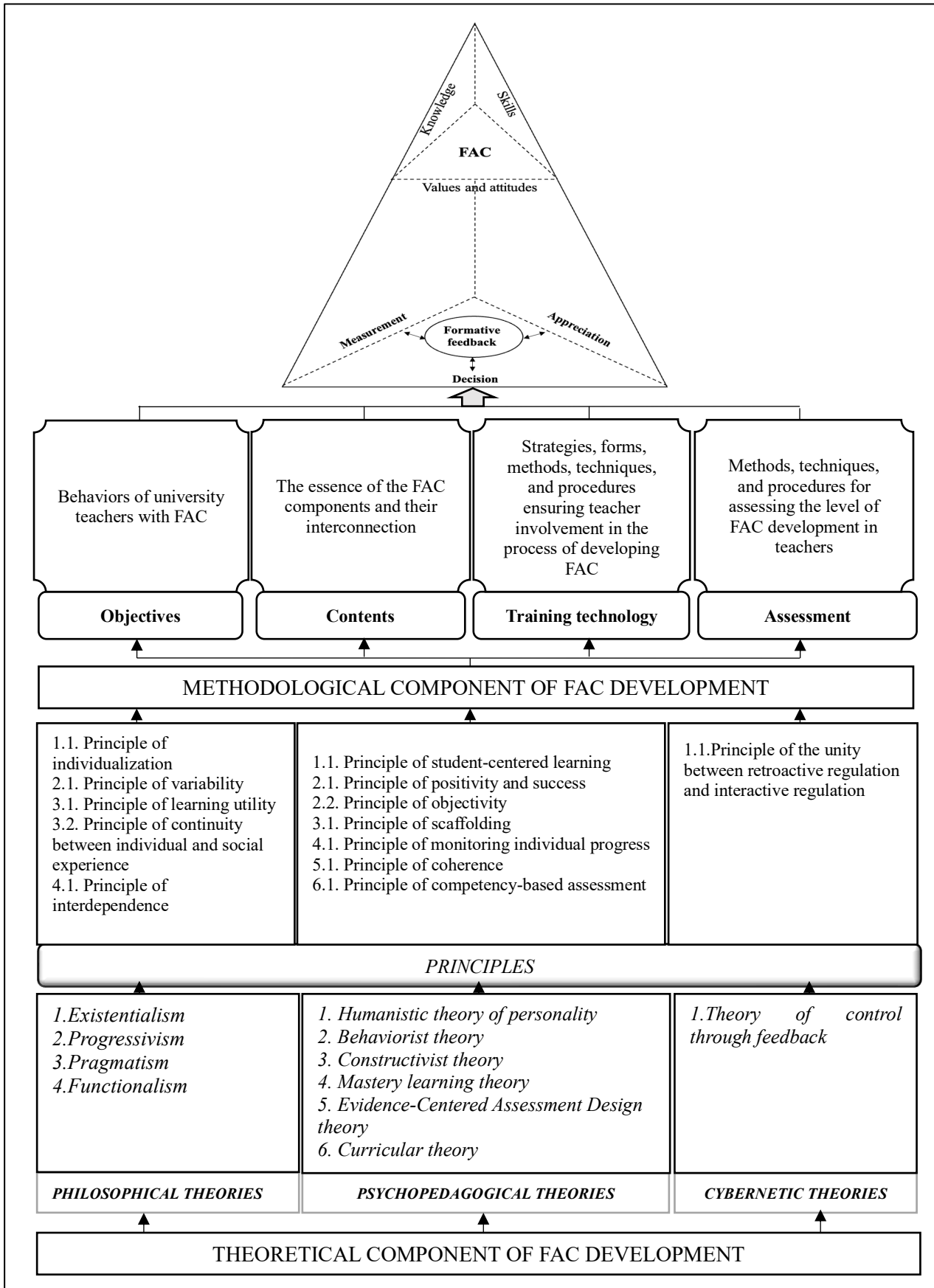


Figure 2.3. The Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff

The objectives related to *formative feedback* involve making value judgments to guide the learning process and the training efforts of students through collaboration and constructive communication within the teacher-student dynamic.

The content for developing FAC is determined based on the predetermined objectives and is specific to each component of formative assessment competence.

In this regard, the content related to the *measurement* component integrates topics on the specifics and operations of measurement, tools, and methods for measuring student achievements.

The *appreciation* component includes content related to theoretical benchmarks of appreciative intelligence, and methods for involving students in the appraisal of achievements through peer assessment, self-assessment, and co-assessment.

The *decision* component includes content related to learning outcomes and strategies for improving them.

The *formative feedback* component includes content related to the significance and functionality of feedback in the formative assessment process, the types of feedback provided in this context, and the structural components of feedback.

Training technology includes a set of strategies, forms, methods, means, techniques, and procedures through which teacher involvement in the process of developing formative assessment competence is ensured. Among the instructional strategies, heuristic strategies predominate, mobilizing the training process through exploration and discovery, problematizing strategies, inductive and creative strategies. Such strategies imply active, learner-centered learning and promote the development of a deep understanding of formative assessment by fostering critical, divergent, and creative thinking. The forms of activity combine group and individual activities to enhance the efficiency of the training process. Group activities promote collaboration, idea exchange, and solution finding for problematic situations. On the other hand, individual activities allow for a focus on the specific needs and learning pace of each participant, promoting mutual feedback, self-assessment, and personal reflection. The harmonious combination of these two forms of activity aims to provide a balanced training experience, adapted to the diversity of learning styles and individual needs of the participants. The proposed activities for achieving the objectives focus on demonstrative, explanatory, and active-participatory methods, which stimulate active involvement of the trainees, promote a deep understanding of the content, and facilitate knowledge transfer in practical contexts. Explanatory and demonstrative methods offer opportunities to understand and concretize concepts related to formative assessment, the methods and tools used in the teaching process. Active-participatory methods stimulate critical thinking, problematization, and the ability to analyze information, placing the trainee at the center of the learning process,

promoting discussion, collaboration, and direct application of knowledge regarding measurement operations and tools, ways of student appraisal, actions in the decision-making stage, and types of feedback. Simulations and case studies are proposed to practice decision-making processes based on various data sets and educational contexts. Encouraging teachers to reflect on their own practices and previous decisions, within a structured framework, is opportune to understand their impact on student learning and to identify possible improvements..

Assessment determines the degree of efficiency and quality of the learning process, as well as the value of the acquisitions gained.

Through *initial assessment*, the level of knowledge and abilities of the trainees is identified at the beginning of the training, facilitating adaptation of the program to their needs. Within the framework of initial assessment, a questionnaire is proposed to determine the level of competence in formative assessment among university teaching staff.

Formative assessment is conducted to continuously monitor the progress of trainees throughout the training program, providing prompt and optimal feedback, based on which learning strategies are adjusted and improved. In this regard, learning tasks are proposed that involve trainees in solving case studies, group discussions, reflective journals, presentations, and role-playing games, all aimed at identifying both progress and potential difficulties. This facilitates the adaptation of the training process and maximizes the instructive-educational benefits for all participants.

Self-assessment and peer assessment activities are carried out to promote responsibility, reflection, and group collaboration among trainees. Through self-assessment, learners have the opportunity to analyze their own achievements, strengths, and weaknesses, thereby developing their awareness of their own learning and metacognitive abilities. Peer assessment, on the other hand, encourages constructive feedback among peers, enhancing communication and offering diverse perspectives on performance and progress.

To consolidate knowledge, completing the Trainee Agenda is proposed, which includes a set of activities related to the proposed FA components for trainees to undertake in the educational process alongside students. The Agenda serves as an essential tool for monitoring and guiding trainees in implementing and conducting formative assessment, applying knowledge in real situations, exchanging experiences, and providing mutual feedback among trainees.

Through final assessment, the level at which trainees have achieved the objectives set at the beginning of the program is determined, providing a summary picture of the acquired competencies and assimilated knowledge. In this regard, the questionnaire used at the initial stage of the formative program is also employed.

From an integrative perspective, the Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff ensures functionality and quality through its core components in fostering formative assessment competence in university teachers.

Chapter 3, *The Experimental Framework for Developing Formative Assessment Competence in Academic Staff*, reflects the psychopedagogical experiment design aimed at developing formative assessment competence in university teachers. The psychopedagogical experiment took place at the State University of Moldova and involved a general sample of 75 university teaching staff, out of which 42 professors participated in the training program.

The purpose of the psychopedagogical experiment was to assess the level of development of formative assessment competence in university teaching staff. The experiment took place from February 2022 to June 2023.

The identification stage of the psychopedagogical experiment unfolded in two phases: phase 1 – assessing the level of formative assessment competence in teaching staff in the general sample, during which the current situation regarding the development of formative assessment competence in university teaching was analyzed; phase 2 – assessing the level of formative assessment competence in university teaching staff in the experimental group (part of the general sample), who voluntarily participated in the training program.

During the identification and control stages, the questionnaire for assessing formative assessment competence among university teaching staff was administered. Following the administration of the questionnaire designed to assess formative assessment competence in teaching staff in the experimental group, the results obtained revealed varying levels of development in formative assessment competence. Therefore, analyzing Figure 3.1, we observe that 19% of the teaching staff possess a high level of formative assessment competence, 50% have a medium level, and 31% have a low level, highlighting the need for further development of formative assessment competence.

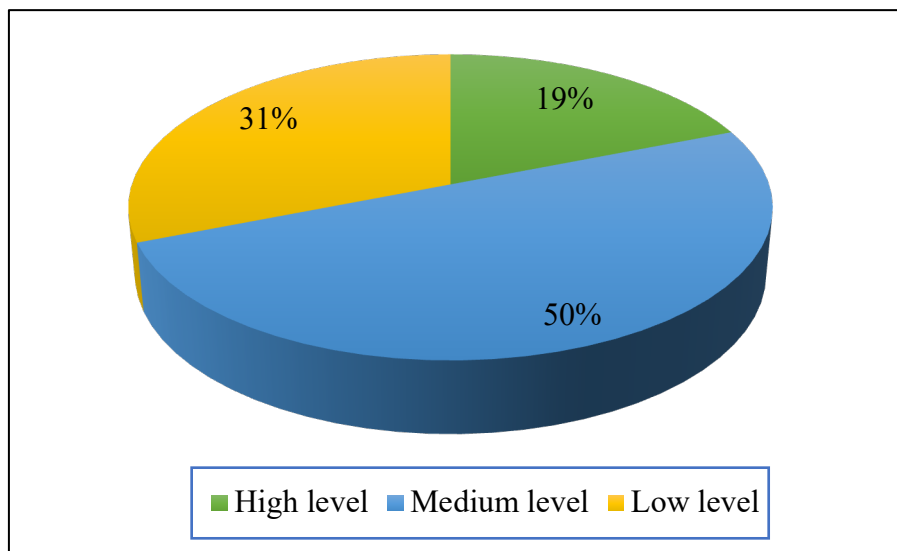


Figure 3.1. Distribution of Formative Assessment Competence Levels in Academic Staff

The training stage of the experiment involved the voluntary participation of teaching staff in a formative training program aimed at developing formative assessment competence, focusing on the components of measurement, appreciation, decision through the lens of formative feedback.

The training program comprised 14 sessions during which the components of formative assessment competence were addressed – measurement, appreciation, decision, and formative feedback (Table 3.1).

Table 3.1. Formative Assessment Competence Development Program for Academic Staff

Session content	Session objectives
INITIAL ASSESSMENT. INTRODUCTION.	
Session 1-2. Initiation into activity. Mutual acquaintance among participants and the facilitator. Essence of the concept of formative assessment in university education.	<ul style="list-style-type: none"> • Mutual acquaintance of participants and the facilitator; • Assessment of the initial level of formative assessment competence in teaching staff; • Understanding the significance of assessment types within the educational process; • Justification of the importance of formative assessment in the educational process; • Analysis of the components of formative assessment according to the proposed model.
MEASUREMENT IN FORMATIVE ASSESSMENT PROCESS	
Session 3. Measurement – a component of the formative assessment process.	<ul style="list-style-type: none"> • Defining the term „measurement” in the formative assessment process; • Highlighting the specificity of measurement within formative assessment; • Determining the operations of measurement.

Session 4-5. Tools for measuring student achievements. Methods for measuring learning outcomes within formative assessment.	<ul style="list-style-type: none"> Identifying tools for measuring student achievements; Analyzing the characteristics of measurement tools; Developing tools for measuring student achievements; Identifying methods for measuring learning outcomes in the process of formative assessment.
APPRECIATION IN FORMATIVE ASSESSMENT PROCESS	
Session 6. Appreciation in formative assessment. Types of feedback provided in student appreciation.	<ul style="list-style-type: none"> Defining the concept of appreciation in formative assessment; Analyzing the types of feedback offered in the process of student appreciation; Justifying the importance of objective feedback in student appreciation.
Sessions 7-8. Methods of involving students in assessing learning outcomes. Positive appreciation of learning situations.	<ul style="list-style-type: none"> Identifying methods to involve students in assessing learning outcomes; Determining the characteristics of self-assessment and peer assessment in the appreciation process; Analyzing the evaluative skills of the teaching staff; Arguing the importance of positive appreciation in the assessment process.
DECISION IN FORMATIVE ASSESSMENT PROCESS	
Session 9. Decision-making - the final stage of formative assessment. The importance of decision in the assessment process.	<ul style="list-style-type: none"> Determining the essence of decision-making in formative assessment; Arguing the role of decision in addressing student achievements in formative assessment.
Session 10. Specificities of decisions in formative assessment.	<ul style="list-style-type: none"> Identifying the types of decisions that can be made in the context of formative assessment; Providing examples of assessment situations that reflect relevant decisions according to students' educational needs.
FEEDBACK IN FORMATIVE ASSESSMENT PROCESS	
Session 11. Feedback in the formative assessment process. Types of feedback.	<ul style="list-style-type: none"> Clarifying the meaning of feedback in assessment; Assessing the functionality of feedback in formative assessment; Identifying the types of feedback provided in the stages of measurement, appreciation, and decision-making; Developing recommendations to enhance the efficiency of feedback in formative assessment.
Sessions 12-13. Feedback structure. Feed-up, feedback, feed-forward.	<ul style="list-style-type: none"> Identifying the structural components of feedback; Arguing the importance of feedback in formative assessment; Applying the components of feedback in assessment situations according to the stages: measurement, appreciation, decision-making.
FINAL ASSESSMENT	
Session 14. Final assessment. Impact of the program and outcomes achieved.	<ul style="list-style-type: none"> Assessment of formative assessment competence following the training sessions; Assessment of program activities conducted, impact, and outcomes achieved.

The formative program involved the participation of academic staff in completing the trainee agenda and developing products based on proposed activities. The elaborated products were

analyzed and evaluated according to a set of predetermined evaluation criteria. The products presented at the end of the formative program included: a measurement tool for assessing student achievements in formative assessment; an inventory of feedback types provided in the process of appreciating student achievements; self-assessment and peer assessment techniques in formative assessment; a sheet of proposed remediation activities at the decision stage; a sheet of examples of feedback provided to students throughout a week in the assessment process. Thus, the quantitative and qualitative analysis of the elaborated products involved evaluating measurable data using assessment tools, specifically the assessment sheet, followed by discussion and reflection on the learning process..

During the control stage, progress in developing formative assessment competence was assessed, and the experimental data obtained from implementing the Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff were analyzed and validated. Based on the results, as depicted in Figure 3.2, changes in the level of formative assessment competence among teaching staff were observed during the control stage.

Thus, 12% of university teaching staff possess a low level of assessment competence, which marks a significant improvement from 31%. 43% of teachers have a medium level, and 45% have a high level, indicating a significant increase from 19%.

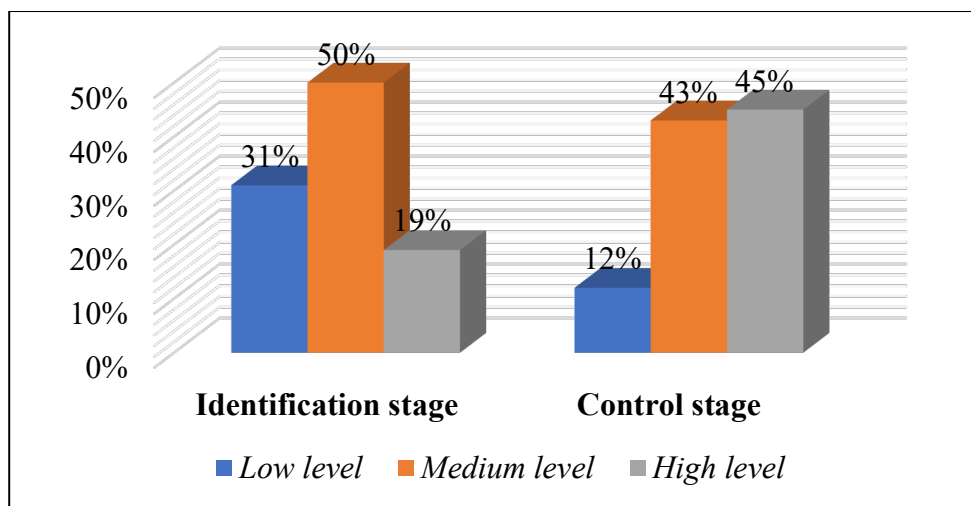


Figure 3.2. Levels of Formative Assessment Competence among University Teaching Staff, at the identification and the control stage

According to the data obtained from the t-test, we identified the means achieved by the experimental group (Table 3.2): before the training program, the mean is 18.90, and after the training program, the mean is 23.62.

Table 3.2. Comparative statistical data on pair sample means

Pair samples	Mean	Standard deviation	Standard Error of the Mean
<i>Identification stage</i>	18.90	4.189	0.646
<i>Control stage</i>	23.62	4.580	0.707

Thus, according to Figure 3.3, the average level of formative assessment competence in teaching staff at the control stage is higher than the average at the identification stage.

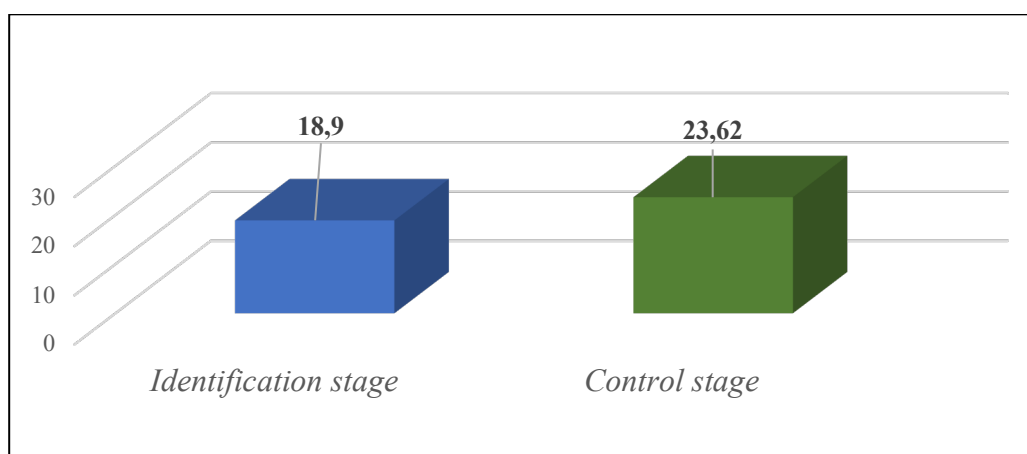


Figure 3.3. Averages of FAC levels at the identification and control stages

The correlation coefficient of 0.637 indicates a moderate positive correlation between the two sets of scores, and the p-value (0.000) indicates that the correlation is statistically significant. In conclusion, we assert that there is a moderate positive and statistically significant correlation between the samples before and after the formative development program for enhancing formative assessment competence in academic staff.

Interpreting the results of the t-test (Table 3.3), we found that the mean difference ($M = -4.714$, $SD = 3.750$) suggests that the scores obtained by subjects at the control stage are, on average, higher than the scores obtained at the identification stage.

Table 3.3. Results of the t-test for paired samples

Mean difference	-4.714
Confidence interval	between -5.883 and -3.546
t value	-8.147
p value	0.000

The t-statistic value is -8.147, indicating a significant difference between the means of the samples. Therefore, the results suggest a significant difference between the scores obtained by the teaching staff at the identification and control stages. This implies that the applied formative program had a significant effect, altering the competence levels observed across the two stages of the psychopedagogical experiment.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

The research conducted focused on addressing current issues related to enhancing and increasing the relevance of learning and development through the development of formative assessment competence in university teaching staff. The study centered on analyzing the concept of formative assessment, exploring various theoretical interpretations, establishing the epistemological foundations related to formative assessment, determining the structure of formative assessment competence in academic staff, and culminated in an experimental approach. This approach involved the development and validation of the *Model for Developing Formative Assessment Competence in Academic Staff*.

Based on the purpose and objectives of the research, we outline the following **conclusions**:

1. The theoretical analysis highlighted that formative assessment is extensively addressed in the literature, encompassing multiple meanings. In the context of our research, formative assessment in university education represents a structured and continuous process aimed at enhancing student learning and development.
2. The analysis and synthesis of theories on formative assessment guided us towards establishing and substantiating epistemological foundations: philosophical, psychopedagogical, and cybernetic approaches. By integrating these diverse perspectives, we emphasized the characteristics of formative assessment processes in university education, focusing on sustaining learning, fostering competence development, promoting autonomy, collaboration, and adapting the educational process through feedback based on student needs and progress.
3. The theoretical coordinates analyzed led us to deduce that the development of formative assessment competence in academic staff is grounded in a set of relevant theories and principles.
4. Focusing on theoretical foundations, we have updated the concept of formative assessment competence, which constitutes an *integrative system comprising knowledge about assessment characteristics, tools, methods, skills related to developing and applying assessment tools, ways to involve students in the assessment process, oriented towards remedying and improving achievements, values, and attitudes expressed through interest, motivation, openness regarding enhancing learning quality reflected in the measurement, appreciation, and decision process through the prism of formative feedback*.
5. Through both theoretical and practical objectives achieved, we have justified the relevance of formative assessment competence within the professional competence framework of university teaching staff, playing a defining role in enhancing the efficiency and quality of the educational process.

6. Theoretical landmarks reflecting theories and the set of deduced principles have generated methodological landmarks with functional and normative characteristics in the development of formative assessment competence in academic staff.

7. In line with the system of theories and principles, we have developed the Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff, which represents a fundamental reference point in designing and implementing the training approach for university teaching staff regarding the development of formative assessment competence. The methodological elements of the model reflect the connection between objectives, content, training technology, and assessment, aimed at developing formative assessment competence in university teaching staff. Through its complex structure, our developed model ensures the efficiency of the process of developing formative assessment competence in academic staff.

8. The psychopedagogical experiment conducted validated the efficiency of the Psychopedagogical Model for Developing Formative Assessment Competence in Academic Staff by enhancing the level of formative assessment competence in university teaching staff. This was evidenced by the comparative results of paired sample means (identification stage - 18.90, post-training stage - 23.62, with a t-statistic value of $t = -8.147$), following their participation in the formative assessment competence development program.

9. The theoretical and applied results generated by our research allow us to conclude that developing formative assessment competence in university teaching staff is a complex endeavor requiring deep and coordinated commitment. This commitment is expressed through openness, adaptation, and flexibility in learning contexts, as well as interest and motivation for professional development.

10. The research results confirm the resolution of the scientific problem, which lies in developing the psychopedagogical model for formative assessment competence development. This has contributed to enhancing the continuous professional development process of university teaching staff regarding formative assessment competence.

Based on the research findings, we propose the following recommendations across the identified dimensions:

a) Dimension of education sciences research

- Expand perspectives on developing formative assessment competency in various educational contexts, such as distance learning, continuous professional development for teachers etc.

- Conduct research that analyzes and establishes the connection between formative feedback and other variables in the assessment process (self-assessment, peer assessment etc.).
- Undertake longitudinal studies to determine the long-term impact of formative assessment on student progress.
- Develop and publish methodological guidelines for developing formative assessment competency in university teachers.

b) Dimension of continuous professional development for university teachers

- Provide ongoing professional development for teachers to enhance their knowledge and skills in effectively implementing formative assessment in university education.
- Utilize the Psychopedagogical Model for developing formative assessment competency and experimental results within continuous professional development courses for university teachers.
- Organize symposiums and thematic conferences on formative assessment in university education to promote the exchange of best practices, trends, and innovations in assessment.

c) Procedural dimension of formative assessment conducted by teachers

- Regularly review and adapt assessment strategies based on feedback provided by students and their learning needs.
- Implement self-assessment and peer assessment in formative assessment to support student reflection and accountability in the learning process.
- Employ various formative assessment tools to obtain a comprehensive picture of student progress.
- Provide consistent feedback to enhance student learning and improve their achievements.

Given the complexity of developing formative assessment competency, our research has identified several limitations. It is important to note that the level of development of formative assessment competence varies depending on the psychopedagogical training (psychopedagogical module) of teachers, resulting in heterogeneity in the level of formative assessment competency. Additionally, there are limitations associated with limited awareness of the benefits of formative assessment, attitudes of teachers toward formative assessment, and their resistance to change, all of which constitute barriers to developing formative assessment competence.

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ADNOTARE

Botezatu Valeria. Repere teoretice și metodologice de dezvoltare a competenței de evaluare formativă la cadrele didactice în învățământul universitar. Teză de doctor în științe ale educației, Chișinău, 2024

Structura tezei. Teza include: introducere, trei capitole, concluzii generale și recomandări, bibliografie cu 250 de surse, 13 anexe, 22 figuri și 23 tabele. Teza conține 147 pagini text de bază. Rezultatele cercetării sunt publicate în 16 lucrări științifice.

Cuvinte-cheie: evaluare, evaluare formativă, competență de evaluare formativă, măsurare, apreciere, decizie, feedback formativ, cadre didactice universitare.

Domeniu de studiu: Teoria generală a educației.

Scopul cercetării constă în fundamentarea teoretică și metodologică a modelului psihopedagogic de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare.

Obiectivele cercetării: analiza conceptului de evaluare formativă; stabilirea fundamentelor epistemologice referitoare la evaluarea formativă; determinarea structurii competenței de evaluare formativă la cadrele didactice universitare; elaborarea modelului psihopedagogic de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare; constatarea nivelului inițial de dezvoltare al competenței de evaluare formativă la cadrele didactice universitare; validarea experimentală a modelului psihopedagogic de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare.

Noutatea și originalitatea științifică a cercetării este obiectivată de: actualizarea conceptului de evaluare formativă; definirea conceptului competență de evaluare formativă; determinarea componentelor competenței de evaluare formativă la cadrele didactice universitare structurate pe cunoștințe, capacități, valori și atitudini necesare pentru desfășurarea eficientă a procesului de evaluare formativă: măsurarea, aprecierea, decizia prin prisma feedbackului formativ; stabilirea abordărilor teoretice referitoare la dezvoltarea competenței de evaluare formativă din perspectivă filozofică, psihopedagogică și cibernetică; fundamentarea științifică a sistemului de principii de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare; elaborarea modelului psihopedagogic de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare.

Rezultatele obținute care contribuie la soluționarea problemei științifice rezidă în: elaborarea modelului psihopedagogic de dezvoltare a competenței de evaluare formativă ceea ce a contribuit la eficientizarea procesului de formare continuă a cadrelor didactice universitare privind dezvoltarea competenței de evaluare formativă.

Semnificația teoretică a cercetării constă în: delimitarea abordărilor teoretice referitoare la dezvoltarea conceptului de evaluare formativă și a competenței de evaluare formativă la cadrele didactice universitare, aspect care contribuie la eficientizarea procesului de predare și învățare; definirea conceptului de competență de evaluare formativă; conceptualizarea și elaborarea modelului psihopedagogic de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare.

Valoarea aplicativă a lucrării consistă în: furnizarea suportului conceptual și metodologic referitor la dezvoltarea competenței de evaluare formativă la cadrele didactice universitare constituit din: modelul psihopedagogic de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare, instrumentul și indicatorii de diagnosticare a nivelului de dezvoltare a competenței de evaluare formativă la cadrele didactice universitare.

Implementarea rezultatelor științifice. Rezultatele cercetării sunt aprobate și validate prin publicarea în monografiile internaționale, reviste științifice, culegeri ale materialelor conferințelor științifice naționale și internaționale.

ANNOTATION

Botezatu Valeria. Theoretical and Methodological Framework for the Development of Formative Assessment Competence in University Academic Staff. Doctoral Thesis in Education Sciences, Chisinau, 2024.

Thesis structure. The thesis includes: the Introduction, three chapters, general conclusions and recommendations, bibliography with 250 sources, 13 appendices, 22 figures, and 23 tables. The thesis contains 147 pages of basic text. The research results are published in 16 scientific papers.

Key words: assessment, formative assessment, formative assessment competence, measurement, appreciation, decision, formative feedback, academic staff.

Field of study: General Theory of Education.

The purpose of the research consists in providing theoretical and methodological substantiation of the psychopedagogical model for the development of formative assessment competence in academic staff.

Research objectives: analyzing the concept of formative assessment; establishing the epistemological foundations to formative assessment; determining the structure of formative assessment competence in academic staff; developing the psychopedagogical model for the development of formative assessment competence in university academic staff; diagnosing the initial level of development of formative assessment competence in academic staff; experimental validation of the psychopedagogical model for the development of formative assessment competence in academic staff.

Novelty and scientific originality of the research is objectified through: updating the concept of formative assessment; defining the concept of formative assessment competence; determining the components of formative assessment competence in academic staff, structured around knowledge, skills, values, and attitudes necessary for the effective conduct of the formative assessment process: measurement, appreciation, decision-making through the lens of formative feedback; establishing theoretical approaches related to the development of formative assessment competence from philosophical, psychopedagogical, and cybernetic perspectives; scientifically substantiating the system of principles for developing formative assessment competence in academic staff; developing the psychopedagogical model for the development of formative assessment competence in academic staff.

The achieved research results that contributed to the solution of the scientific problem lies in: developing the psychopedagogical model for the development of formative assessment competence in academic staff, which has contributed to the efficiency of the continuous training process for academic staff regarding the development of formative assessment competence.

The theoretical research significance consist in: delineating the theoretical approaches to the development of formative assessment competence in academic staff, an aspect that contributes to the efficiency of the teaching and learning process; defining the concept of formative assessment competence, conceptualizing and developing the psychopedagogical model for the development of formative assessment competence in academic staff.

The practical significance of the thesis consists in: providing a conceptual and methodological framework for developing formative assessment competence in academic staff, comprised of: the psychopedagogical model for the development of formative assessment competence in academic staff, the tool and indicators for diagnosing the level of development of formative assessment competence in academic staff.

Implementation of scientific results. The research results was approved and validated through publication in international monographs, scientific journals, and collections of materials from national and international scientific conferences.

АННОТАЦИЯ

Ботезату Валерия. Теоретические и методологические основы развития компетенции формативного оценивания у преподавателей вузов. Диссертация на соискание ученой степени доктора педагогических наук, Кишинэу, 2024

Структура диссертации. Диссертация включает: введение, три главы, общие выводы и рекомендации, библиографию (250 источника), 13 приложений, 22 рисунка и 23 таблиц. Диссертация содержит 147 страницы основного текста. Результаты исследования опубликованы в 16 научных работах.

Ключевые слова: оценивание, формативное оценивание, компетенция формативного оценивания, измерение, оценка, принятие решений, формативная обратная связь, преподаватели вуза.

Область исследования: общая теория образования.

Цель исследования заключается в теоретическом и методологическом обосновании психолого-педагогической модели развития компетенции формативного оценивания у преподавателей вузов.

Задачи исследования: анализ концепции формативного оценивания; определение теоретических основ формативного оценивания; спецификация структуры компетенции формативного оценивания у преподавателей вузов; разработка психолого-педагогической модели развития компетенции формативного оценивания у преподавателей вузов; выявление начального уровня развития компетенции формативного оценивания у преподавателей вузов; экспериментальное обоснование психолого-педагогической модели развития компетенции формативного оценивания у преподавателей вузов.

Научная новизна и оригинальность исследования заключается в: актуализации концепции формативного оценивания; определении концепции компетенции формативного оценивания; выявлении компонентов компетенции формативного оценивания у преподавателей вузов, структурированных на знаниях, умениях, навыках, ценностях и отношениях, необходимых для эффективного проведения процесса формативного оценивания; установлении теоретических подходов к развитию компетенции формативного оценивания с философской, психолого-педагогической и кибернетической точек зрения; научное обоснование системы принципов развития компетенции формативного оценивания у преподавателей вузов; разработка психолого-педагогической модели развития компетенции формативного оценивания у преподавателей вузов.

Полученные результаты, которые способствуют решению научной проблемы заключаются в разработке психолого-педагогической модели развития компетенции формативного оценивания, что способствовало повышению эффективности процесса непрерывного обучения преподавателей вузов в области развития компетенции формативного оценивания.

Теоретическая значимость исследования заключается в следующем: определение теоретических подходов к развитию компетенции формативного оценивания у преподавателей вузов, что способствует повышению эффективности процесса преподавания и обучения; определение концепции компетенции формативного оценивания; концептуализация и разработка психолого-педагогической модели развития компетенции формативного оценивания у преподавателей вузов.

Практическая значимость исследования заключается в предоставлении концептуальной и методологической поддержки по развитию компетенции формативного оценивания, включая психолого-педагогическую модель развития компетенции формативного оценивания, инструменты и индикаторы для диагностики уровня развития компетенции формативного оценивания у преподавателей вузов .

Внедрение результатов исследования. Результаты исследования одобрены и подтверждены публикациями в международных монографиях, научных журналах, сборниках материалов национальных и международных научных конференций.

BOTEZATU VALERIA

**THEORETICAL AND METHODOLOGICAL FRAMEWORK
FOR THE DEVELOPMENT OF FORMATIVE ASSESSMENT
COMPETENCE IN UNIVERSITY ACADEMIC STAFF**

SPECIALITY 531.01 - GENERAL THEORY OF EDUCATION

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