

METHODOLOGICAL TRAINING OF FUTURE PHYSICS TEACHERS ROLE OF ACT AND PROFESSIONAL DUTIES

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ABSTRACT

The priority task of training future teachers in HEIs is to form the teacher's ability to solve professional problems. It is appropriate to use modern methods of teaching physics in general secondary schools. In order to strengthen students' knowledge, it is necessary to adapt students to rapidly changing conditions, use information and communication technologies, and create virtualized knowledge.

Keywords: teacher's professional activity, methodical training, physical knowledge, cognitive task, experimental installation, design and modeling of pedagogical activity.

Activating students' creative abilities is defined as students' conscious need to acquire high-level knowledge and skills, high results, and breadth of thinking.

This activity does not always occur, it occurs only due to the teacher's appropriate pedagogical influence and the ability to create a favorable pedagogical psychological environment. Effective influence in teaching physics and creation of a favorable socio-psychological environment depends on the modern pedagogical technologies used by the lecturer.

Any technology produced by didactics serves to activate the cognitive activity of students and increase the effectiveness of education. They are:

1. Didactic game technologies.
2. Problem-based educational technologies.
3. Modular educational technologies.
4. Cooperative teaching technology.
5. Design technology.

In the process of education, together with the unique features of technologies that enable the activation of students' mental activity and increase the effectiveness of education, they provide education, develop, educate, lead to creative activity, communicative, logical thinking, mental activity. performs such functions as formation of methods, analysis of one's activity, introduction to the profession, training to get the goal right, creation of cooperation.

The implementation of distance education in higher education and the development of digital textbooks is an innovative method of teaching in education, which aims to improve the quality of education, eliminate corruption and reduce it. aimed at prevention. Before designing digital textbooks, many aspects are studied, that is, research is conducted on teaching it. As a result, the created textbooks are directed to be interesting, light, memorable and harmless in the process of learning. A single page can contain both text and audio explanations, videos and 3D animations at the same time. According to the research conducted on such textbooks mainly on physics and anatomy textbooks, 80% of the participants can remember the information because the textbooks are virtual, multi-format and interactive. It is also appropriate to use 3D

animation to include the learner in the educational process and to create knowledge and skills in the planned lessons. In particular, in higher education, conducting some laboratories in the field of physics: molecular physics, atomic physics, nuclear physics, and quantum mechanics creates a number of difficulties. The reason for this is that special conditions are required for a special experiment or the experimental equipment is insufficient. Through 3D holograms, these labs can be made virtual.

To date, there is a contradiction between the modern trends of modernization of professional education and the real state of methodological preparation of students in HEIs, which creates the need to master the use of new modern information and communication technologies in the proper formation of professional education. Mastering this knowledge serves to solve the problem of formation of professional activity. In the process of education of future physics teachers in higher education institutions, together with the assimilation of modern knowledge, future teachers are required to learn the methods of creativity and special preparation for each lesson.

According to the opinion of the majority of researchers in the field of professional pedagogy, the result of professional training is determined by evaluating the knowledge skills acquired by the pedagogical skills of the pedagogic higher educational institution graduate. The future teacher requires evaluation through the following points:

- 1) highlight the professional duties of a physics teacher;
- 2) development of animated teaching methods of generalized physical processes;
- 3) to develop and implement a model of the educational process that allows each student to express his or her opinion on the subject, to master the generalized methods of solving them.

The main professional duties of a modern future physics teacher are strengthened by the following factors:

- 1) Planning of educational material with animation in physics;
- 2) Preparation for teaching the subject of the physics course;
- 3) Development of different types of (animated, multimedia) lessons:
 - A lesson on studying material to strengthen students' knowledge of physical processes;
 - A lesson on teaching methods of solving physical problems;
 - A lesson of teaching practical actions;
 - A lesson on generalization of knowledge;
 - A lesson on studying practical material and methods of teaching physical processes;
 - A lesson on diagnosing the level of knowledge acquisition and skills acquisition;
- 4) Creation of an educational experimental base, development of an experimental system on the topics of the physics course;
- 5) Development of a system of tasks-exercises and tasks-problems for accurate mastering in the process of applying the knowledge learned on the subject;
- 6) Organization of research and project activities using physical knowledge.

Formation of professional skills of future teachers of physics, development of electronic teaching-methodical complexes and introduction into the educational process, the methodology of teaching physics is being formed in the pedagogical HEIs. In order to raise the knowledge of future physics teachers to a new level of quality, it is necessary to create conditions for the

inclusion of generalized activity methods in the active process of forming students' professional skills. General solution methods are manifested in a number of different professional tasks. Learning and academic achievement are inseparable in Physics teaching. If learning truly takes place it will be reflected in students' academic achievement. For learning to take place in Physics teaching two things are imperative; teacher's knowledge and learner's interactions, both are categorized into three each.

Content knowledge: Physics teacher must be knowledgeable about physics; he/she should know about theories, concepts, principles and laws. **Pedagogical knowledge:** Physics teacher should know the nature of learning; methods of teaching, student assessments and classroom management. **Technological knowledge:** This deals with the knowledge and skill to operate and apply technologies, for instance, using of computers and projectors. Physics teacher should be able to operate and apply technologies in physics class.

Learners – teacher interactions: This deals with the interactions between students and teacher in teaching and learning process. It includes interaction during lessons and outside classroom interaction.

Learner - learner interactions: This is interaction in various group studies either in the class or outside the classroom. Group studies are important to students' learning in Physics.

Learners – environment interaction: This includes various activities student carried out using community as learning resources. Community resources are very important to science learning (Besty, 2012) especially Physics.

Computers can be put to different types of use in teaching Physics which include, simulations, computer data acquisition, animation and many more.

Educational software can be used to teach difficult concepts or observe difficult skills in Physics. For example teaching of electric motor in Physics can be done with the aid of Encarta educational software. The rotation of the coil in the magnetic field will be best appreciated by student when seeing it demonstrated through this software. Most Physics teachers could not explain the mechanism of either electric motor or generator to student properly because of its complexity; when demonstrated in a computer through software the problem of complexity will be over and student learning is enhance.

Apart from using educational software as earlier discussed, video is another resource that can be used for learning of Physics. Brekke and Hogstad stated:

SimVideo are interactive learning tools integrated with SimReal which contains video-lectures, video-simulations, interactive simulations, task review and applications with opportunities for continuous exchange between different elements without losing the focus in the temporarily abandoned item.

1.1 Multimedia and its Elements

“Multimedia is any combination of text, graphic art, sound, animation, and video that is delivered by computer. When you allow the user – the viewer of the project – to control what and when these elements are delivered, it is interactive multimedia. When you provide a structure of linked elements through which the user can navigate, then the interactive multimedia becomes hypermedia”.

Optimally all physics classes should include the following: real hands-on experiments, demonstration experiments performed by the teacher, simulations, embedded videos, or other new technologies.

1.2 Multimedia and ICT used in Education

Nowadays there is an enormous pressure on the schools from the society, and from the media to ensure that students are competent in the area of learning technologies. The majority of the teachers tend to change their attitude and introduce new ICT tools and technologies into their physics classes. Many international projects, - several ones coordinated by the European Schoolnet - aim to give teachers a big help to use digital materials prepared and tested.

CONCLUSIONS

Use of the ICT in Education combined with the project method could be a promising asset to modernize the teaching of physics and make natural sciences more attractive by engaging multimedia and Internet communication. With the help of the innovation – the attitude improving projects – we have come closer to the goal of having students who are autonomous, have a creative way of thinking and by integrating their experimental, theoretical, mathematical and IT skills they are able to have proficiency of knowledge that is universal and useful.

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