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APPROACHES TO THE ANALYSIS OF THE CURRENT STATE OF THE METHODOLOGY FOR IMPROVING THE TEACHING OF PHYSICS IN HIGHER EDUCATIONAL INSTITUTIONS

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ABSTRACT

The article addresses the critical issue of improving the methodology of teaching physics in higher educational institutions, particularly in the context of credit-based teaching. The complexity of physics as a subject of general education has led to several challenges, including consistency in the teaching of the subject. As such, the article emphasizes the importance of developing both personal and professional knowledge in physics specialists.

The scientific basis of the research is the competency-based approach, which forms the foundation for the systematic analysis of the issue. The study used both empirical and theoretical research methods to analyze the effectiveness of the current methodology for teaching physics in higher educational institutions. The analysis focused on the classification of the competences of pedagogical specialists developed through the teaching of physics.

To address the challenges highlighted in the study, the article proposes several strategies for improving the teaching of physics in higher educational institutions. These strategies include the use of interactive teaching methods, the incorporation of technology in teaching, and the use of formative assessment to enhance student learning outcomes. The article emphasizes the importance of continuous research and evaluation of the teaching of physics to identify areas for improvement and ensure that students are adequately prepared for the challenges of the 21st century.

The article highlights the urgent need to improve the methodology of teaching physics in higher educational institutions. The current methodology is ineffective in equipping physics specialists with the knowledge and skills they need to teach the subject effectively. However, the article provides practical solutions that can be implemented to enhance the teaching of physics and ensure that students are well-prepared for the challenges of the 21st century. The article's findings and recommendations can be used to guide the development of effective strategies for teaching physics in higher educational institutions.

Keywords: Credit Technology, Physics Course, Professional, Methodology, Teaching Methodology.

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YÜKSEK EĞİTİM KURUMLARINDA FİZİK ÖĞRETİMİNİ GELİŞTİRME METODOLOJİSİNİN MEVCUT DURUMUNUN ANALİZİNE YAKLAŞIMLAR

ÖZET

Makale, özellikle krediye dayalı öğretim bağlamında, yüksek eğitim kurumlarında fizik öğretimi metodolojisinin geliştirilmesine ilişkin kritik konuyu ele almaktadır. Genel eğitim konusu olarak fiziğin karmaşıklığı, konunun öğretiminde tutarlılık da dahil olmak üzere çeşitli zorluklara yol açmıştır. Bu nedenle makale, fizik uzmanları için hem kişisel hem de mesleki bilgi geliştirmenin önemini vurgulamaktadır.

Araştırmanın bilimsel temeli, konunun sistematik analizinin temelini oluşturan yetkinlik temelli yaklaşımdır. Çalışma, yüksek eğitim kurumlarında fizik öğretimi için mevcut metodolojinin etkinliğini analiz etmek için hem ampirik hem de teorik araştırma yöntemlerini kullandı. Analiz, fizik öğretimi yoluyla geliştirilen pedagojik uzmanların yeterliliklerinin sınıflandırılmasına odaklandı.

Çalışmada vurgulanan zorlukları ele almak için makale, yüksek eğitim kurumlarında fizik öğretimini geliştirmeye yönelik çeşitli stratejiler önermektedir. Bu stratejiler, etkileşimli öğretim yöntemlerinin kullanımını, teknolojinin öğretime dahil edilmesini ve öğrencilerin öğrenme çıktılarını geliştirmek için biçimlendirici değerlendirmenin kullanımını içerir. Makale, iyileştirilecek alanları belirlemek ve öğrencilerin 21. yüzyılın zorluklarına yeterince hazırlanmalarını sağlamak için fizik öğretiminin sürekli araştırılmasının ve değerlendirilmesinin önemini vurgulamaktadır.

Makale, yüksek eğitim kurumlarında fizik öğretimi metodolojisini iyileştirmeye yönelik acil ihtiyacı vurgulamaktadır. Mevcut metodoloji, fizik uzmanlarını konuyu etkili bir şekilde öğretmek için ihtiyaç duydukları bilgi ve becerilerle donatmada etkisizdir. Ancak makale, fizik öğretimini geliştirmek ve öğrencilerin 21. yüzyılın zorluklarına iyi hazırlanmalarını sağlamak için uygulanabilecek pratik çözümler sunmaktadır. Makalenin bulguları ve tavsiyeleri, yüksek öğretim kurumlarında fizik öğretimi için etkili stratejilerin geliştirilmesine rehberlik etmek için kullanılabilir.

Anahtar Kelimeler: Kredi Teknolojisi, Fizik Dersi, Profesyonel, Metodoloji, Öğretim Metodolojisi.

INTRODUCTION

The quality of higher education has become an increasingly pressing issue in many countries, including the Republic of Kazakhstan, which has recently acceded to the Bologna process. As the country strives to align its higher education system with international standards, the need to ensure the quality of education and to prepare students for the challenges of the 21st century has become paramount. Among the many subjects taught in higher educational institutions, physics holds a special place, as it is an essential component of many fields of study, including engineering, technology, and natural sciences. However, teaching physics to students of pedagogical specialties poses a range of methodological, organizational, and content-related challenges that need to be addressed.

At our university, we have gained long-term experience in teaching physics to students of pedagogical specialties, and we have identified several problems that need to be addressed. These problems include the need to improve the methodology of teaching physics, the lack of information on experimental testing of the methodological system of teaching physics, and the challenges posed by the introduction of credit education technology. The new technology has transformed the way teaching is organized and delivered, and it requires a different approach to teaching and learning. The teacher is no longer the sole source of information, and the boundaries between different forms of classroom activity have become blurred. In this context, the weight of the

student's own work has increased, and the need for personal and professional education has become more pronounced.

In this changing educational landscape, not all teachers of higher educational institutions are ready to teach effectively. Many teachers lack the necessary skills and knowledge to teach physics in the context of credit education technology, and the methodology of teaching physics to students of pedagogical specialties has not been fully developed. Additionally, there is a lack of information on the experimental testing of the methodological system of teaching physics using a competency-based approach or its individual components. Therefore, there is an urgent need to systematically analyze the current state of physics teaching methodology in universities for pedagogical specialties and to draw conclusions about its effectiveness.

In this article, we aim to address this complex task by conducting a comprehensive analysis of the current state of physics teaching methodology in universities for pedagogical specialties in Kazakhstan. Our study will use a competency-based approach and a range of empirical and theoretical research methods to identify the strengths and weaknesses of the current methodology. Additionally, we will propose practical solutions to improve the teaching of physics to students of pedagogical specialties in the context of credit education technology. Our findings will be of great interest to physics teachers, educational policymakers, and researchers, as they will provide insights into the challenges and opportunities of teaching physics in the 21st century.

THE PURPOSE OF THE STUDY

The purpose of the study is to analyze the current state of the methodology of teaching physics in higher educational institutions and to draw conclusions about its effectiveness in preparing competent pedagogical specialists. The importance of this research lies in the fact that with the accession of the Republic of Kazakhstan to the Bologna process, the quality of higher education has become a more pressing issue. The changing organization of the educational process, particularly with the introduction of credit education technology, has led to a number of methodological, organizational, and content-related problems in teaching physics to students of pedagogical professions. These issues have a significant impact on the formation of professional and personal knowledge of specialists, and thus the quality of their work.

RESEARCH MATERIALS AND METHODS

In order to achieve the research goal, a methodological basis was chosen that includes improving the quality of professional education, personality development, and system-synergistic approaches. Two groups of research methods were used to achieve the research goal: empirical and theoretical. The empirical research methods included the study of official and regulatory documents that regulate the organization of the educational process on credit education technology, observation, conversation, mutual opinion exchange method, asking questions, and studying the opinions of employers. The theoretical research methods included analysis, synthesis, generalization, classification, formulation of conclusions, and other techniques to explore the current state of the methodology of teaching physics in higher educational institutions.

The choice of these research methods was made based on the need to obtain comprehensive and reliable data on the effectiveness of the current methodology of teaching physics in higher education institutions. The use of empirical research methods allowed for the collection of data directly from the field, while theoretical research methods allowed for the synthesis and generalization of the collected data. This approach ensured the reliability and validity of the research results, and allowed for the development of informed conclusions about the effectiveness of the methodology of teaching physics in higher educational institutions for the formation of competent pedagogical specialists.

CONTENT OF THE STUDY

The goal of education is to prepare graduates for their professional careers by providing them with the necessary skills, knowledge, and attitudes. The competence method is an approach that emphasizes the importance of practical skills and problem-solving abilities in preparing graduates for their chosen fields. This article will explore the concept of competence in education and how it relates to the professional activities of technicians.

The concept of competence refers to the ability to apply knowledge and skills in practical situations. In the context of education, competence means that graduates are able to carry out professional activities effectively and efficiently. The competence method emphasizes the development of practical skills, such as problem-solving and decision-making, rather than just the acquisition of theoretical knowledge.

The competence approach to education has several benefits. Firstly, it helps to bridge the gap between theory and practice. Graduates who have developed practical skills during their studies are better equipped to apply their knowledge in real-world situations. Secondly, the competence approach is more closely aligned with the needs of employers. Employers are looking for graduates who can contribute to their organizations immediately, and the competence approach prepares graduates for this.

In the context of technicians, competence means the ability to design and solve complex engineering problems, develop systems, components or processes that meet specific requirements, and take into account cultural, social and environmental aspects. Technicians are responsible for applying their knowledge and skills to solve practical problems in their field of expertise.

The role of a technician is becoming increasingly important in today's world. As technology advances and becomes more complex, the demand for skilled technicians continues to grow. The competence approach to education is particularly relevant for technicians, as it emphasizes the development of practical skills that are essential for their work.

The competence method is an effective approach to education that emphasizes the importance of practical skills and problem-solving abilities. In the context of technicians, competence means the ability to apply knowledge and skills to solve practical problems in their field of expertise. The competence approach prepares graduates for the demands of the modern workplace and ensures that they are able to make meaningful contributions to their organizations.

As the role of technicians becomes increasingly important, the competence approach will continue to play a crucial role in preparing graduates for their professional careers [2].

In the field of pedagogy, the concept of competence has gained increasing attention over the past few decades as a way to define the skills, knowledge, and abilities that students should acquire during their educational journey. Competence-based education (CBE) is a framework that aims to prepare students for real-world situations by focusing on the development of specific competencies.

As part of our research, we sought to develop a classification of the competences of pedagogical specialists formed during the teaching of physics. Our classification was based on the main results of the training process, namely general, subject-specific, and special competencies.

General competencies refer to the skills and abilities that are necessary for success in any field or discipline. These include communication skills, critical thinking, problem-solving, and creativity. In the context of physics education, general competencies might include the ability to analyze data, make predictions, and draw conclusions based on evidence.

Subject-specific competencies, on the other hand, are specific to a particular field or discipline. In the case of physics education, subject-specific competencies might include a deep understanding of fundamental physical concepts such as energy, motion, and force, as well as the ability to apply these concepts to real-world problems.

Special competencies, meanwhile, are those that are unique to a particular profession or occupation. For pedagogical specialists in physics education, these might include the ability to design effective lesson plans, create engaging learning activities, and assess student performance using a variety of methods.

In developing our classification, we also considered the types of competencies that are most effective in improving knowledge formation. We found that the teaching methodology of physics should focus on improving both motivational and cognitive aspects of learning, as well as on developing universal methods of action that can be applied across disciplines.

Motivational competencies include those that help students to develop a sense of curiosity and enthusiasm for learning. These might include the ability to set goals, self-evaluate, and reflect on one's own learning progress. Operational competencies, meanwhile, are those that relate to the actual process of learning, such as the ability to organize information, manage time effectively, and apply problem-solving strategies.

Cognitive competencies are those that relate to the development of critical thinking and analytical skills. These might include the ability to analyze data, draw conclusions based on evidence, and apply scientific principles to real-world problems.

Finally, meta-disciplinary competencies are those that are applicable across disciplines and professions, such as the ability to collaborate with others, communicate effectively, and use technology to enhance learning.

Our classification of the competencies of pedagogical specialists in physics education is based on the main results of training and emphasizes the development of general, subject-specific, and special competencies. We also highlight the importance of focusing on motivational,

operational, cognitive, and meta-disciplinary competencies in order to improve knowledge formation and prepare students for success in the real world.

The success of education is often measured by the competence of the graduate to perform professional activities. This competence can be classified into three types: general, subject-specific, and special. In the case of teaching physics, the competencies of pedagogical specialists can be developed through various methods.

To obtain the desired results, it is important to take into account a number of factors. These factors include the organization of the educational process, the competence of the teacher, the motivation and abilities of the students to learn, professional goals, development of evaluation and selection criteria, and the most effective ways to solve problems. It is also crucial to strive for self-development and continuously improve teaching methods.

However, the reality of the state of competence formation of pedagogical specialists during physics teaching at universities may not always match this ideal. An analysis of normative documents related to credit-based learning technology reveals that the pedagogical aspect of teaching includes comparison, systematization, generalization, and acquisition of new knowledge. On the other hand, the personal aspect focuses on analysis, synthesis, critical reflection, the ability to generate ideas, creativity, motivation, interest, and self-development.

It is important to note that the personal aspect of competence formation plays a crucial role in the success of education. Pedagogical specialists need to possess not only subject-specific knowledge, but also the ability to reflect critically, generate ideas, and motivate students. The development of such competencies can be achieved through various teaching methodologies.

One effective method of developing competencies in pedagogical specialists is through professional improvement knowledge. This method focuses on developing motivational, operational, cognitive, and other personality changes. It helps in improving knowledge formation and enhancing the personal aspect of competence formation.

Another method of developing competencies is through meta-disciplinary approaches. This approach focuses on universal methods of action and can be applied across different subjects. It helps in developing problem-solving skills and enhancing the general and subject-specific aspects of competence formation.

It is crucial to note that the success of education is not solely dependent on the teaching methodologies employed. The competence of the teacher also plays a crucial role. A competent teacher possesses subject-specific knowledge, teaching skills, and the ability to motivate and inspire students. Teacher training programs need to focus on developing such competencies in teachers to ensure the success of education.

The competence method is an effective way of measuring the success of education. The success of education depends on various factors, including the organization of the educational process, the competence of the teacher, the motivation and abilities of the students, professional goals, and the most effective ways to solve problems. The development of competencies can be achieved through various teaching methodologies, including professional improvement knowledge and meta-disciplinary approaches. Teacher training programs need to focus on

developing subject-specific knowledge, teaching skills, and the ability to motivate and inspire students to ensure the success of education.

Based on the results of the analysis, a model of pedagogical specialist competencies in the form of groups of competencies that are interconnected and complementary to each other was proposed. The proposed model of pedagogical specialist competencies to be a valuable contribution to the field. It is evident that the model considers the interrelatedness of competencies and highlights the need for both pedagogical and personal aspects in the development of specialists.

One of the key findings of the analysis is the importance of social competences for pedagogical specialists. Communication is a crucial aspect of teaching, and the ability to effectively communicate with students, colleagues, and other stakeholders is essential for success in this field. However, it is also important to recognize the personal side of social competences, which includes self-improvement motives. Pedagogical specialists should constantly strive to improve their own knowledge, skills, and abilities, and this self-improvement should be reflected in their teaching practices.

The instrumental competencies highlighted in the model are also important for pedagogical specialists. These competencies include the ability to perform calculations and draw conclusions, use tools and equipment, find and process information, use information tools and technologies, and speak three languages. It is evident that in today's rapidly changing technological landscape, it is crucial for pedagogical specialists to be proficient in the use of various tools and technologies. Additionally, the ability to speak multiple languages is an asset in a multicultural and diverse educational environment.

In terms of personal instrumental competencies, the model emphasizes the importance of the formation and ownership of analysis and synthesis methods, patent search, experiment implementation, interpretation of results, and formulation of conclusions. These competencies are particularly relevant for specialists involved in research and development activities. It is important for pedagogical specialists to be able to analyze and synthesize data, interpret results, and draw meaningful conclusions to improve their teaching practices and contribute to the development of the field.

The general professional competencies highlighted in the model include modeling, planning, organizing, managing, compiling, evaluating, and setting abilities. These competencies are essential for effective teaching and management of educational institutions. Pedagogical specialists must be able to effectively plan and organize their teaching activities, manage resources, evaluate student performance, and set clear goals and objectives for themselves and their students.

The model also emphasizes the importance of personal general professional competencies, including the ability to analyze, synthesize, justify, and make decisions, predict, choose research methods, and plan. These competencies are particularly relevant for specialists involved in research and development activities but are also essential for effective teaching and decision-making. Pedagogical specialists must be able to analyze and synthesize data, make informed decisions, and plan their activities to achieve their goals.

Special competencies in pedagogical terms include regulation of technological processes, their management, ensuring safety and environmental protection, and maintenance of production. These competencies are particularly relevant for specialists involved in technical and vocational education, where safety and environmental protection are critical concerns. Additionally, the development and improvement of pedagogical objects and processes, identification of improvement objects in technique and technology, transformation of knowledge into technology, assessment of risks and determination of security measures, and the possibility of using methods of pedagogical and economic analysis are also considered. These competencies are particularly relevant for specialists involved in educational innovation and development.

Overall, the proposed model of pedagogical specialist competencies highlights the importance of both pedagogical and personal competencies in the development of effective specialists. It is important for pedagogical specialists to be proficient in both social and instrumental competencies, as well as in general professional and special competencies. Additionally, the model emphasizes the importance of personal instrumental and general professional competencies, which are particularly relevant for specialists involved in research and development activities.

Teaching of physics requires a well-planned curriculum and effective teaching strategies to ensure that students can learn and understand the complex concepts and theories in the subject matter. In this regard, it is essential to examine the content of the subject matter and develop a course plan that is both comprehensive and feasible.

The subject of physics is vast and covers various areas such as mechanics, vibrations and waves, molecular physics and thermodynamics, and electricity. To cover all these topics in a 15-week course, a well-structured and organized plan is necessary. It is vital to allocate the appropriate amount of time for each topic to ensure that students can grasp the fundamental concepts and theories.

Ideally, a 15-week physics lecture course should consist of 15 lectures, with each lecture covering a specific topic. The course's introductory lecture would provide an overview of the subject matter and its relevance to other disciplines, followed by six lectures on mechanics, one lecture on vibrations and waves, four lectures on molecular physics and thermodynamics, and three lectures on electricity. However, it is important to note that in practice, some lectures may be missed due to unforeseen circumstances such as holidays or student absences.

Moreover, it is essential to consider the time limitation of classroom sessions when developing a course plan. In most cases, physics lectures are conducted for 50 minutes, which is often insufficient to cover a topic comprehensively, especially those with extensive theoretical and factual materials.

For instance, mechanics is one of the most crucial topics in physics, covering kinematics of a material point, kinematics of rotational movement, dynamics of a material point, dynamics of a rigid body, elements of the special theory of relativity, conservation laws, and elements of continuum mechanics. With such a broad range of topics, it may be challenging to cover all of them adequately within a 50-minute lecture period.

Therefore, it is important to adopt effective teaching strategies such as active learning to ensure that students can engage with the material, participate in the learning process, and understand the fundamental concepts and theories. One way to achieve this is through problem-based learning, where students are presented with real-world problems that require the application of physics concepts to solve.

Additionally, teachers can use multimedia and visual aids such as diagrams, videos, and animations to help students understand complex concepts and visualize abstract ideas. This approach can be particularly effective in teaching topics such as vibrations and waves and electricity, which may require students to visualize the movement of waves or the behavior of electrical currents.

Furthermore, the use of group work and collaborative learning can also enhance student engagement and understanding. By working in groups, students can learn from each other, share ideas, and solve problems collaboratively, which can be particularly helpful in topics such as molecular physics and thermodynamics, where understanding complex concepts may require a group effort.

The process of improving knowledge in pedagogical specialties through special practicals has been a topic of discussion. While there are practical and laboratory lessons available, the methodology for organizing them is yet to be established. Every teacher conducts the lessons in their own way, and there are no rules or regulations to guide the process. Laboratory classes take twice as much time as lectures, but even this does not solve the problem. Though laboratory classes offer students the opportunity to conduct experimental research independently, there is still a lack of guidance in the process. The teacher only advises the students on the most difficult problems. Therefore, it is doubtful that traditional methods of teaching physics to students of pedagogical professions are effective.

To test this assumption, a survey of second-year students was conducted. The survey involved 67 students of pedagogical specialties, and expert evaluation methods were used to compile the questionnaires. The purpose of the survey was to determine the success of the formation of the main groups of competencies in the physics lessons. The results of interviews with employers, materials from periodicals, and our own ideas were also considered.

To analyze the formation of students' competencies, i.e., practical, and subject competencies, the results of observation work, control work, laboratory work, and certification results were also taken into account. After analyzing the obtained data, conversations with teachers, expert opinions, and participation in physics classes, our assumption about the insufficient level of competence formation was confirmed.

The lack of established guidelines for organizing laboratory classes has resulted in a lack of consistent competence formation in students. While laboratory classes provide students with the opportunity to conduct independent experimental research, the lack of guidance from teachers has left students struggling to complete the tasks assigned to them. In some cases, students even complete laboratory work without fully understanding the concepts they are working with.

The issue is compounded by the fact that the time allotted for lectures is insufficient to cover the theoretical and factual material required to master the topics. For example, mechanics includes kinematics of a material point, kinematics of rotational movement, dynamics of a material point, dynamics of a rigid body, elements of the special theory of relativity, conservation laws, and elements of continuum mechanics. With only 50 minutes allocated to each lecture, it is impossible to master all of these topics in depth.

Furthermore, there is a lack of uniformity in the teaching of physics. Each teacher conducts their lessons in their own way, resulting in a lack of consistency in the material covered and the methods used to teach it. This further exacerbates the problem of inconsistent competence formation in students.

To improve the education of teaching physics to students of pedagogical professions, there is a need for the development of a methodology for organizing laboratory and practical classes. The methodology should provide teachers with guidelines for conducting classes and provide students with the necessary guidance to complete the tasks assigned to them.

In addition, there should be a standardization of the teaching of physics. Teachers should be provided with guidelines on the material to be covered and the methods to be used to teach it. This will ensure that all students are exposed to the same material and taught using the same methods, resulting in a more consistent level of competence formation.

A physics lesson typically lasts 90 minutes and is conducted with the assistance of an assistant who helps with various tasks such as managing computer presentations, conducting experiments, preparing demonstration experiments, and erasing the board. The professor's role in the lecture is to present the material, ask and answer questions, and write formulas on the board. The average workload for a physics professor is 240 hours per year. The university provides each professor with a private office that is fully equipped with computers, furniture for work and relaxation, and a file cabinet for storing instructional materials for classes.

Teaching materials and assignments for students are stored electronically on the university network. None of the faculty offices visited have physical copies of the syllabus or study program for students. When asked to provide a syllabus, the professors replied that the syllabus is available on the university network and that students can easily access it there. The professors do not take an active role in developing methodological guidelines for laboratory or practical lessons or organizing students' independent work. None of the professors provided an OC (methodological complex in the subject) for physics.

This lack of involvement in developing teaching materials and guidelines raises questions about the effectiveness of the physics curriculum. Without clear and consistent teaching guidelines, there is a risk that students will not receive a consistent and high-quality education. Additionally, the lack of participation by professors in the development of the curriculum leaves room for inconsistency and deviation from established standards.

To address this issue, the university may consider implementing a more structured approach to developing teaching materials and guidelines. Professors could work together to establish clear learning objectives for each course, develop standardized syllabi and teaching

materials, and create guidelines for laboratory and practical lessons. This approach would ensure consistency in the quality of education that students receive.

Furthermore, professors could play a more active role in developing the syllabus and study programs for students. By providing students with clear learning objectives and expectations for each course, professors can help students better understand the material and be more successful in their studies.

Another area that could benefit from increased professor involvement is in the development of methodological guidelines for laboratory and practical lessons. By providing guidelines for conducting experiments and organizing independent work, professors can help ensure that students are properly trained in the subject matter and have the necessary skills to succeed in their future careers.

The pedagogical equipment in the physics classrooms is impressive and up-to-date. A small but powerful projector is able to display transparent images, as well as enlarged images of any objects with the necessary degree of magnification. In addition, classrooms are equipped with gas, water, and alternating and constant voltage. The computer control system of the classroom is modern and comprehensive, with features such as darkening of the classroom, degree of illumination of student workspaces, and raising and lowering of chalkboards. This system also allows for the use of computer demonstrations and interactive programs, which can be activated by the teacher at any time.

The classroom also has two exits, although one is deemed dangerous. However, access to the laboratory is readily available, which includes various equipment such as computers, gas, plumbing, and more. The laboratory assistant is responsible for preparing the necessary equipment for the classes conducted by the professor. The laboratory also provides trolleys for transporting equipment and cabinets for storage.

With such advanced equipment available, it is clear that the university has invested a significant amount of resources to ensure that students receive a top-notch physics education. This is particularly important in the field of physics, where experiments and demonstrations play a vital role in learning. The ability to display high-quality images and control classroom features with ease provides both students and teachers with an optimal learning environment.

Moreover, the availability of modern computer technology is a crucial component in today's education system. With the help of advanced computer programs and interactive simulations, students can explore complex physics concepts in a more engaging and interactive way. This not only helps to deepen their understanding of the subject matter but also prepares them for the digital age and the technological advancements that are sure to continue in the future.

The presence of a laboratory assistant is also a valuable asset, as they can provide assistance and support to both the teacher and students during experiments and demonstrations. This allows the professor to focus on delivering the material and answering questions, while the assistant handles the logistics of the experiment. Additionally, the availability of equipment trolleys and storage cabinets ensures that equipment is properly organized and easily accessible, which can save valuable time during laboratory sessions.

During my visit to various universities in Kazakhstan, I had the opportunity to observe the lecture rooms for physics classes for students pursuing pedagogical professions. I was impressed by the quality of the facilities and equipment provided for their education.

The lecture rooms were spacious and well-equipped, with up-to-date technology that meets the demands of the profession. For instance, the rooms were equipped with a small projector that can project not only transparent images, but also magnified images of any objects. This is a useful tool for teachers to use during lectures to help students visualize complex concepts. Additionally, the classrooms were equipped with gas, water, and both alternating and constant voltage, which is essential for physics experiments.

The classroom environment was also highly conducive to learning. The computer control system in the classroom was designed to be compact and safe, and it could be activated at any time the teacher deemed necessary. This system allowed for the darkening of the classroom, degree of illumination of student workplaces, raising and lowering of chalkboards, use of computer demonstrations, interactive programs, and more.

The lecture rooms also had access to the laboratory, which was well-equipped with computers, gas, plumbing, and more. The laboratory assistants were responsible for preparing the necessary equipment for the classes conducted by the professor. In addition, the laboratory had trolleys for transporting equipment and cabinets for storing it.

In addition to the facilities, the lecture rooms also meet the requirements and demands of the profession in which future pedagogical specialists are being trained. For example, during one of the physics lectures, a portion of the lecture room was dedicated to practical implementation of the acquired knowledge. This hands-on approach to learning is an effective way of teaching, as it allows students to immediately apply the concepts they have learned. During the lecture, a student was given a task and performed it in front of all the listeners, which not only helped to reinforce the concepts taught in class, but also provided an opportunity for the student to demonstrate their understanding of the subject matter.

However, despite the impressive facilities and hands-on approach to learning, there were still some concerns about the effectiveness of the teaching methodology. Specifically, in the area of laboratory and practical lessons, there was a lack of uniformity in the way that teachers conducted the lessons. Each teacher conducted the lesson in their own way, and there were no rules or regulations governing the methodology of organization. While laboratory classes took twice as much time as lectures, this did not necessarily solve the problem. Laboratory classes were used to solve real problems, and students conducted experimental research independently, with the teacher only advising on the most difficult problems. This lack of uniformity and regulation in the teaching methodology raised concerns about the success of improving the education of teaching physics to students of pedagogical professions based on the traditional method.

To test this assumption, a survey of second-year students was conducted. 67 students of pedagogical specialties took part in the survey, and expert evaluation methods were used to compile the questionnaires. The purpose of the survey was to determine the success of the formation of the main groups of competencies in the physics lessons described above. Also, the

results of observation work, control work, laboratory work, and certification results were taken into account to analyze the formation of students' competences, i.e., practical and subject competences. After analyzing the obtained data, conversations with teachers, expert opinions, observations, and participation in physics classes, it was confirmed that the level of competence formation was insufficient.

The integration of modern technologies in the teaching of physics has undoubtedly made the job of a physics teacher much easier. The use of multimedia tools such as projectors and computer presentations in classrooms, and the availability of necessary equipment for experiments and demonstrations has revolutionized the way physics is taught. These technological advancements have freed teachers from daily manual work and opened up new opportunities to explore and incorporate innovative techniques in physics teaching.

However, despite the availability of modern tools, the lectures observed during my visits did not always involve the use of interactive teaching methods. The exchange between teacher and student was often limited to a question-and-answer format, rather than an interactive dialogue based on active teaching. This approach may not be as effective in promoting the formation of the necessary competencies in students.

It is worth noting that the classrooms are well-equipped and designed to meet the requirements of the profession. During a lecture on physics for teaching professions, I observed a practical implementation of the knowledge acquired by one of the students in front of the entire class. This approach allowed for immediate application of the newly learned concepts, which is known to be an effective way of teaching.

The advantages of the conditions provided for the formation of competencies of future specialists are evident. The classrooms and laboratories are equipped with necessary resources such as gas, water, electricity, and computer control. The pedagogical equipment in the classrooms is up-to-date, and the facilities for practical work meet the requirements of the profession.

In terms of self-improvement, the university provides the professors with a private office equipped with computers and furniture. The working documents, including the programs and assignments for students, are stored electronically on the university network. However, it was noticed that the professors do not create methodological guidelines for laboratory or practical lessons, nor for organizing independent work of students. The absence of a standard methodology for teaching physics may result in inconsistencies in the quality of education.

RESEARCH RESULTS AND DISCUSSION

Pedagogical specialty is undoubtedly complex and multifaceted, requiring constant research and analysis of its various aspects. In this particular study, we focused on examining the current state of physics teaching methodology in the training of pedagogical specialists at the university.

To achieve this, we utilized a range of interrelated and complementary methodological approaches, including the competence approach, the approach to personality development, and the system-synergistic approach. In addition, we employed both empirical and theoretical research

methods, allowing us to gain a comprehensive understanding of the current state of physics teaching methodology.

Our findings revealed that the current methodology of teaching physics does not fully meet the goals and objectives of the subject in terms of the formation of professional and personal competences of future pedagogical specialists. While the university provides adequate resources and facilities for teaching physics, the teaching methods utilized by the professors are somewhat outdated and do not fully engage the students in the learning process.

Specifically, we found that interactive teaching methods were rarely employed during lectures, and that the typical question-and-answer system between teacher and student was used more often than a heuristic conversation or educational dialogue based on interaction. This lack of engagement and interactivity in the teaching process may be hindering the development of key competences and skills among the students.

Despite these shortcomings, there are still advantages to the current methodology of teaching physics in the training of pedagogical specialists. The facilities and resources provided by the university, such as the up-to-date pedagogical equipment and technology, simplify the work of the teacher and open up new opportunities for using the most advanced technologies in teaching physics.

However, it is clear that further research is needed in order to develop conceptual rules and models for teaching physics to competency-based pedagogic students. Such research should focus on identifying effective and engaging teaching methods that can foster the development of key competences and skills among students, while taking advantage of the facilities and resources provided by the university.

CONCLUSION

To conclude, the importance of enhancing the methodology for teaching physics in higher education is highlighted. Physics is a complex subject that demands a thorough comprehension of its principles and concepts. However, the current approach is inadequate in equipping physics experts with the essential knowledge and skills to teach effectively. A competency-based approach is emphasized, which concentrates on the personal and professional development of physics specialists.

A comprehensive analysis of the effectiveness of the existing methodology for teaching physics in higher education is offered. The empirical and theoretical methods used to identify the competencies of pedagogical experts are discussed. Several challenges faced by physics experts, such as inconsistency in teaching the subject, are highlighted. Various strategies for improving the teaching of physics, including interactive teaching methods, technology integration, and formative assessment for better student learning outcomes are proposed.

The suggested strategies hold significant implications for devising effective teaching approaches in higher education. Interactive methods, such as problem-based learning and peer instruction, can increase student engagement and comprehension of complex physics concepts. Technology can supplement traditional teaching methods and provide students with interactive

learning opportunities. Formative assessments can assist physics experts in identifying areas of student difficulty and modifying teaching techniques accordingly.

The result stresses the significance of continuous evaluation and research to improve physics teaching and ensure that students are adequately prepared to meet the challenges of the 21st century. Physics experts must possess a deep understanding of the concepts and principles of physics, as well as the required skills to teach the subject effectively.

Valuable insights into the present state of physics teaching methodology in higher education are offered. The proposed strategies have important implications for devising effective teaching approaches in the subject. The continuous evaluation and research of physics teaching can ensure students are prepared to meet 21st century challenges. The recommendations and findings can aid in developing effective teaching strategies in higher education.

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