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ORGANIZATION OF TRAINING IN INFORMATICS COURSES USING COLLABORATIVE TECHNOLOGIE

Abstract. Educational program in Informatics has a serious impact on the perspective, talent, ability and creativity of everyone in the labor market in modern times. It is explained by the exceptional role of Computer Science in the preparation and formation of young people for life and practical activities. Informatics also plays an exceptional role in the cognitive development of the student, in the formation of logical thinking, and in the improvement of judgment and understanding abilities. Therefore, the Informatics is the main general education course in the formation of the founders and future residents of the information society. As part of curriculum reform, teaching computer science requires the creation of new training technologies. The curriculum drawn up for Informatics defines the main goals of teaching this subject in secondary schools, reflects all activities to achieve training outcomes. Informatics Curriculum is directed to the capabilities and needs of each student, it serves to form the young generation, solve the problems they face and make independent decisions. The Curriculum is aimed at having the skills of competent use of information technologies and systems meeting the necessary information provision of schoolchildren. The teaching of Informatics in all grades of secondary schools, the application of computers in the teaching of all subjects gives this course a general educational character. The curriculum covering the main content lines of informatics includes a wide range of content. The content, which has an integrative nature, allows us to understand that different knowledge is related to each other not only within the Information Science, but also in other subjects and in real life. With the implementation of the new curriculum Computer Science teacher faces tasks such as preparing the young generation for life in the information society, working with new programs and conditions, searching for information, placing information in the information space,

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organizing joint work using different Internet services. The use of new educational technologies and methods based on Internet services allows schoolchildren to get in touch with the information world they will live in tomorrow. Characteristics of people living in the information society is continuous education, the ability to continuously learn new information.

Keywords: informatization of education; collaboration; Informatics; Internet services; personality development.

INTRODUCTION / ВСТУП

Statement of the problem / Постановка проблеми. The main task of a modern teacher is to form a new way of thinking in students in accordance with the new subject curriculum. Thanks to this, a modern school graduate must study independently, using all available information technologies, including Internet services, set self-education goals and find ways to solve them. The subject outcomes envisaged in the new curriculum and which the student must master include individual, meta-subject (covering several subjects) and subject-based outcomes.

In general education, for successful continuation of education, subject and interdisciplinary results (learning motivation, regulatory qualities) are first of all necessary. The level of student achievement is determined as a result of individual final certification of graduates (assessment of student achievements) in accordance with the curriculum. The curriculum, along with communicative and speech actions, specifically mentions interaction (taking into account the position of the interlocutor) and a special type of activity considered as cooperation – communicative activity. Communicative activity is, of course, an individual characteristic of the student.

One of the interesting trends in education in recent decades is collaborative pedagogy [2]. “Collaboration is the ability to work with others, do not hesitate to ask for help, strive to share work and ideas, carry out solidarity, discussion and analysis in joint activities, and be able to evaluate each other” [4]. The essence of cooperative pedagogy is that the teacher relies on his students in the pedagogical process and its management, and accepts children as close assistants. Takes into account their opinions, wishes and suggestions when organizing the pedagogical process. In this process, the teacher wants children to be more actively involved in the educational process, to act as equal participants and organizers of the pedagogical process. The purpose of the collaborative process is to provide knowledge to students, as well as to create opportunities for the full development of the student's personality and full self-expression.

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In the context of informatization of education, the form, content and technology of cooperation are subject to change. The enormous potential of the Internet for learning collaboration has been little explored. Here there are opportunities for teacher-student, teacher-student group, student-student group and intra-group cooperation. These questions are gradually coming to the center of attention of pedagogical science.

It should be noted that a child's communication with peers is accompanied by the implementation of various communicative goals: monitoring the actions of a partner, monitoring the implementation of these actions, evaluating specific behavioral actions, using their own examples, constant comparison with themselves, etc. When communicating with adults, children follow the general standards of behavior, but in relation to peers they can commit the most unexpected actions. Another special case of relationships with peers is that he considers himself superior to his peers. In connection with cooperation in the educational process, direct assistance from the teacher to students is of little use from a pedagogical point of view. In this case, the teacher takes on the reflective part of the work. To more actively establish the motivational side of action and control, the child needs his peers, and not an older person. Collaboration with peers during the learning process encourages students to discover and coordinate their abilities in activities and make joint decisions. The development and implementation of cooperation projects in the field of education is becoming more and more common every year.

Analysis of (major) recent research and publications / Аналіз (основних) останніх досліджень і публікацій. In the last 15 years, a number of scientists have shown that the development of students in the educational process is largely related to the teaching of computer science N. Buslova [6], A. Pelengov [4], I. Semakin [10], T. Lugovaya [9], etc. Research emphasizes that in the process of learning computer science, independence, creativity and other personal qualities of students are possible.

AIM AND TASKS / МЕТА ТА ЗАВДАННЯ

Goals and ***objectives*** of the article: organizing group collaboration of students using the capabilities of the Internet service to obtain learning results in accordance with the subject curriculum in computer science, its theoretical justification, preparation of appropriate methodology and practical application.

THEORETICAL FRAMEWORK / ТЕОРЕТИЧНІ ОСНОВИ

Computer science as a fundamental science is a set of methodologies that

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have a significant impact on many areas of scientific research and advanced scientific approaches at the present stage of its development (information modeling methodology, approach to the analysis of various objects, processes, natural and social phenomena as an information model, etc.) Therefore, computer science interacts with other disciplines, integration into more fields is important. This integrative connection manifests itself as an interdisciplinary connection and can be built on the resources of the Internet.

The methodology for using Internet services in school education has been studied in a number of studies. These studies analyze the didactic capabilities of telecommunications tools and consider the capabilities of network resources [7], [8]. Despite this, the issues of organizing student collaboration in computer science classes using computer technologies and Internet services have not been sufficiently studied in scientific research. There is less research on group collaboration in computer science classes using the power of the Internet in this process.

In our study, we used competency-based, activity-based and systemic approaches. Based on the analysis of theoretical sources, we came to the conclusion that these approaches are the most productive and appropriate methodological strategies for students to achieve individual, interdisciplinary and subject-specific results in computer science classes. Analyzing the curriculum of computer science subjects, we came to the conclusion that it is necessary to include group forms of student collaboration based on Internet services in school in order to prepare students for active work in the modern information society. Educational cooperation is a pedagogical technology aimed at developing the student's personality. It involves information and communication activities of high school students to jointly solve educational problems based on Internet services. Joint information activities of schoolchildren involve searching, creating, processing and exchanging information results using Internet services in the process of information processing. Joint communicative activity based on Internet services means the creation of speech data, mutual communication taking into account the position of the partner, joint activity based on Internet services. At the same time, educational cooperation has all the distinctive features of pedagogical technology [7]. The goal of the method of organizing educational cooperation based on Internet services is to expand the range of educational results obtained by students in computer science classes [5].

At this time, it is expected to acquire the following knowledge and skills: developing the ability to apply learned concepts, methods, results to solve practical problems and to solve other issues from related disciplines (using

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reference books, various sources, computer); obtaining an understanding of the computer as a universal information processing device, developing basic skills in the practical use of a computer; developing skills in formalizing and structuring information, the ability to choose a method of presenting information (tables, charts, graphs, charts) according to the task using appropriate software for processing data; development of safe and adequate skills and behavior by observing information ethics and legal norms when working with computer programs and the Internet; transformation of acquired skills for application in educational, training and social projects.

When organizing group activities using Internet services in computer classes, an important task of the teacher is to take into account students' readiness for joint activities, control the stages of activity, and help them make group decisions. The teacher can also provide psychological support when the student works together without physical contact with group partners. In accordance with the set goals and objectives, the organization of joint activities of students on the Internet is implemented in a classroom-lesson system. Online collaboration between students in the classroom is facilitated under the guidance of the teacher. This helps solve many problems of students at the initial stage of educational cooperation via the Internet. When organizing joint activities via the Internet, you can organize the interaction of students in different classes. This can make teaching computer science easier because the subject is taught by dividing students into groups and teaching them in different classes. That is, there is no need to separate students and teachers by space and time when organizing joint group activities using Internet services in computer science lessons.

"Universal learning activity (ULA) is the main element of learning ability. This is a set of methods of activity and learning skills of a student, allowing him to independently develop and improve in the direction of the desired social experience throughout his life.

Universal training events perform the following functions:

- be ready for continuous education, create conditions for the comprehensive development of the individual;
- contribute to the successful formation of skills and competencies in various subjects, assimilation of knowledge;
- independently carry out training, setting goals, monitoring and evaluating the process and results of the student's learning.

A number of scientists have defined the functions, composition and content of universal educational activities as follows:

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- personality-oriented (determination of goals, development of motivation, development of unique concepts and moral qualities, development of moral attraction, orientation of the student towards moral and ethical relations);
- regulatory, i.e. time sequence of life plans, creative planning and organization;
- purposeful, i.e. self-government and self-esteem, activities according to an established plan;
- subject-oriented, i.e. research activities – information search, research, complex forms of cognitive activity, data processing and structuring (working with text, semantic reading), the formation of combined elements of thinking as a component of hypothetico-deductive intelligence, working with scientific concepts and a component of logical thinking, accepting general facts as Part;
- communicative, that is, measures aimed at implementing interpersonal communication (personal characteristics of the partner, position in communication and interaction, taking into account different opinions, means of solving communication problems, influences, disputes), measures aimed at cooperation – joint activities (work in a group, discussion, exchange, search for solutions, taking initiative, organizing and planning work in a group, including conflict resolution), actions that ensure the formation of personal and cognitive thinking.

The program for the development of universal educational activities shows that it is important to pay attention to such recommendations as universal educational standards, functions that ensure the acquisition of basic competencies (skills), and important factors that form the basis of reading ability [9]. Communication plays an important role in the development of individual, cognitive and regulatory universal actions for the development of universal learning activities. Communication between teacher and student, communication with parents and other elders allows for the formation of creative activity. The completeness of communication methods shapes students' ideas about themselves, their attitude towards themselves, their view of the world, the directions of their knowledge, and the regulation of their activities. Thus, universal educational activities create broad conditions for the development of self-realization (self-affirmation) of the individual and the improvement of communicative qualities based on preparation for continuous cognition and education; they provide the successful acquisition of knowledge and skills, the opportunity to understand the world and develop skills in any field of knowledge, a focused approach to interdisciplinary communication and

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the formation of scientific qualities. They provide conditions for mastering a computer science course based on new educational standards and achieving individual results.

In this regard, for high-quality assimilation of individual results, the educational programs of complete secondary and basic (general) schools must reflect:

1) reflecting social experience, various forms of social consciousness, modern worldview – science, art, morality, religion, law, socio-political culture, in accordance with the current level of development of science and culture;

2) formation of the foundations of self-development and self-education on the basis of universal moral values and the ideals of civil society;

3) development of tolerant consciousness and political culture, formation of individual behavior in understanding and communication, negotiating with other people, achieving mutual understanding, finding common goals and cooperation to achieve these goals;

4) be ready for free, creative and responsible activities (educational, scientific research, communication skills);

5) to develop skills in productive, educational, social and useful cooperation with peers, cooperation with older and younger children in the areas of educational-creative, educational-innovative and other types of activities;

6) the formation of moral consciousness, feelings and behavior in the direction of mastering universal moral values and social consciousness (love, kindness, compassion, equality, justice, responsibility, freedom of choice, honor, dignity, conscience, honesty, duty, etc.);

7) be ready and able to learn and self-educate throughout life; a conscious attitude towards continuing education to improve professionalism and social activity;

8) formation of the foundations of aesthetic education (including everyday aesthetics, scientific and technical creativity, sports, social relations);

9) conscious choice of a future profession, based on the possibilities of realizing personal life plans; civil attitude to professional activities, personal participation in solving public, state, and national problems.

New requirements are being put forward for educational activities, human development and the formation of personal qualities. In accordance with the requirements of education and modern development, didactic issues are specified in the requirements of educational programs and determine the development of the individual, his knowledge and skills, and the results of individual development [6].

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While studying a computer science course, students acquire universal cognitive skills. These skills include posing a problem and expressing it correctly; search, selection, structuring, visualization of the necessary information, selection of effective ways to solve problems depending on specific conditions, independent creation of an action plan-algorithm in order to solve creative and search problems, solving communication problems using Internet services, etc. [4].

In our study, we refer to the following as individual results:

Cognitive and communicative components of creativity. The cognitive component includes the following types: working with different types of logical information, checking the reliability of information from different points of view. The communicative component shapes the development of a social situation, listening, dialogue, interaction, cooperation with peers and adults using Internet communications services.

In addition to the above factors, the term "individual performance" refers to the application of learning skills in education, intellectual development, cognitive and communication skills. In the process of teaching computer science, opportunities to use the Internet and communicate for educational purposes arise as a result of the development of self-development and understanding of students through working with the Internet. As indicated in the curriculum, the results of mastering a computer science course influence its personal orientation. Subject-oriented results relate to students' mastery of interdisciplinary concepts and general educational activities (regulatory and motivating).

Subject-oriented results also include the ability to use them in educational, cognitive and social practice, planning, implementing educational activities, organizing educational cooperation with teachers and peers, and developing individual learning qualities. If we analyze the subject concepts of the computer science course, we will see that the goal of the school computer science course is to develop students' attention to various subjects, "object", "system", "model", "algorithm", "performer" and to teach concepts. Computer science, along with theory, forms general educational and information-logical skills: analysis, synthesis of objects and situations, composing a whole from parts, free assimilation of missing components; selection of bases and comparison criteria, classification of objects; summarizing information; draw conclusions; building relationships; building logical chains of ideas, etc.

The scientific methodology of computer science is widely used (methodology of information modeling, information approach to the analysis of various objects, processes and events in nature and society, etc.). Within these

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features, strong interdisciplinary connections have been established between the school computer science course and other subjects, both at the human-hardware level and at the level of methods of understanding. Accordingly, the school course in computer science is aimed at a generalized form of skills in working with information, the formation of a scientific worldview, and the continuous development of education and professional activity in the information society. Thus, the formation of computer science as an academic subject and the identification of effective technologies for its development have a positive impact on the teaching of other subjects.

A number of scientific studies have focused on the importance of computer science, which contributes to personal development in various aspects. It is important to add these specific skills to the universal information skills of personal development: using ICT tools to receive, store, process and transmit information, work with text, hypertext, sound and graphics in the appropriate environment; performing calculations in a table processor environment; posting information on computer networks; making and executing decisions using certain algorithms, ability to manage objects; acquiring basic research skills and conducting virtual tests; master methods for mastering new tools; acquire productive mutual cooperation with peers, correctly and clearly express your opinion, communicate with interviewers; carry out joint information activities in a team, present to the audience during the implementation of the project, present the results of their work using ICT; the use of these technologies in educational activities and everyday life, etc.

The special role of educational cooperation in the educational process can be realized more effectively within the framework of the new curriculum. Students can apply universal learning activities, learning cooperative learning, achieve self-development and self-improvement through the conscious and active assimilation of new social experiences. Various group work forms provide potential opportunities for UTF development. Here, students master the features of teamwork, acquire skills of cooperation, regulation of relationships with other people, thanks to this they gain the opportunity to understand themselves, form adequate self-esteem, cognitive motivation and activity [7].

There are various forms of organizing educational cooperation. One of the common forms is the organization of cooperation in small groups. One of the important conditions for the effectiveness of group cooperation are the components of activity that students must master: cognitive, regulatory, communicative, motivational. Mastering cognitive activity helps students “discover” new knowledge: regulatory – involves the implementation of a conscious part of the activity, mental, creative connection in the process of

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activity; communicative (communicative) – the ability to negotiate, put forward hypotheses and arguments; motivation-oriented – the ability to consciously initiate, direct and support efforts aimed at realizing a common goal.

RESEARCH METHODS / МЕТОДИ ДОСЛІДЖЕННЯ

The article used methods such as questionnaires, interviews, observation of computer science lessons, analysis-synthesis, mathematical statistics, analysis of textbooks and methodological tools in computer science, pedagogical experiment, etc.

RESEARCH RESULTS / РЕЗУЛЬТАТИ ДОСЛІДЖЕННЯ

In the process of research devoted to the methods of organizing educational cooperation among students in computer science lessons on the Internet, we came to the following conclusions:

In the process of teaching computer science in high school, it is advisable to organize joint group collaboration of students based on the Internet service in order for students to achieve individual, subject-specific and generalized results.

The Computer Science curriculum requires students to achieve a wide range of learning outcomes. Analysis of these standards requires the widespread use of active learning methods in teaching computer science to achieve individual, subject-specific and generalized results.

The study used group work and the project method as methods that develop the individual qualities of the student and create conditions for solving specific methodological issues in computer science classes.

The development of the student's personality, the formation of his communication, cognitive skills and abilities requires the completion of special tasks. Tasks based on project methods should be implemented to achieve overall results in computer science education. These tasks form in students such important skills as planning, control, self-control, and evaluation of results.

The results of the subject in computer science depend on computer programs, services, systems for working with various types of information, its processing, presentation, level of proficiency, effective organization of this activity and relevant requirements.

CONCLUSIONS / ВИСНОВКИ

Educational activities on the Internet allow you to use the intellectual potential of students individually and collectively. In this case, the student is an active participant in the educational process; a lot depends on him. Each student

has the opportunity to “discover”, add something that others do not know, and coordinate activities with a partner.

The perception of forms of cooperation gives the students’ activities a subjective character. This form requires cooperation based on mastery of the subject. In this case: a) the student independently overcomes the lack of individual knowledge, distinguishes between the known and the unknown, and acquires the ability to choose educational goals by mastering the content of educational activities. b) Using new forms of educational activities based on Internet services, it becomes possible to carry out educational connections with other students. Thus, collective forms of activity on the Internet make it possible to maximize the student’s abilities to solve a specific educational problem.

During the research, a methodology for organizing educational cooperation among schoolchildren based on Internet services was experimentally tested. The components of educational cooperation of schoolchildren based on Internet services at each stage of the educational process are theoretically substantiated and defined.

Future Research Directions Prospects for further research in this direction / Перспективи подальших досліджень у цьому напрямі. The indicators for assessing the level of individual, subject and general results are theoretically substantiated and specified. The conducted pedagogical experiments have proven that the organization of joint activities of students based on Internet services in computer science lessons contributes to the development of universal educational activities (motivational, regulatory, cognitive, communicative). It also ensures the achievement of a high level, multifaceted individual, subject and general results, and provides teachers with a unified, systematic methodology. This well-founded and experimentally tested methodology allows for effective group collaboration among students in computer science classes.

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ОРГАНІЗАЦІЯ НАВЧАННЯ З КУРСІВ ІНФОРМАТИКИ З ВИКОРИСТАННЯМ ТЕХНОЛОГІЇ СПІВПРАЦІ

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Анотація. Освітня програма з інформатики має серйозний вплив на перспективи, талант, здібності та креативність кожного на ринку праці в сучасний час. Це пояснюється винятковою роллю інформатики у підготовці та формуванні молоді до життя та практичної діяльності. Інформатика також відіграє виняткову роль у когнітивному розвитку учня, у формуванні логічного мислення, а також у вдосконаленні здібностей судження та розуміння. Тому інформатика є основним загальноосвітнім курсом у формуванні засновників і майбутніх жителів інформаційного суспільства. У рамках реформування освітніх програм навчання інформатики

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потребує створення нових технологій навчання. Освітня програма, складена з інформатики, визначає основні цілі цього предмету в закладах загальної середньої освіти, відображає усі заходи щодо досягнення результатів навчання. Освітня програма з інформатики орієнтована на можливості та потреби кожного учня, слугує формуванню підростаючого покоління, вирішенню проблем, що постають перед ним, та прийняттю самостійних рішень. Освітня програма спрямована на формування навичок грамотного користування інформаційними технологіями та системами, що відповідають необхідному інформаційному забезпеченню школярів. Викладання інформатики в усіх класах закладів освіти, застосування комп'ютера у викладанні всіх предметів надає цьому курсу загальноосвітній характер. Навчальний план, що охоплює основні змістові лінії інформатики, включає широкий спектр змісту. Зміст, який має інтегративний характер, дозволяє зрозуміти, що різні знання пов'язані між собою не тільки у рамках інформатики, а й в інших предметах і у реальному житті. З впровадженням нової освітньої програми перед учителем інформатики постають такі завдання, як підготовка молодого покоління до життя в інформаційному суспільстві, робота з новими програмами та умовами, пошук та розміщення інформації в інформаційному просторі, організація спільної роботи з використанням різних Інтернет-сервісів. Використання нових освітніх технологій і методик на основі Інтернет-сервісів дозволяє школярам доторкнутися до інформаційного світу, в якому вони житимуть завтра. Характерними рисами людей, що живуть в інформаційному суспільстві, є безперервна освіта, здатність постійно вивчати нову інформацію.

Ключові слова: інформатизація освіти; співпраця; інформатика; Інтернет-послуги; розвиток особистості.

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