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MODEL FOR THE DEVELOPMENT OF COGNITIVE COMPETENCE OF BACHELORS IN THE SUBJECT METHODOLOGY OF TEACHING MATHEMATICS

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Abstract:
This article explores the theoretical foundations and practical approaches to developing cognitive competence among undergraduate students in the course "Methods of Teaching Mathematics." It emphasizes the effectiveness of non-standard tasks developed using the iSpring Quiz platform in enhancing students' skills in logical reasoning, independent thinking, and problem-solving. The paper also analyzes heuristic problems, the case study method, and techniques for assessing cognitive competence.

Keywords: Cognitive competence, methods of teaching mathematics, non-standard tests, iSpring Quiz, heuristic problems, case study, educational technologies.

Introduction

MATEMATIKA O‘QITISH METODIKASI FANIDA BAKALAVRLARNING KOGNITIV KOMPETENTLIGINI RIVOJLANTIRISH MODELI

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Anotatsiya:
Ushbu maqolada bakalavr bosqichida matematika o‘qituvchilari tayyorlovchi "Matematika o‘qitish metodikasi" fanida kognitiv kompetentlikni shakllantirishning nazariy asoslari, amaliy yondashuvlari va innovatsion texnologiyalardan foydalanish imkoniyatlari yoritilgan. Jumladan, iSpring Quiz

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dasturida tuzilgan nostandart test topshiriqlari asosida talabalar mustaqil fikrlash, muammoni hal etish, mantiqiy va tanqidiy fikrlash ko‘nikmalarini rivojlantirishi mumkinligi isbotlangan. Maqolada evristik yondashuv, keys-stadi metodikasi va kognitiv kompetentlikni baholash usullari ham keng tahlil etilgan.

Kalit so‘zlar: kognitiv kompetentlik, matematika o‘qitish metodikasi, nostandart test, iSpring Quiz, evristik masalalar, keys-stadi, ta’lim texnologiyalari.

Аннотация:
В данной статье раскрываются теоретические основы и практические подходы к формированию когнитивной компетентности у студентов бакалавриата по дисциплине «Методика преподавания математики». Особое внимание уделяется использованию нестандартных заданий, созданных в программе iSpring Quiz, как эффективного инструмента развития навыков логического мышления, самостоятельного анализа и решения проблем. Также подробно рассматриваются эвристический подход, метод кейс-стади и методы оценки когнитивной компетентности.

Ключевые слова: когнитивная компетентность, методика преподавания математики, нестандартные тесты, iSpring Quiz, эвристические задачи, кейс-стади, образовательные технологии.

Today, in higher education, special attention is paid to the formation of students' cognitive competence, that is, a complex of knowledge and skills such as independent learning, logical thinking, and problem solving. Cognitive competence is considered an important competence in the modern competency approach that applies to all stages of the educational process [1]. This article discusses the model for developing cognitive competence for undergraduate students within the subject "Mathematics Teaching Methods". Below, the concept of cognitive competence and methods of studying it are analyzed step by step, the possibilities of forming this competence in the subject of mathematics teaching methods, the stages of assessing and developing cognitive competence through non-standard tests, and the model developed on the basis of experience, the methods used, and the expected results.

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Cognitive competence is an integrative quality that expresses a person's ability to acquire new knowledge and skills, apply them in practice, and constantly strive for self-development. In research, cognitive (mental) competence is characterized by the student's independent acquisition of a set of skills necessary for both reproductive (repetitive) and productive (creative) learning activities, and this competence is manifested not only in the educational process, but also in various life situations. Also, in some sources, cognitive competence is defined as an individual's readiness to systematically improve their level of education, their desire to fully realize their personal intellectual potential, independently acquire new knowledge and skills, and a tendency to lifelong learning. Thus, cognitive competence includes components such as knowledge, thinking skills, and motivation for self-development. At the bachelor's level, various diagnostic methods are used as methods for measuring and studying cognitive competence. In particular, special tests, observations, interviews, and portfolios can be used to determine a student's ability to think independently and solve problems. One of the most common methods is to assess the cognitive level of students based on the criteria of Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, evaluation) [2].

The state of cognitive competence is also studied by giving students non-traditional problems, observing their process of finding solutions, determining the level of creative thinking, and filling out self-assessment questionnaires. For example, in pedagogical research, observation tables, test questions, analysis of students' independent work, and questionnaires have been used to diagnose cognitive competence. Thus, if the concept of cognitive competence comprehensively represents the intellectual development of a student, then a comprehensive approach to its measurement and research - a combination of test tasks, observation, and analysis - is important.

The content of the subject “Mathematics Teaching Methodology” includes pedagogical knowledge and skills, including methods of teaching mathematical concepts. This subject provides undergraduate students with not only theoretical knowledge, but also teaches them to solve didactic problems, that is, how to explain mathematical topics to students, analyze students’ mistakes, and plan the lesson process. It is in these processes that students can increase their cognitive activity. In the subject of methodology, the student deeply understands each mathematical topic and develops a strategy for communicating it to others - this

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requires thorough logical thinking and problem-solving skills. Thus, within the subject of mathematics teaching methodology, a favorable didactic environment is created for the formation of cognitive competence [3]. One of the effective methods for developing cognitive competence in the process of lessons in this subject is the use of heuristic (non-traditional) mathematical problems. Research shows that heuristic mathematical problems of varying complexity play an important role in the formation of cognitive competence of future mathematics teachers at each stage. For example, students are given problems that require unusual solutions in addition to simple examples. In this case, students try to solve the problem in several ways, developing creative and critical thinking. Also, in the subject of methodology, it is possible to introduce tasks in the style of case studies - in which students analyze the problem using the example of a real educational process and propose their own solutions. Such case tasks develop the ability of students to apply theoretical knowledge in practice.

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