

DEVELOPING FUTURE PHYSICS TEACHERS' COMMUNICATION SKILLS THROUGH E-LEARNING TOOLS

D.B. Nurgaliyeva* , N.Zh. Zhanatbekova 

Zhetysu University named after I. Zhansugurov, Republic of Kazakhstan, Taldykorgan

*e-mail: dinara_nurgaliyeva91@mail.ru, n.zhanatbekova@mail.ru

Abstract. The activity of a teacher is closely related to interpersonal communication. In this regard, communication skills occupy one of the leading roles in the activity of a teacher and are considered an important component of pedagogical skills.

The teacher's interaction with students directly affects their interest in the subject, and as a result, their academic performance. Physics is no exception. Teaching physics requires not only high-level knowledge of the subject, but also oral and written skills, the ability to build relationships with subjects of the educational process, as well as developed empathy, which together can be attributed to the communicative skills of a physics teacher.

Currently, various methods and tools are used to form the communication skills of future teachers, but e-learning tools can be highlighted among them. These tools have a wide range of functionality, which makes them universal for use in the educational process.

This paper presents a model for the formation of future physics teachers' communication skills through e-learning tools. The purpose of the article is to study the components of this model and its possible effects in teaching physics.

This study complements the research on the integration of technologies into education and allows understanding the potential advantages of e-learning tools in the formation of future physics teachers' communication skills.

Keywords: communication skills, e-learning tools, educational process, quality of education, higher education, teaching physics, physics teacher.

Introduction

It is important that future teachers have communication skills in order to effectively exchange information with students, parents, colleagues and the school administration in their future activities. According to Bekar Ş. et al. [1] for a successful professional path, students of pedagogical educational programs must effectively master communication skills before starting their careers.

Currently, the educational process assumes that teachers must have a sufficient level of communication skills to effectively communicate with colleagues, students and other subjects of the educational process.

In general, communication skills are necessary to convey ideas and thoughts in various areas of life. As Pasaribu A. et al. [2] point out, in the processes of the modern education system, the task and role of the teacher is now not only to convey information (education), but also to stimulate students' learning so that they can form their understanding of the subject through various actions, including the communication aspect.

This means that teachers must create an environment in which students can form their understanding of the subject through active involvement in the educational process and communication.

Musa F. et al. [3] emphasize, that communication skills are becoming an important factor in learning in the XXI century. In the view of Mastura T. et al. [4] communication as a way of expressing ideas, including learning outcomes, contributes to a new perception of the educational process by students. Developing communication skills to express a point of view allows students to better understand physics. The acquisition of communication skills by students is important in improving the quality of education. As noted by Malik A. et al. [5], communication skills are necessary in all areas, especially in the teaching of Natural Sciences.

Studying physics is inseparable from communication. Students and teachers should be able to describe physical phenomena, discuss the topic under study, interpret data, and collaborate on solving problems.

Mastering physics also requires communication skills. In the teaching of physics in the XXI century, it is important to form the necessary skills, including communication ones.

As stated by Kusuma A.E. et al. [6] one of the requirements and problems of the educational process is the development of students' ability to communicate effectively, that is, their communication skills. According to Etkina E. et al. [7], the skills and abilities necessary for a physics teacher include interpreting physical processes in various ways, establishing communication, designing practical research, collecting and analyzing data. In addition, a person who will work as a physics teacher in the future should have excellent communication skills and be able to work in a team. Physics is a branch of science that studies the material structure, properties and interaction of natural phenomena. In physics, students must understand and explain phenomena, objects, and events, visualize and analyze observable data, ask questions, comment, and convey ideas. Thus, it is necessary for future physics teachers to be competitive in the 21st century labor market. Agapov A.M. and Mysina, T.Yu. [8] conclude that the mastery of communicative skills by university students who study pedagogical program has become one of the requirements and tasks of the educational process of higher education.

At the same time, changes in the educational process today are characterized by a change in the way of using information, which is associated with the need for quick access to knowledge and the desire to meet the information needs of participants in the educational process. The widespread use of modern technologies in higher education has had a huge impact on the way information is stored, accessed and disseminated.

As noted by Lamanauskienė G. [9], teachers of natural sciences, including physics, are widely using the Internet, and the popularity of e-learning tools is growing.

In the 21st century, the integration of digital technologies into education has significantly changed the way knowledge is acquired and shared. The advent of e-learning tools has changed the educational process, making information more accessible, as well as facilitating self-learning.

E-learning tools include all materials that contain information that can be accessed through digital or online means using computer technology. Anyim W. [10] concludes that information on electronic resources does not differ from information in paper form, except for the method of access, storage and distribution. While Zhang L. et al. [11] state that e-learning tools are becoming very useful, as they can be used in teaching disciplines, gaining knowledge, and conducting research.

As Haleem A. et al. [12] point out, the main opportunities for using e-learning tools in teaching students include their good assimilation of the material being taught, providing additional information to the study of the topic, awakening interest in the topic, introducing new elements into the lessons being held, the convenience of these resources, saving time, access to teaching materials.

Nevertheless, effective integration of e-learning tools into teacher education requires a systematic approach. The development of communication skills through digital resources should be based on a pedagogically sound model reflecting the principles of personality-oriented education.

For the effective use of e-learning tools in the formation and development of communication skills of future physics teachers, a special training model is needed.

For this purpose, teachers of a higher educational institution that trains physics teachers should identify a teaching model and strategy that meets the conditions of the educational environment and apply it in education.

According to Pratiwi T. et al. [13], teachers, as managers of the process of teaching a subject, should switch to innovative teaching aimed at students and thus try to expand their knowledge through information from various sources of learning.

In this context, the role of teachers is also changing. Thus, one can observe the transformation of teachers from a person who explains the topic being studied to facilitators of student-centered learning. The right choice of learning models directly affects student engagement and learning outcomes.

The only way to increase students' motivation and understanding of learning material is to use an appropriate learning model. As highlighted by Hao L. and Guanghai G. [14], to increase

the activity of students, the ability to think, easily communicate with teachers and group mates, the ability to express their opinion and answer questions, and make teaching more effective, it is better to use a learning model that corresponds to the current situation and the material presented.

The above determines the relevance and importance of this study, the need to develop a model for the formation of future physics teachers' communication skills using e-learning tools.

Therefore, this study is devoted to the development of a pedagogical model for the formation of communicative skills of future physics teachers using e-learning tools. The study is based on the assumption that the targeted integration of digital educational resources into teacher training contributes to the systematic formation of communicative competence, which, in turn, improves the quality of education in physics.

The purposes task of this study is to develop and substantiate a model for the formation of future physics teachers' communication skills using e-learning tools.

The objectives of the research include: analyzing the structure of communication skills in the context of teaching physics, identifying pedagogical and methodological conditions for their development, and proposing a structural and substantive model that can be implemented in higher and postgraduate education institutions to develop the communicative skills of students enrolled in the Physics educational program.

Materials and methods

To achieve the objectives of the study, a combination of theoretical research methods was applied.

The analysis and synthesis of scientific and pedagogical literature related to the formation of communication skills and the use of e-learning tools in teacher education were carried out to determine the theoretical foundations of the research problem.

The study also involved the generalization of pedagogical experience in the field of developing students' communication skills through e-learning tools. This made it possible to identify effective approaches, tools, and principles for integrating e-learning into the process of developing communication skills among future physics teachers.

The main method of scientific cognition used in this research was pedagogical modeling. Based on theoretical analysis and generalization, a model for the formation of future physics teachers' communication skills using e-learning tools was developed. The model includes its goal, components, criteria, indications, pedagogical conditions, methods, and tools that ensure the systematic and purposeful development of communication skills. In addition, the study identified levels and stages of communication skills formation that can serve as diagnostic indicators for future practical implementation and evaluation in physics teachers education programs.

To achieve the objectives of the study, a combination of theoretical research methods was applied.

The analysis and synthesis of scientific and pedagogical literature related to the formation of communication skills and the use of e-learning tools in teacher education were carried out to determine the theoretical foundations of the research problem.

The study also involved the generalization of pedagogical experience in the field of developing students' communication skills through e-learning tools. This made it possible to identify effective approaches, tools, and principles for integrating e-learning into the process of developing communication skills among future physics teachers.

The methodological basis of the study was built on the principles of systematization, consistency, and interconnection between pedagogical theory and practice. The theoretical analysis covered both classical and modern pedagogical works focusing on communicative competence, digital learning environments, and the specifics of teaching natural sciences. Particular attention was paid to studies that describe the relationship between communication and cognitive activity in physics education.

The main method of scientific cognition used in this research was pedagogical modeling. Based on theoretical analysis and generalization, a model for the formation of future physics teachers' communication skills using e-learning tools was developed. The model includes its goal,

components, criteria, indications, pedagogical conditions, methods, and tools that ensure the systematic and purposeful development of communication skills.

The process of model construction consisted of several stages:

1. Identification of the structural components of communication skills (motivational, cognitive, and functional);
2. Definition of pedagogical conditions and factors affecting their development;
3. Selection of e-learning tools and technologies that can be effectively integrated into the educational process;
4. Designing the model's logical structure, which reflects the interrelation between goals, content, methods, and expected outcomes.

In addition, the theoretical validity of the model was verified through logical consistency analysis and correlation of its components with didactic principles. The developed model serves as a conceptual framework that can be implemented and tested in further empirical research. Also the study identified levels and stages of communication skills formation that can serve as diagnostic indicators for future practical implementation and evaluation in physics teachers education programs.

Results and discussion

Before developing a model for the formation of future physics teachers' communication skills using e-learning tools, it is necessary to determine the criteria for assessing the formation of communication skills and clarify the indicators for determining the studied skill.

Three components of the formation of the communicative skills of future physics teachers using e-learning tools were identified: motivational, cognitive, and functional. The criteria and indicators corresponding to these components are shown in Table 1.

The identified criteria are necessary to determine the level of the communication skills formation.

Table 1 – Components, criteria and indicators of the formation of future physics teachers' communication skills using e-learning tools

| Components | Criteria | Indicators |
|-------------------|--|--|
| Motivational | Motivation for the communication skills formation using e-learning tools | - need to formation of communication skills; - aspiration to use e-learning tools in professional activities |
| Cognitive | Practical and methodological | - knowledge of the communication skills essence, the significance of communicative skills in the professional activity of a physics teacher; - knowledge of the communication skills features in the conditions of the electronic educational environment; - knowledge of how to use e-learning tools in professional activities |
| Functional | Reflexive evaluation | - ability to communication activities, taking into account the emotional and value qualities of the personality; - reflection of the results of the implementation of communication skills |

After studying the works related to the research topic, three levels of the communicative skills formation were identified: high, average and low.

The low level is characterized by the student's fragmentary knowledge of communication skills and components of communicative activity. A student of this level does not understand the significance of communication skills in the professional activity of a physics teacher, does not know the specifics of implementing communication skills in an electronic educational environment, as well as how to use e-learning tools in professional activities, cannot effectively organize communicative activities in an electronic educational environment to achieve optimal pedagogical results, does not demonstrate communication skills to implement this activities.

The average level is characterized by sufficient knowledge of the student about communication skills, components of communicative activity, features of the communicative skills implementation in an electronic educational environment, understanding how to use e-learning tools in professional activities, but the lack of application of the acquired knowledge to achieve optimal pedagogical results, including in an electronic educational environment.

The high level is characterized by the fullest demonstration of the communicative skills development according to all three criteria. The student has a knowledge system about communication skills, understands in detail all the components of communicative activity in the field of professional pedagogical activity and is fully aware of the communicative activity significance, takes into account the features of the communication skills implementation in an electronic educational environment, knows how to use e-learning tools in professional activities.

Within the framework of the study, a model was developed in accordance with the identified components, criteria and indicators of the formation of future physics teachers' communication skills using e-learning tools (Figure 1).

Within the framework of the proposed model, a unified pedagogical process develops. The model includes the goal, components, criteria and indicators, pedagogical conditions, methods and means, stages, levels and result.

The implementation of the developed model will be effective only if certain pedagogical conditions are met.

During the research the following *pedagogical conditions* were identified that are necessary for the formation of the communication skills of future physics teachers using e-learning tools:

1. Personal development conditions.

Its components are:

- goals and motives. Since the need for communication is one of the leading spiritual needs of every person, the motivation of the future physics teacher to form a communication skill is especially important in the desire to build successful and influential communication, professional and any interpersonal interaction. Therefore, if the student feels the importance of this skill, the work on its formation is purposefully carried out by the student.

- special education in communication – knowledge of the main mechanisms, specific ways, techniques, levels, styles of communication and interaction, social perception and ways to communicate.

- focus on performing tasks.

2. Conditions of organization:

- material and technical equipment of the educational process;

- implementation of educational activities that positively contribute to the goal achievement. The formation of communication skills in the educational process is carried out not only during class hours, but also in extracurricular activities.

3. Didactic conditions:

- Compliance with didactic principles. Determine the internal logic of presenting educational material in accordance with the communication skills and cognitive capabilities of students, the goals of training, through didactic principles, and guide them in teaching disciplines.

- Conformity of the chosen methods and forms of training with the goal. Such a choice is determined by the specifics of the content and goals of training.

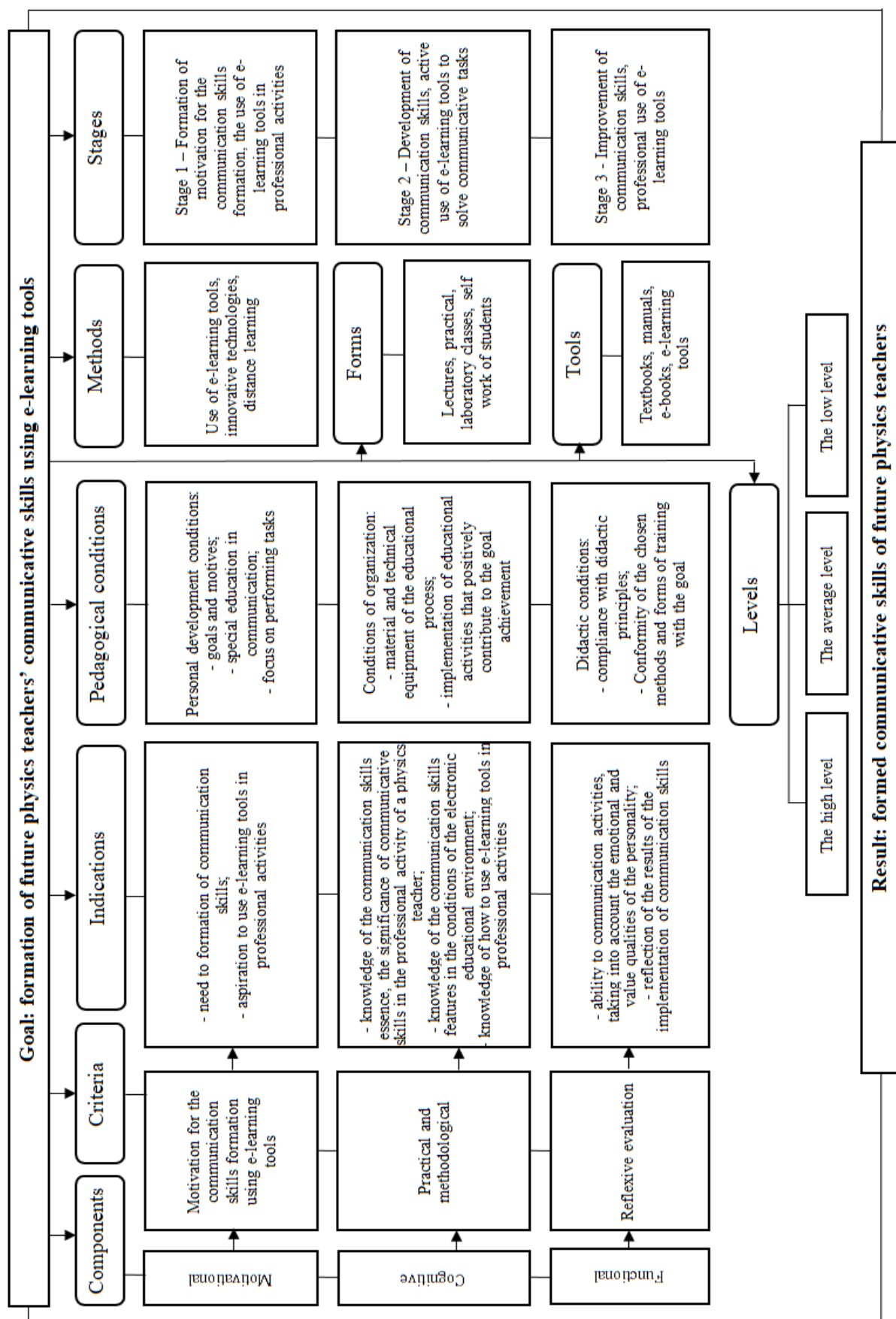


Figure 1 – A model for the formation of future physics teachers' communication skills using e-learning tools

According to the developed model, the use of e-learning tools was chosen as the main method for the formation of communication skills of future physics teachers. This method can be combined with the use of innovative technologies and distance learning. These methods are used in modern education to improve the quality of teaching and make it more accessible and flexible.

The use of e-learning tools gives students access to many types of information and materials, increasing their understanding of the subject and interest in the educational process.

Innovative technologies include the introduction of advanced technologies in the course of training, such as virtual reality, augmented reality, artificial intelligence and gamification. These technologies provide an interactive and exciting experience.

For example, using virtual reality headsets, students can immerse themselves in virtual physical simulations, allowing them to see complex concepts firsthand and interact in a three-dimensional environment.

Likewise, with the help of augmented reality applications, it is possible to visualize the concepts of physics, which allows students to study virtual objects and manipulate them in real time.

Gamification of physics lessons can make learning more enjoyable and interactive. Physics-based games and simulations encourage students to solve problems, apply concepts, and compete with their teammates, increasing interest and motivation in the lesson.

In addition, distance learning, which is currently carried out in almost all universities, does not require the direct participation of educational entities, and online platforms, video conferences and other means of communication are used in this learning form. Distance learning is a great opportunity for students who cannot attend classes directly due to geographical, temporal or personal limitations.

In general, these methods are aimed at improving the practice of forming the communication skills of future physics teachers, increasing the activity of students in mastering this skill, ensuring the availability of information and materials provided to them, which, in turn, increases the level of students' communication skills.

These methods can be used in the implementation of all forms of training in a students.

In general, the formation of communication skills of future physics teachers using the e-learning tools should be carried out in 3 stages:

- Stage 1 – Formation of motivation for the communication skills formation, the use of e-learning tools in professional activities;
- Stage 2 – Development of communication skills, active use of e-learning tools to solve communicative tasks;
- Stage 3 - Improvement of communication skills, professional use of e-learning tools.

Thus, the developed model can be used as a fundamental tool in the formation of the communicative skills of future physics teachers using e-learning tools.

According to Zelenický L. et al. [15], the communication skill is among the most necessary in the professional activity of physics teachers. As noted by Mahdi H. S. et al. [16], the teacher spends 80% of time during the lesson in the form of communication (verbal or non-verbal) with students. Therefore, the communication skill allows the teacher to effectively explain abstract and complex scientific concepts. Physics is often a discipline that includes complex mathematical equations and theoretical foundations. If the ideas and instructions of physics are not presented clearly and concisely, students may feel difficulty understanding them. Frymier A.B. et al. [17] conclude, that by using effective communication techniques, such as using simple language, giving relevant examples, and using visual aids, physics teachers can make these concepts accessible and understandable to their students.

In addition, as Fahainis M.Y. and Haslina H. [18] point out, communication skills have a direct impact on the teacher's authority over students. Also communication skills are necessary to create a pleasant and favorable atmosphere in the classroom. Physics teachers should create a comfortable environment for students to ask questions, participate in discussions, and share their thoughts. As noted by Cretu D. [19], mutually beneficial communication allows teachers to communicate with students, build trust, and encourage students to engage and attend classes.

One of the most effective ways to form the communication skills of future physics teachers in connection with digitalization in all areas of activity, including education, is the use of e-learning tools, as emphasized by Van de Heyde V. and Siebrits A. [20].

This article presents a model for the formation of future physics teachers' communication skills using e-learning tools. An analysis of the motivational, cognitive and functional components of the communication skills revealed their importance for the successful professional development of teachers. The criteria and indicators of each component formation made it possible to systematize the process of assessing the level of future physics teachers' training.

Conclusion

The main pedagogical conditions, methods, objects and tools described in the paper contribute to the effective formation of the communicative skills of students who will work as physics teachers in the future. Within the framework of the model, the identified stages of the communication skills formation can be used as a specific action plan that allows future physics teachers to systematically develop and evaluate this skill.

In addition, the study revealed the levels of the future physics teachers' communication skills formation, which is very convenient for assessing the extent to which these skills are formed and, if necessary, for further development of the identified level.

In general, the proposed model is a valuable tool for improving the quality of physics teachers training and increasing their professional competence in the field of communication and can be used in subsequent research in this area, in the educational process of higher educational institutions that train physics teachers.

The model proposed in this study has both theoretical and practical significance. Theoretically, it contributes to the development of pedagogical science by clarifying the relationship between communication competence and the use of digital learning tools in teacher education. Practically, it provides a structured framework that can be implemented in educational institutions preparing future physics teachers, helping to organize training more purposefully and effectively.

Further research may focus on the experimental verification of the proposed model, the development of digital platforms to support communication skills training, and the adaptation of the model to other subject areas. Expanding the use of e-learning tools and integrating them with innovative teaching methods will help to further enhance students' motivation, interactivity, and professional readiness for teaching physics in modern educational environments.

REFERENCES:

- 1 Bekar Ş., Bilgin A., Nas S. (2022). Investigation of the Effect of Life Skills Education Guidebook on Pre-service Science Teachers' Use of Communication Skills // Van Yüzüncü Yıl University Journal of Education., vol. 19., No. 2., pp. 405–428. <https://doi.org/10.33711/yyuefd.1098294>
- 2 Pasaribu A., Patriot E., Ritonga A., Saparini S., Ariska M., Berimah A. (2023). Enhancing Scientific Communication Skills of Pre-Service Science Teacher Through Guided Inquiry Learning on Basic Physics Laboratory Activities // Jurnal Penelitian Pendidikan IPA., vol. 9., pp. 307–315. <https://doi.org/10.29303/jppipa.v9iSpecialIssue.6560>
- 3 Musa F., Mufti N., Latiff R. A., Amin M.M. (2012). Project-based Learning (PjBL): Inculcating Soft Skills in 21st Century Workplace. Procedia // Social and Behavioral Sciences., vol. 59., pp. 565–573. <https://doi.org/10.1016/j.sbspro.2012.09.315>
- 4 Mastura T., Soh T., Mohamad N., Osman K. (2010). The Relationship of 21st Century Skills on Students' Attitude and Perception towards Physics // Procedia - Social and Behavioral Sciences., vol. 7., pp. 546–554. <https://doi.org/10.1016/j.sbspro.2010.10.073>
- 5 Malik A., Setiawan A., Suhandi A., Permanasari A., Dirgantara Y., Suhendi H.Y., Sapriadi S., Hermita N. (2018). Enhancing Communication Skills of Pre-service Physics Teacher through HOT Lab Related to Electric Circuit // Journal of Physics: Conference Series., vol. 953., pp. 012017. <https://doi.org/10.1088/1742-6596/953/1/012017>
- 6 Kusuma A.E., Wasis W., Susantini E., Rusmansyah R. (2020). Physics innovative learning: RODE learning model to train student communication skills // Journal of Physics: Conference Series., vol. 1422., pp. 012016. <https://doi.org/10.1088/1742-6596/1422/1/012016>
- 7 Etkina E., Van Heuvelen A., White-Brahmia S., Brookes D. T., Gentile M., Murthy S., Rosengrant D., Warren A. (2006). Scientific abilities and their assessment // Physical Review Special Topics - Physics Education Research., vol. 26., No. 2., pp. 1–15. <https://doi.org/10.1103/PhysRevSTPER.2.020103>

- 8 Agapov A.M., Mysina, T.Yu. (2022). The Relationship of Subject-Methodological Skills, Analytical and Communicative Competencies of Pedagogical Students // European Proceedings of Educational Sciences, pp. 58–68. <https://doi.org/10.15405/epes.22043.6>
- 9 Lamanauskienė G. (2007). Electronic information resources for science education. // Natural Science Education., vol. 2., No. 19., pp. 27–34. <https://doi.org/10.48127/gu-nse/07.4.27a>
- 10 Anyim W. (2021). Relevance of Electronic Resources and Improvement of Access for Effective Distance Learning and Continuing Education Programme // International Journal of Asian Education., vol. 2., pp. 52–63. <https://doi.org/10.46966/ijae.v2i1.83>
- 11 Zhang L., Ye P., Liu Q. (2011). A survey of the use of electronic resources at seven universities in Wuhan, China // Program: electronic library and information systems., vol. 45., pp. 67–77. <https://doi.org/10.1108/00330331111107402>
- 12 Haleem A., Javaid M., Asim Qadri M., Suman R. (2022). Understanding the role of digital technologies in education: A review // Sustainable Operations and Computers., vol. 3, pp. 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- 13 Pratiwi T., Munasir M., Suprpto N. (2020) Enhancing students' science communication skills through more learning model // JPPS (Jurnal Penelitian Pendidikan Sains), vol. 10., pp. 1844. <https://doi.org/10.26740/jpps.v10n1.p1844-1856>
- 14 Hao L., Guanghai G. (2023). Reconfiguration of college physics teaching based on the “Trinity” education model // SHS Web of Conferences., vol. 166., pp. 01033. <https://doi.org/10.1051/shsconf/202316601033>
- 15 Zelenický L., Horváthová D., Rakovská M. (2019). Forming the professional skills of a future physics teacher // AIP Conference Proceedings., vol. 2152., pp. 030040. <https://doi.org/10.1063/1.5124784>
- 16 Mahdi H.S., El-Naim M. (2012). The effects of informal use of computer-mediated communication on EFL learner interaction // Studies in Literature and Language., vol. 5., No. 3., pp. 75–81. <https://doi.org/10.3968/j.sll.1923156320120503.801>
- 17 Frymier A.B., Houser M.L. (2000). The teacher-student relationship as an interpersonal relationship // Communication Education., vol. 49., No. 3., pp. 207–219. <https://doi.org/10.1080/03634520009379209>
- 18 Fahainis M.Y., Haslina H. (2014). Understanding Teacher Communication Skills // Procedia - Social and Behavioral Sciences., vol. 155., pp. 471–476. <https://doi.org/10.1016/j.sbspro.2014.10.324>
- 19 Cretu D. (2017). Fostering 21st Century Skills For Future Teachers // Edu World 2016 7th International Conference., pp. 672–681. <https://doi.org/10.15405/epsbs.2017.05.02.82>
- 20 Van de Heyde V., Siebrits A. (2019). The ecosystem of e-learning model for higher education // South African Journal of Science., vol. 115., No. 5/6., pp. 78–83. <https://doi.org/10.17159/sajs.2019/5808>

ЭЛЕКТРОНДЫ ОҚЫТУ ҚҰРАЛДАРЫН ПАЙДАЛАНУ АРҚЫЛЫ БОЛАШАҚ ФИЗИКА МҰҒАЛІМДЕРІНІҢ КОММУНИКАТИВТІК БІЛІКТЕРІН ҚАЛЫПТАСТЫРУДЫҢ МОДЕЛІ

*Нурғалиева Д.Б. *, Жанатбекова Н.Ж.*

І. Жансүгіров атындағы Жетісу университеті, Қазақстан Республикасы, Талдықорған қ.
*e-mail: dinara_nurgalieva91@mail.ru, n.zhanatbekova@mail.ru

Аңдатпа. Педагог қызметі тұлғааралық қарым-қатынаспен тығыз байланысты. Осыған орай, коммуникативтік білік мұғалім қызметіндегі маңызды рөлдердің бірін атқарып, педагогикалық шеберліктің негізгі құрамдас бөлігі болып саналады.

Мұғалімнің оқушылармен қарым-қатынасы олардың пәнге деген қызығушылығына, демек олардың үлгеріміне тікелей әсер етеді. Бұл тұжырым физика пәніне де таралады. Физиканы оқыту үшін пәнді жоғары деңгейде біліп қана қоймай, ауызша және жазбаша сөйлеу дағдыларына, білім беру процесінің субъектілерімен қарым-қатынас орнату қабілетіне, сондай-ақ дамыған эмпатияға ие болу керек. Бұның бәрін физика мұғалімінің коммуникативтік білігіне жатқызуға болады.

Қазіргі уақытта болашақ мұғалімдердің коммуникативтік білігін қалыптастыруда түрлі әдістер мен құралдар қолданылып келеді, бірақ олардың ішінде электронды оқыту құралдарын ерекше атап өтуге болады. Аталған құралдарды түрлі жолмен қолдануға болады, бұл оларды білім беру процесіндегі әмбебап құралға айналдырады.

Бұл ғылыми мақалада электронды оқыту құралдарын пайдалану арқылы болашақ физика мұғалімдерінің коммуникативтік біліктерін қалыптастырудың моделі ұсынылған. Зерттеу физиканы оқыту саласындағы тиімді коммуникацияға деген артып келе жатқан қажеттілікті қанағаттандыруға

бағытталған. Мақаланың мақсаты – осы модель компоненттерін және оның физиканы оқытудағы ықтимал әсерін зерттеу.

Аталған зерттеу білімге технологияларды кіріктіру бойынша зерттеулерді толықтырып, болашақ физика мұғалімдерінің коммуникативтік білігін қалыптастырудағы электронды оқыту құралдарының әлеуетті артықшылықтарын түсінуге мүмкіндік береді.

Кілт сөздер: коммуникативтік білік, электронды оқыту құралдары, білім беру үрдісі, білім сапасы, жоғары білім беру, физиканы оқыту, физика мұғалімі.

СТРУКТУРНО-СОДЕРЖАТЕЛЬНАЯ МОДЕЛЬ ФОРМИРОВАНИЯ КОММУНИКАТИВНЫХ УМЕНИЙ БУДУЩИХ УЧИТЕЛЕЙ ФИЗИКИ С ИСПОЛЬЗОВАНИЕМ ИНСТРУМЕНТОВ ЭЛЕКТРОННОГО ОБУЧЕНИЯ

Нурғалиева Д.Б. *, Жанатбекова Н.Ж.

Жетысуский университет имени И. Жансугурова, Республика Казахстан, г. Талдықорған

*e-mail: dinara_nurgalieva91@mail.ru, n.zhanatbekova@mail.ru

Аннотация. Деятельность педагога тесно связана с межличностным общением. В связи с этим, коммуникативные умения занимают одну из ведущих ролей в деятельности педагога и считаются важным компонентом педагогического мастерства.

Взаимодействие учителя с учениками напрямую влияет на их интерес к предмету, и как следствие, на их успеваемость. Не является исключением и физика. Для обучения физике требуется не только знание предмета на высоком уровне, но и навыки устной и письменной речи, умение выстраивать взаимоотношения с субъектами образовательного процесса, а также развитая эмпатия, что в совокупности можно отнести к коммуникативным умениям учителя физики.

В настоящее время для формирования коммуникативных умений будущих учителей используются различные методы и средства, но среди них можно особо выделить электронные средства обучения. Данные средства обладают широким функционалом, что делает их универсальными для использования в образовательном процессе.

В данной научной статье представлена модель использования инструментов электронного обучения для повышения коммуникативных умений будущих учителей физики. Исследование направлено на удовлетворение растущей потребности в эффективной коммуникации в области физического образования. Целью этой статьи является изучение компонентов этой модели и ее потенциального влияния на преподавание и изучение физики.

Данное исследование дополняет существующую литературу по интеграции технологий в образование и дает понимание потенциальных преимуществ инструментов электронного обучения в улучшении коммуникативных умений будущих учителей физики.

Ключевые слова: коммуникативные умения, инструменты электронного обучения, образовательный процесс, качество образования, высшее образование, преподавание физики, учитель физики.