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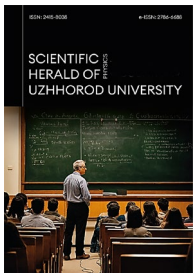

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Ways of interdisciplinary communication of physics and informatics

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Abstract

Relevance. The relevance of this research is due to the problem of improving the quality of education using interdisciplinary integration, which allows deepening your knowledge of subjects, understanding how they are applied in practice to create an understanding of the professional and social aspects of practical activities for students in the future.

Purpose. The purpose of the article is to develop a model for interdisciplinary communication of physics and informatics during school education.

Methodology. A questionnaire of schoolchildren was the leading method to studying the problem of increasing motivation factors and creating practical skills when studying physics and informatics, as well as pedagogical observation and expert evaluation of the results to assess the effectiveness of the developed model of interdisciplinary communication of physics and informatics in schoolchildren.

Results. The article presents a model of interdisciplinary communication of physics and informatics aimed at professional competence, which allows students to learn the directions of application of the two subjects according to the totality of their capabilities and knowledge to create a presentation project on a smart home object, which will allow them to form motivation to study the subjects, as well as professional skills to use them in the future.

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Conclusions. The developed model of the interdisciplinary connection between the two subjects in the form of a project work concerning a smart home object presentation provides schoolchildren with holistic and semantic knowledge during their studies at a secondary educational institution, and allows them to activate their intellectual work, increases motivation for in-depth study of the subjects, allows self-realization, increases self-esteem, strengthens communicative ties with teachers and classmates, which has practical significance for the field of education.

Keywords: technical sciences; interdisciplinary relations; school education; teaching methods; practical activity.

Introduction

In the modern world, there is technological progress that makes life more convenient and comfortable thanks to the knowledge that stands within the framework of a set of concepts in many disciplines, which allows us to form a holistic, general, competent worldview in future specialists, who are now schoolchildren, aimed at developing objects that increase and improve the quality of life of society at the level of high development of science and technology [1]. It is known that for the first time students encounter specialised knowledge during their secondary education, and it is important to present much knowledge at this stage based on aspects regarding future professional activity in all areas of work by generalising knowledge in many disciplines, in fact in all of them, but especially engineering, on which future technical progress depends, and it is important to aim it at raising life as a whole to a higher, comfortable level, taking into account the preservation of the ecology of the surrounding world, improving the welfare of society [2]. In this aspect, many subjects will be considered within the framework of environmental-oriented education, and such subjects as physics and computer science are important for new technical and engineering discoveries, which dictates the need for future specialists in this field to present knowledge at the level of interdisciplinary communication with an overview of their relationship in the development of new technical products [3]. When studying at school, many students think about their professional preferences, learn which subjects they are more interested in and begin to dream about their future profession. So, along with the general course of studying the prescribed subjects and presenting practical recommendations in the framework of lessons, why this knowledge will be useful to all schoolchildren in the future, and how they can be used in life, but for a deeper understanding of the knowledge in the studied subjects, it is necessary to learn them with an interdisciplinary connection, as in this case physics and computer science, which would allow already at the school level to identify talented students with technical thinking, allowing them to self-actualize and teaching them to think in this direction, which will also help to identify their professional prerequisites at an early stage [4].

The form of knowledge presentation is of great importance, and a parallel of interdisciplinary communication must be drawn at each new stage of deepening, for a better understanding by schoolchildren of the world as a whole at all its levels, so that they have a general picture of life in the world, showing the relationship of all components in all knowledge should be in all subjects, combining knowledge into a general picture of production, professional characteristics, everyday life, hobbies, and teaching was built at such a level that general-to-specific knowledge was presented so that students understood why and how they could use their knowledge in the future and they developed an understanding of the functionality of all spheres of life that are considered when studying at school [5]. This concept of interdisciplinary communication in this parameter will strengthen the motivation to study, create conditions for selective in-depth study of some subjects that students will be interested in as part of their hobbies or future professional activities. Technical progress, the importance of which is now observed, is on the verge of several specialties, and considering it from the perspective of environmental-oriented education, the interdisciplinary connection of physics and computer science in the context of a preserved attitude to ecology will form the necessary qualities in schoolchildren for their future professional activity within the framework of the well-being of society [6].

Materials and Methods

In the course of the study, the method of questioning schoolchildren was used for factors affecting their understanding of studying different subjects, increasing motivation and interest in studying them during school, which had a clarifying nature of possible ways to implement an interdisciplinary connection between physics and computer science, including specifying what practical result students would like to see from the combination of simultaneous study of two or more subjects, which would also involve their independent activity and in-depth study of the necessary topics, as well as parallel pedagogical observation and expert evaluation of the results of the developed model of organizing interdisciplinary interaction between physics and computer science for students studying in schools. The survey of students included the task of knowing the features that strengthen the psychological aspirations of students by determining their existing interests in the study of subjects such as physics and computer science, the self-tasks that they set for themselves, how they see the need to learn these subjects to use them in their lives, the features of acquiring intellectual and practical skills with increased motivation for their self-actualisation as a result of their creative activity, and fruitful interaction with teachers and classmates, increasing the incentive function for independent activity, as well as generalized criteria that will create conditions for the development of the thinking and analysing process students during lessons built on an interdisciplinary connection between physics and computer science based on the scope of their education at school, which implies the development of creative motivation in working with factors of good self-regulation of their emotions and actions, which is reflected in the ability to control themselves, maintain an adequate level of calm and sobriety of thought in situations related to the educational process, which is comparable with the health-

saving conditions created during the educational process, and which guarantees the formation of knowledge and practical skills, skills within these subjects for schoolchildren.

Thus, a detailed analysis of the data of the survey results, pedagogical observation and further expert evaluation of the results of their work within the framework of interdisciplinary communication allows us to determine the parameters necessary for creating a model for organising interdisciplinary communication between physics and computer science. To calculate the results, the standard method of mathematical calculation and graphical representation of the results was used. The basis of the experimental study was Secondary School No. 142 of the Republic of Kazakhstan. According to the chosen method, the survey was conducted on 20 students of 14-15 years old from the 8th "A" class. The research process was carried out in three stages:

1. The first phase of the research was the stage of analysis of information data for interdisciplinary communication of physics and computer science in philosophical, psychological and psychological-pedagogical publications, research papers, existing methods of data analysis, after which the issues, purpose and methods for conducting a pedagogical experiment according to the drawn-up plan were determined.

2. The indicators were clarified and criteria were developed in the subsequent second stage of the pedagogical experiment, which includes a survey of the respondents to form a model of interdisciplinary communication of physics and computer science in school education, during the experimental work, as well as the data were analysed and conclusions were formed based on the results.

3. The third stage was the final one in this pedagogical experiment, within the framework of which the systematised results were presented and the conclusions were clarified.

Results

Based on the analysis of the obtained material according to the results of the study, within the framework of the system-activity approach, statistical data of students of the educational school were obtained reflecting indicators for creating understanding, interest and motivation to study two subjects, such as physics and computer science, as motivational-target, content-procedural, performance-evaluation and structural types of them [7]. Their detailed analysis will allow us to identify important components that will strengthen the motivational character and cognitive activity with high interest and activation of the activity-thinking function of students, which will affect their activities within the framework of the interdisciplinary connection of the subjects under consideration, due to which students will have an understanding of the general concept of the influence of subjects on each other and their practical significance, which they will be able to use for their successful further educational activities, and which will allow them to further show their potential, both intellectual work and its creative component, which will initiate the strengthening of their interest in the learning process and the formation of their practical skills [8]. The result of their activity will also be an indicator of the personal psychological properties and qualities of the student, which will allow us to judge his attitude to life and society, based on their value concepts, which will be reflected by the indicators of the finished product of their activity within their intellectual, behavioural and emotional manifestations, and this will show the semantic result of the created project task within the interdisciplinary direction of studying subjects in its semantic and practical significance [9].

Thus, teachers can analyse and adjust the result in its entirety by based on the current important trends of health and environmental conservation applicable in the field of education for the educational purpose of forming in students, as future specialists and members of society, value concepts of any kind of their activities aimed at creating conditions for a prosperous life of society and the surrounding world. Because the final result of a student's work will reflect a number of his personal emotions and associations, which will encourage in the future or, on the contrary, contribute to the neglect of the activities that affect the health of both his personal and other people, which will depend on the result of his professional sphere in the future [10]. All of the above is taken into account in detail when developing a model of interdisciplinary communication of physics and computer science due to the identified patterns necessary for the development of this model, taking into account the criteria voiced by the students themselves for their personal interest and motivation in activating their assigned work. Thus, with combined and complex considerations, these components of the study reveal the development of an interdisciplinary path between physics and computer science for students in an educational school. Based on the results of the conducted experimental research, its functional activity, the created model of successful interdisciplinary functioning of physics and computer science is understood in the educational school process. The introduction of a structured model to analyse the results involved conducting research work within several research stages:

- determination of the initial indicators and criteria for the interdisciplinary connection of physics and computer science using the methods of questioning, analysis of psychological and pedagogical control and statistical calculation of the obtained data of this pedagogical experiment;
- formation and testing the model in students at school based on the analysis of research results for their subsequent implementation in the field of practical education;
- determination of the effectiveness of the developed model in an educational school.

During the pedagogical experiment, the survey was conducted with the participation of 20 schoolchildren studying from the 8th grade of an educational school where physics and computer science are studied. The analysis of the survey results allowed us to conclude about the indicators and criteria that affect the development of motivation, the activation of interest in educational activities, the effectiveness of acquiring and understanding the knowledge, skills and abilities taught, as well as understanding the application of the acquired knowledge in one's life. Thus, the main elements were identified that should be present in the combined study of several subjects

for the appearance of deep understanding and interest, as well as the manifestation of activity in an interdisciplinary lesson. These factors included various factors and elements, in which all the students (100%) said about an important component for themselves what to have during lessons: the opportunity to express themselves, not have clear time boundaries and, if necessary, continue their work in the next lesson or even think about some things they did outside of the scheduled time, have the opportunity to think and analyze the necessary components of the task in the lesson, the opportunity to ask a teacher to clarify something without fear of this affecting the assessment, the possibility of communication between classmates, a calm emotional background in the lesson, more disciplinary freedom within the framework of cultural behavior, understanding the meaning of receiving the possibility of free discussion during the lesson, without affecting the assessment to receive the necessary help from the teacher , the opportunity to jointly engage in one task in the lesson with classmates in the category of friends, an interesting presentation of knowledge, stories-examples for a better understanding of the application of knowledge in the future, which also forms a social model of their application, goodwill and intelligence on the part of the teacher, to do all tasks slowly, at a comfortable pace, with an understanding of the benefits of the knowledge received. Also, the visibility of the presented information and creative elements was important for 17 schoolchildren (85%).

The analysis of the results showed the identified factors influencing the formation of interest and motivation in the educational process for the manifestation of personal activity and interest in obtaining knowledge in the classroom, as well as the effectiveness of knowledge acquisition, which it should be noted reflect the need for psychological health and show motivational and intellectual elements of the personal level within the framework of creative and self-fulfilling indicators, as well as the implementation of these criteria will contribute to the disclosure of personal talents and increase the self-esteem of students, which is an important task of the education sector.

The implementation of the research conditions in the process of developing a model for ensuring interdisciplinary communication of such subjects as physics and computer science for students in educational schools required methodological work on the data obtained during the research. Step-by-step analysis of the results helped to formulate the main important components in this process and determined from them the main, which will depend on the successful curricular activities in the framework of an interdisciplinary program that brings important effects for the students themselves, to develop their intellect, practical knowledge, independent activity, creative expression and self-realization, and given new form and related factors of lesson, and creative communicative relationships with teachers and classmates that allows you to create a friendly atmosphere in the classroom during the learning process in the classroom, and that will also create a motivational background prosperous stay in school in General, and increase the level of interest in acquiring knowledge, which is based on the total component of their presentation will be more understandable for young learners in the sense of its manifestation, which will create a clear idea about the organization of many processes in the world, and will be the Foundation for the formation of practical skills that they can use based on real-life situations and future professional activities of selection, which occurs in most children during school studying and what is very important, that is the General understanding of the relationship of knowledge from different subjects of the school curriculum will allow students, in fact the younger generation, which in a small number of years will become professionals in their field, to realise the whole concept of the results of its activities, and its impact on the lives of other people and the world, which is important for the restoration and preservation of the environment, and prosperous life in the General population, and thus formed the model becomes another important criterion for its construction, as ecologisation and health care, which are mandatory for the implementation of any activity if it is aimed at the improvement of life quality, well-being and restore ecological balance to restore the health of the entire biosphere, which applies to people.

So, taking into account the above, the model was developed of interdisciplinary interaction of physics and computer science, which reflected the main criteria that were identified after the survey of school students. A detailed analysis of them allowed us to determine that the main way of interdisciplinary interaction should be in the learning process, as an indicator of the general component of any activity in all spheres of life, that is, the education system itself should be built on the presentation of general-to-specific knowledge during school education, but as one of the options, for example, which was formed within the framework of interdisciplinary interaction of physics and computer science subjects, is presented in the form of creating a presentation project on the developed smart home object, which is invented or modernized for a better quality of life in compliance with environmental conservation by students themselves, who can unite at will in groups of several people.

At the control stage of the study, the developed model of interdisciplinary communication between physics and computer science was tested by students of an educational school and data were revealed concerning the formation of motivation and interest, as well as understanding and assimilation of knowledge in a given format among respondents, and the data obtained from the repeated survey of 20 schoolchildren allowed us to conclude about the success and effectiveness of the developed model. So in the stated form, the lesson aroused the interest of all (100%) schoolchildren, as they all understood the semantic form of the material being studied, 17 (85%) increased motivation to learn, and 19 (95%) had a sense of self-actualisation. It should be noted that the effectiveness in this form of an interdisciplinary lesson is also determined by the indicators of extensive knowledge, which used together, resulting in the successful creation of a presentation project on the developed smart home object, which was noted during the survey of teachers in physics and computer science. Thus, this model of an interdisciplinary lesson allows you to evaluate the knowledge and skills of students (100%) based on the received finished result of their educational activities at a

high, deep level, which they should show in a normal learning environment at the level of the final control work. Based on the data obtained, we can say that the identified factors and the model of interdisciplinary communication between physics and computer science allow us to activate motivation for learning, improve the semantic understanding of the knowledge being studied, as well as check the assimilation of extensive knowledge among schoolchildren of educational schools, and the interest created during the implementation of this model will further help them during the educational process to express themselves in studies at the proper level by taking an active part in it. The correctness of the study was ensured by the fact that the characteristics and data parameters of the survey and the developed parameters were comparable in the study correctly. The analysis of the research results made it possible to determine the success of the developed model of interdisciplinary communication of physics and computer science among students of educational schools.

Discussion

The educational process can be presented in different forms and based on the possibilities of the modern world, and in this case, the result is important, which is considered from the side of the educational work of the younger generation, for the formation of worthy members of society with an already formed culture of psychological health and environmental conservation, so that future specialists could show themselves at a high moral level with value motivations for improving the prosperous life of society, and restoring, saving the surrounding world for the development of a healthy and harmonious life in general, and from the considered position, which is the main one at the world level and the leading role in it is assigned to the sphere of education shows the need to include in the educational process at all levels of interdisciplinary connections of different subjects that will allow you to understand, study and realize the phenomena and various manifestations of life that can occur in life from their general representation and in the future partially deepen something necessary for a better understanding of the functioning of a number of important aspects, this position is important for school education, and in the further educational process, which implies obtaining professional skills already at the next stages of higher school of education, based on personal preferences, school graduates will study specialized knowledge in their chosen field more deeply and in detail based on their professional interest for obtaining a working specialty [11].

Also, the introduction of interdisciplinary connections is a very important task of education at the present stage, which will create conditions for the development of intelligence and awareness of the semantic concept of the studied knowledge and skills by creating a full-fledged emotional sphere with a friendly, calm background during training [12]. Forms of the educational process using interdisciplinary connections will allow to provide high-quality education at the level of its assimilation, understanding, comprehension, which will allow students to apply the knowledge and skills acquired at school in the future in their lives for their successful self-actualisation for the benefit of society and the surrounding world, taking into account the cultures of psychological health and environmental conservation formed during school education, which will be further corrected, deepened and directed on the path under consideration by school teachers, at each stage of the task to understand the importance of the result obtained in the direction of development and preservation of a prosperous life of society [9]. All of the above will make it possible to educate a worthy member of society in the school environment with formed motivational and value priorities that will make his entire future life favorable, both for his own personality and for others, and the result of their professional activities will be thought out, and proceed from the creation of favorable conditions for the prosperity of life as a whole [13-16].

Interdisciplinary lessons and in general, the approach in education is also important in the vision of human life itself, which is integral and filled with interdisciplinary knowledge in its entirety, and if such an approach is also in education from general knowledge to details, then during school education, students will receive knowledge that will help them better understand the structure of everyday and professional life, and after graduation from school they will be adapted to their adult life with acquired skills, and knowledge of many areas, taking into account their application in practice, what they will understand from knowledge at interdisciplinary lessons, which at the beginning will be to present the information generically and only after its realization in the future to deepen the necessary topics in detail, which will allow students to form logical, figurative and associative chains in comparison with life situations at different levels of life activity [4, 17]. This will be an important moment for the younger generation, as one of the main ones for learning about the world around them, that is, learning about its integration and interdisciplinarity from school subjects, which, taking into account the presentation of forms of knowledge at the level of health and environmental conservation, will allow students to acquire aesthetic, cognitive and environmentally literate, socio-functional parameters that will be embedded in them at the level of psychological health and environmental culture, which will ensure their future activities at the level of favourable actions towards society and the surrounding world [18].

In the school years of learning, children who still grow up, in fact and according to the law, just begin to develop independence and conscious behaviour, and given that there is no close person nearby who will prompt and support everything, both physically and emotionally, and the age in primary school still based on their age-related psychophysical characteristics needs great care and help from adults, therefore these duties are imposed on the teacher, who ensures the flow of the educational process in the conditions of health-saving schoolchildren who need a comfortable physical and psycho-emotional environment to maintain their healthy growth, and development excluding the acquisition of many diseases while studying at school, which is currently happening with great progression, taking into account the published statistical data on diseases acquired by the younger generation during their stay in school institutions, which needs correction at the level of updating the program with updating the conditions of stay of schoolchildren in these territories, to improve statistical data on preserving their health and

continuing their healthy harmonious development at the psychophysiological and physical levels, in fact, all absolutely children and adolescents, as students of educational or other types of schools, since school, secondary education within the law must pass and receive absolutely all children therefore, in this case we are talking about the entire younger generation [19-21].

An increased interest in the surrounding world in all its diversity and beauty is an important characteristic of the years of study at school, and students are highly active in what causes them positive emotions and allow them to learn new things in their beautiful expression, what has a beneficial effect on them and improves their quality of life, so given this aspect, interdisciplinary lessons will create an interesting area for learning a complete overview of many phenomena and facts that will be understandable to schoolchildren, which will contribute to better assimilation of the material and develop motivation for learning [9, 22]. So, within the described framework, the form of lessons is also important and it should be aesthetic, competent, comfortable for perception, presented at a creative and respectful level, with the maintenance of positive emotions in students, which corresponds to the framework of health saving and will cause high activity in educational activities among schoolchildren, which they will successfully apply during lessons [23]. It is known that with growing up, it is important for middle and high school students to have opportunities for self-actualisation of their activities, which should be correctly directed by teachers based on a health-saving and environmental-saving model of behaviour in their activities, and it is also important that students understand that the fruit of their work should be taking into account the preservation of the environment and the well-being of society, so some interdisciplinary subjects may result in some product of their intellectual work with creative, communicative and active components that allow them to self-actualise [24-27]. It is also important that such interdisciplinary lessons will interest students with poor progress and low interest, which is of pedagogical benefit in this aspect. The above-described form of integration within the framework of interdisciplinary lessons allows the formation of a student's personality with high self-esteem, with a better understanding of their priorities for choosing future professional activities, which is of practical significance and is important for the future career guidance of schoolchildren, which will allow them to find their place in society from the perspective of their future adult life [28].

Accepted at the moment tutorials showing and giving a narrow, partial and fragmented knowledge, form pupils defective thinking, which does not allow students to be practitioners theorists even on an ordinary average, because their knowledge is very isolated, and can be manifested only in a single example or task that cannot be extended to any field or area of application where you want to apply the totality of knowledge. Even those with progress can not do that when receiving separate and unrelated fragments of knowledge. This is a big problem when professionals lose almost all talented and smart guys, who were the best students in schools but were not taught to put together the meaning and the practical role of subjects, and apply knowledge from the perspective of life, and the sphere of professional industrial activity in general. They just don't understand how to apply theoretical knowledge and skills and use them in practical professional activities. There is a lack of application of knowledge from an interdisciplinary point of view. Society does not need honours students, who then become inconspicuous, ordinary employees, but standouts formed with imaginative thinking [29]. Introduced into education, including school, multilateral interdisciplinary connections will allow solving many problems and will form a holistic creative worldview that preserves health and ecology with value concepts and practical knowledge that allowed them to become highly qualified specialists in the future, due to the understanding of integrative relations between objects, phenomena and processes of reality, which will be aimed at improving well-being based on the above-described form of education and show all their talents and intellectual opportunities for new achievements and discoveries in science and practice, which should be observed in those who presented themselves well at all stages of education [30-32].

The developed model of one of the possible forms of interdisciplinary communication between physics and computer science meets the above concepts and criteria, and is presented in the form of creating a presentation project on the developed smart home object, which is invented by students themselves after a lesson about what a smart home is, what advantages and opportunities it gives, which models have already been created at the moment from the position of environmental conservation and health saving, and after students are offered to join groups and develop their own smart home models, which they will have to draw in a graphic editor and describe its structure, essence and functions in text editors and then create a presentation within the framework of several lessons, where they will present their work with an overview introduction about the smart home, with a search for information about it in the global network, and justify its benefits for improving the quality of human life, and based on their health-saving and environmental-saving criteria, which they took into account when developing their subject for the smart home. This system will increase the educational level of training, strengthen the communicative ties between teachers and classmates, which will be important for communication and further discussions within the framework of school education, as well as for the educational and correctional function in the field of environmental and health conservation, which will allow forming moral and aesthetic parameters of the individual, activates their mental activity, forms an integral system of knowledge and interdisciplinary, interdisciplinary knowledge, skills and abilities [33-36].

The developed model of interdisciplinary communication will perform educational, developing and self-fulfilling functions. The educational function will consist of the study, selection, and so coordinated personal actions with information materials of different subjects for a holistic understanding of the system at the level of perception of the world as a whole. The educational function will increase the level of education, training, will bring interest and practical significance, which will result in self-actualisation with an increase in self-esteem and own status of a person who has created an environmentally oriented object to improve life, which will form value

concepts and criteria for moral and aesthetic qualities of the student's personality, as well as such activities allow the teacher to correct his students at a creative and respectful level within the framework of their personal development described above [23, 37, 38]. The developing function is to activate mental activity, which allows increasing the intellectual abilities of the student, as well as to form an integral system of knowledge at the level of a general organisational idea of objects, phenomena, processes in life in general, everyday life support and professional activities, and a model will also be formed on how to apply their interdisciplinary knowledge in practice. Thus, the presented model contributes to preparing students with full-fledged knowledge and skills combined into a single system for understanding and future practical application [39, 40].

This approach will allow talented and intelligent students who have shown themselves in their studies as excellent students and hopeful, as successful future highly qualified specialists in various professional fields, to show themselves not only at a high theoretical level of school education during primary education, but also having their training based on the general-to-specific system, to have a formed holistic concept of the functioning of different spheres of activity in the world based on interdisciplinary general-to-specific knowledge, which will allow them to prove themselves as successful specialists in their professional environment in the future, who will be able to show their talents, knowledge and skills at the level of practical implementation which will contribute to new discoveries and achievements, including technical ones, which will be able to significantly improve the standard of living and well-being of society as a whole and thus they will justify the hopes that were rest on them earlier.

Conclusions

The inclusion of a system in the educational process that allows presenting general-to-specific knowledge as necessary within the framework of preserving health and environment will contribute to a successful educational process as a result of which the student will become a worthy person with high self-esteem, creative motivational attitudes and goals that will contribute to the successful development of society as a whole due to a holistic understanding of different spheres in the world. The formed model of interdisciplinary ways of interaction in the general-to-specific educational process and specific models of interdisciplinary communication of physics and computer science when creating a presentation on a created or modernised smart home object will allow students to increase their interest and motivation to learn. they will create conditions for their creative and intellectual self-realisation and will contribute to a holistic knowledge of the field of technical equipment and a functional, practical model for applying the acquired school knowledge at a possible level of their application in the future.

This humane direction of research makes a great contribution to the field of education and a huge irreplaceable benefit to students themselves in their development and acquisition of knowledge that they will be able to apply at a high excellent level in their further professional activities. Thus, the considered options and the formed model of interdisciplinary connection of physics and computer science, introduced into the educational process, will allow students to receive full-fledged knowledge and skills that they will be able to fully use in their lives in the future due to the formed holistic knowledge of all levels of activity studied at school. The materials of this article are useful for employees of the field of education and can be applied in practice, which will contribute to the formation of a valuable and holistic system of knowledge about the functioning of different spheres of activity in the world among graduates of schools or other educational institutions.

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Conflict of Interest

None.

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Шляхи міждисциплінарних зв'язків фізики та інформатики

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Анотація

Актуальність. Актуальність даного дослідження обумовлена проблемою підвищення якості освіти з використанням міждисциплінарної інтеграції, яка дозволяє поглибити свої знання з предметів, зрозуміти, як вони застосовуються на практиці для формування у студентів розуміння професійних та соціальних аспектів практичної діяльності в майбутньому.

Мета. Метою статті є розробка моделі міжпредметних зв'язків фізики та інформатики під час шкільної освіти.

Методика. Провідним методом дослідження проблеми підвищення мотиваційних чинників та формування практичних навичок при вивченні фізики та інформатики було анкетування школярів, а також педагогічне спостереження та експертна оцінка результатів для оцінки ефективності розробленої моделі міжпредметних зв'язків фізики та інформатики у шкільному навчанні.

Результати. У статті представлено модель міжпредметних зв'язків фізики та інформатики, спрямовану на формування професійної компетентності, яка дозволяє учням вивчити напрями застосування двох предметів відповідно до сукупності їх можливостей та знань для створення презентаційного проєкту про об'єкт "розумного будинку", що дасть змогу сформувати мотивацію до вивчення предметів, а також професійні навички для їх використання в майбутньому.

Висновки. Розроблена модель міжпредметного зв'язку двох предметів у вигляді проєктної роботи з презентації об'єкта "розумний дім" забезпечує школярів цілісними та смисловими знаннями під час навчання в загальноосвітньому навчальному закладі, дозволяє активізувати їх інтелектуальну діяльність, підвищує мотивацію до поглибленого вивчення предметів, дає можливість самореалізації, підвищує самооцінку, зміцнює комунікативні зв'язки з учителями та однокласниками, що має практичне значення для галузі освіти.

Ключові слова: технічні науки, міжпредметні зв'язки, шкільна освіта, методи навчання, практична діяльність.