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COMPUTER SCIENCE TEACHERS' READINESS TO DEVELOP AND USE COMPUTER DIDACTIC GAMES IN EDUCATIONAL PROCESS

Abstract. The paper reports research on computer science teachers' readiness to develop computer didactic games and implement them into the educational process. Today's teacher of computer science has to acquire and improve professional competencies in line with modern trends of high technological society. It is a process that we consider in the context of life-long education. The use of computer didactic games is one of the forms of innovative education, which increases the attractiveness of education, generates the development of learners' endeavour and creativity. The authors emphasize that computer science teachers' readiness to use computer didactic games becomes impossible without mastering the methodology of pedagogical endeavours and gaming technologies in education. By this, we mean a search for more efficient ways of achieving pedagogical goals, the ability to select computer didactic games and a search for ways of their successful realization in professional activities. Development of computer didactic games requires a computer science teacher to learn methodology and standards within this domain, and to obtain the basic knowledge of environment and skills to use in games development. Our survey revealed that the use of computer didactic games is sporadic and inadequately prioritized by the computer science teachers, who appeared to have very little knowledge in techniques aimed at their development and implementation into the educational process. The main reason is that prospective computer science teachers do not learn it sufficiently in higher educational establishments. This sphere remains underestimated by those who educate prospective computer science teachers, as well as by computer science teachers themselves. As a result, we observe a lack of knowledge in development, selection and implementation of computer didactic games. Theoretical analysis of the use of computer didactic games and their implementation into the educational process remains out of scholars' attention, despite the issue becoming more and more attractive. The examination

of computer science teachers' readiness to develop computer didactic games and implement them into the educational process allows us to suggest ways for enhancing the level of teachers' readiness for this training activity.

Keywords: readiness; computer science teachers; computer didactic games; educational process; professional activity; life-long learning.

INTRODUCTION

The problem statement. The objective of today's education is creating conditions for shaping an individual who is at the same time professionally competent, socially engaged and creative. The content of the knowledge to be acquired by modern specialists, its volume, the set of skills necessary for professional activities are constantly changing and increasing. All spheres of education are searching for ways to intensify and quickly modernize the training system, improve education quality by using information and digital technologies (IDT) as an instrument for human activities and a new and fundamentally different way of education. This led to the development of new methods and forms for the provision of education [1]. One of the most significant innovations in the educational process is the introduction of computer didactic games (CDGs). The games accompany people throughout life and this phenomenon greatly attracts the interest of researchers. In the current situation, they may be a great motivation for students to learn specific subjects on the one hand and a way to facilitate teachers' work on the other.

With traditional approaches to education, the teacher evaluates students' progress manually, which very often causes a delay in response and leads to dissatisfaction. CDGs may help reduce such delays to virtually nothing. CDGs throw students into a world that is easy to research without the interference of a teacher. CDGs are a perfect environment for promoting authentic educational processes, advancing a process of learning-by-doing and thus enabling a student to control his/her own training experience. In this context, CDGs may provide an informative experience in simulating interactive scenarios that students deal with in the real world. CDGs are a perfect environment for active learning and improving task solving skills rather than learning by rote. CDGs may also increase students' self-realization and efficiency.

An increasing number of teachers recognize the value of CDGs in education. The majority of popular games, such as Scratch, for instance, are ready for implementation. A teacher or a school may download a game for free or buy it. Moreover, this raises a question to the teacher of whether or not it is necessary to create CDGs if there are those ready to use? Game creation is a labor-intensive process that requires relevant competencies. Working in accordance with the approved training program, teachers strive to achieve educational standards. This raises a further question: does a teacher have to spend time on the creation of CDGs? Let us look at the advantages of CDGs created by teachers and the disadvantages of commercial CDGs. From our point of view commercial CDGs have such disadvantages as:

- absence of integration with the current educational program,
- sometimes it is difficult to synchronize a game with the current curriculum,
- games may not meet educational standards,
- absence of evaluation criteria,
- some games offer substantial educational content but contain some mistakes and inaccuracies, made to make a game more attractive,
- some games are very expensive,
- some games need a license,
- some games are not technically maintained,
- etc.

The article presents the research of high school computer science teachers' readiness to develop computer didactic games and implement them into the educational process. The readiness of computer science teachers to develop CDGs and implement them into the educational process is to be understood as a feature that allows them to carry out the innovation activities in implementing CDGs into the educational process independently, enables them to acquire necessary knowledge and skills, make adequate decisions in challenging situations, organize educational process, ensure self-control, self-regulation, and self-improvement during their efficient implementation. The readiness of computer science teachers to develop CDGs and implement them into the educational process is a complex, integrative, personal and professional phenomenon, which consists of motivational-value, cognitive-activity and personality-reflexive components.

The creation of high-quality CDGs is a challenge for teachers. Normally, computer science teachers do not have the relevant technological education, or have very little funds to attract CDGs developers. Using Microsoft™, XNA or OGRE platforms for creating CDGs, computer science teachers need skills for programming games, which often turns out to be problematic. There are game editors that are easy to use due to available tools, like plug-and-play tools for some components of the game. Examples are 3D Game Studio, RPG Maker, Unity and others. However, working in such environment may be difficult for non-professional developers. Some tools, for example, allow the configuration of some parts of the game by the friendly user interface, but the additional parts are to be made independently, programming scenarios using languages C#, java, etc. An alternative solution to this problem is game creating platforms, developed to be used in education: EUTOPIA and <e-Adventure>. For example, games produced using <e-Adventure> may be used through platforms for e-learning such as Moodle ™ or Sakai ™.

Analysis of recent studies and publications. The research publications of Ukrainian and foreign scientists gave careful consideration to the question of development and efficient implementation of CDGs or their elements into the educational process on different levels of education. The above issue was thoroughly highlighted in recent years by V. Bykov, M. Kademiia, V. Kontsedailo, S. Lytvynova, Yu. Mashbyts, O. Melnyk, N. Rybka, S. Semerikov, M. Zhaldak, J. Basler, M. Griffiths, M. Michala, D. Tsolis and others.

The majority of the studies in this sphere concern primary education. To a lesser extent, attention is paid to secondary and higher education. The studies have mostly been carried out based on the examples of using CDGs to learn mathematics and languages. Game is a priority activity for pre-school children and remains an active way of discovering the world for primary school children [2]. Using games for secondary school pupils remains less researched, since children of this age group are educated on the basis of the activities-oriented approach with the use of more formal ways of learning.

The effectiveness of education with electronic educational game resources in mathematics, conducted during the study "Rozumnyky" (Smart kids) is described in the works of V. Bykov, S. Lytvynova and O. Melnyk [3]. They argue that using electronic educational game resources in the educational process showed a positive effect when studying mathematics (the level of educational achievements, the development of memory and thinking) [3].

M. Michala, C. Alexakos and D. Tsolis, for example, analyzed the available digital and mobile games which are used in education. They examined the benefits of using games and digital educational programs in the educational process, aimed at developing cognitive and emotional skills, highlighted computer and mobile play-based approach, founded on the Greek art and culture for high school [4].

N. Rybka undertook a study in which she examined the phenomenon of gamification based on the example of using computer games for teaching philosophy in engineering higher

educational institutions, attempted to determine all negative effects they may have, and tried to find ways to overcome them. The author emphasizes that playing practices are of significant importance for students in engineering educational establishments, since they help to strengthen and develop intellect. The author believes that research and development of evaluation methods for appropriateness, efficiency, and even economic feasibility of using game technologies in the educational process are forward-looking for every subject and separate topics [5].

Despite the extensive research, the issue of computer science teachers' readiness to develop and use CDGs in the educational process remains poorly understood. It is also relevant in relation to the rapid development of IDT and the transformation of the educational system in line with the societal changes of the 21st century.

Therefore **the aim of our research** is to determine the level of the computer science teachers' readiness to develop didactic computer games and use them in the professional activity and to single out the components of such readiness.

The tasks of the research are the following:

1. To describe the indicators, criteria and levels of computer science teachers' readiness to develop and use CDGs.
2. Using empirical research methods (observation of teaching activities, questionnaires, interviews), as well as verbal-communicative and psychodiagnostic research methods, to determine the readiness of computer science teachers to develop and use CDGs.
3. To identify ways to increase the readiness of computer science teachers to develop and use CDGs.

2. COMPUTER DIDACTIC GAMES AND THEIR USE IN THE EDUCATIONAL PROCESS

One of the most important tasks of the educational system today is to introduce educational technologies that could facilitate the formation of a creative and active personality, able to meet the challenges and to achieve the desired goals. The above highlights the importance of the development and implementation of different approaches to the realization of educational tasks, aimed at the development of students' creative activities.

The use of gaming technologies and CDGs, in particular, is one of such approaches. A computer science teacher today has to understand the efficient pedagogical technologies and effectively use information and digital technologies in teaching informatics.

Today's teachers succeed in mastering educational electronic resources that they use in the class [6]. We assume that electronic educational resources are educational resources presented in electronic and digital form and compose a complex, open, dynamic system, which transforms, develops and interacts with the world informational environment. It is based on the principles of synergetic interaction, technologies for building adaptive multilevel hypermedia. CDGs as a system of education may be an integral part of electronic educational resources.

Computer didactic games present a type of electronic educational resource that targets students and functions on the basis of information and communication technologies, presenting a chain of tasks built on the basis of the development education. CDGs do not change but complement traditional game forms and classes, and present a natural way to attract students to the latest information technologies [7]. The practical application of such games demonstrates that they remain valuable educational tools as they have the following advantages [8]:

– attractive sounds, actions and colors make games interesting and help students to obtain information in a user-friendly form,

– a new way of working provokes students' interest in education,

– practical manipulation assists the processes of learning, memorization, increases cognitive abilities, enables the realization of individual learning strategies and stimulates students' capacity for research and talent.

CDGs may be divided into three groups [7]:

1. Educational. They contribute to students' education: familiarize the child with the alphabet, develop reading skills, form elementary mathematical understanding, etc. (Picture 1).

Picture 1. Panda School [9]

2. Developing. They contribute to students' cognitive development, encourage activities and independent creative work (Picture 2).

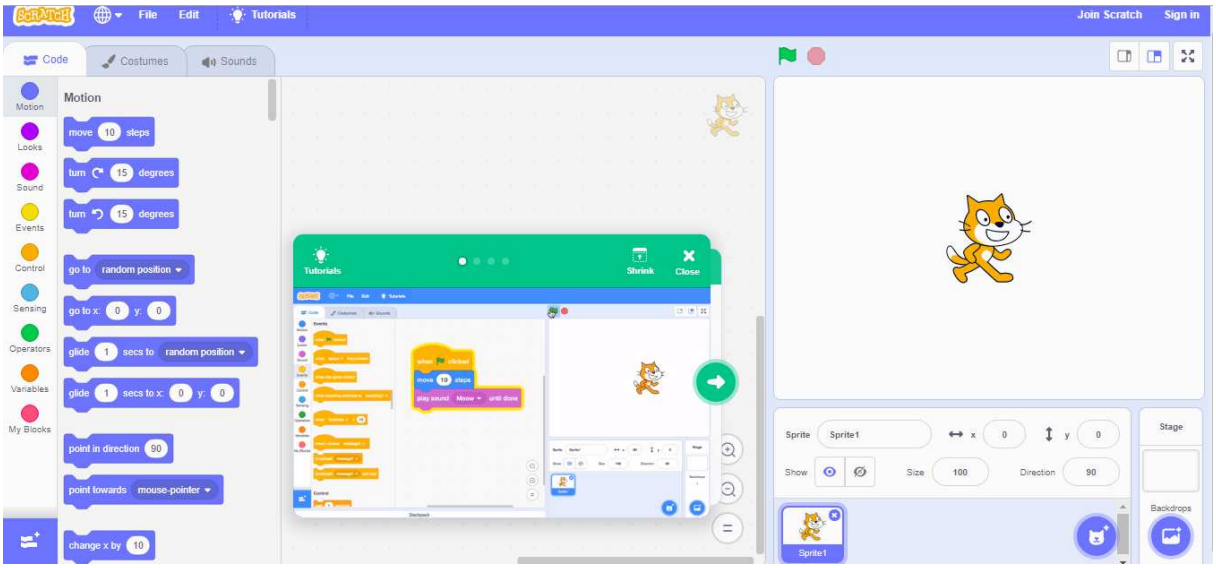
3. Diagnostic. They determine the level of children's development.

The studies carried out up to now demonstrate that important skills may be acquired, developed or supported by CDGs. Spatial visualization (rotation and mental manipulation by two- and three-dimension objects), for example, improves during the reproduction of videogames [10].

The presented types of computer games have the same characteristics as the usual didactic, plot-related didactic and role-playing games.

Categories of CDGs may be correlated with them. They also contain educational and developing tasks, playing actions as well as the rules. In his papers, M. Griffiths presents examples in which CDGs were used for the treatment and rehabilitation of children and adolescents [11].

Methodological recommendations for the use of CDGs are one of the most important components in the process of developing them.



Picture 2. Scratch [12]

A number of recent researches into using computers at school were to further explore whether or not these games are able to support the educational purposes. Extensive studies on the implementation of videogames in school curriculum are focused around the influence of the game materials on education. These studies strictly correlated the grasp of content in the curriculum with the knowledge that was used in the games. The fact that the games may attract children to the educational process caused an increase in "educational" mass media. Watching children play games leads to the assumption that they prefer this approach in education. Nevertheless, it seems that the commercial market offers too few games with educational purposes.

3. SELECTION OF METHODS AND DIAGNOSTICS

Information on how CDGs are being developed and used in the educational process was generated following the results of the analysis of public educational standards [13], typical educational programs, curricula, other normative documents, methodological works of teachers and literature sources. Analysis as for the readiness of high school computer science teachers to develop and use CDGs in the educational process was carried out by using empirical research methods (observation of teaching activities, questionnaires, interviews), as well as verbal-communicative and psychodiagnostic research methods.

The questionnaire was submitted by 183 computer science teachers of different Ukrainian regions via email by means of Google Forms.

Diagnosing during the study was made with the use of valid and reliable methods: "Diagnostics of motivation for success and fear of failures" (A. Rean) [14]; tests and questionnaires on determining levels of formation of motivational-value, cognitive-activity and personality-reflexive components; "Self-controlling Abilities" (N. Peisakhov); "Self-Efficacy Test" (J. Maddux, M. Sherer, adapted by A. Boyaryntseva); "Research of Strong-willed Self-regulation" (A. Zverkov, Ye. Eidman).

4. RESULTS AND DISCUSSION

The authors analyzed the results of the evaluation of the level of components that constitute the readiness of computer science teachers to develop CDGs and implement them into the educational process.

To evaluate and analyze the levels of components of the computer science teachers' readiness to develop CDGs and implement them into the educational process, the following criteria were used: the motivational-value criterion, the cognitive-activity criterion, the personality-reflexive criterion.

The motivational-value criterion, which characterizes a set of motives and the awareness of these motives, plays an important role in the formation of computer science teachers' readiness to develop CDGs and implement them into the educational process. The following indicators of this criterion are defined: the interest in training and CDGs, the interest in the professional activities, the awareness of the importance of readiness to develop and use CDGs for successful professional activities.

Interviewing, questioning and testing were used in the evaluation of the level of *the motivational-value criterion* of computer science teachers' readiness to develop and use CDGs in the educational process. During questioning, we were trying to realize to what extent the activities related to the development and implementation of CDGs are understandable, relevant, necessary and desirable. Teachers' responses (among which diagnostically significant were the following: "*Do you agree that readiness for the development and implementation of CDGs is an important component of professional and information competencies of today's computer science teachers?*", "*Is it interesting for you to learn the way of developing and implementing CDGs in the educational process more deeply?*") showed that teachers are aware of the importance of readiness for the development and implementation of CDGs for successful professional activities (high level – 30,4 %, average – 50,1%, low – 19,5% of teachers) (see Figure 1). Value orientations also contribute to the achievement of professional success in teaching computer sciences (see Table 1).

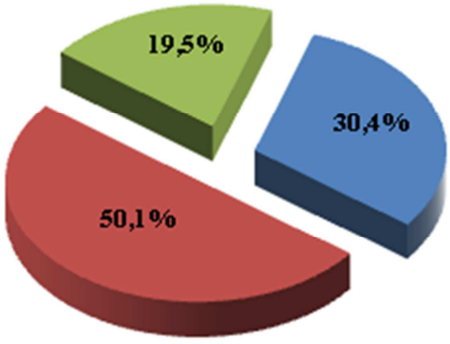


Figure 1. Significance of readiness for the development and implementation of CDGs for successful professional activities (high level – 30,4 %, average – 50,1%, low – 19,5% of teachers)

It is necessary to note that the ranged list of 14 value orientations was completed by means of measuring the frequency use of orientations named by computer science teachers during interviews.

Thus, understanding the importance of the development and implementation of CDGs into the educational process, the dominating values of teachers are the following: possibilities to introduce new methods and forms of works with students, develop students' interest to computer sciences, possibility to improve pedagogical skills in using CDGs, self-

development, self-improvement as well as achieving professional success, development of personal strengths, talents, acquiring professional and information competencies in developing CDGs. During the evaluation of values we found significant discrepancies in the values of ranges and indexes 3 and 13. The analysis of discrepancies showed that teachers give more priorities to using CDGs in the educational process rather than developing them. In addition, the sphere of CDGs development is of higher priority than their implementation for acquiring professional and information competencies.

Table 1

Hierarchy of computer science teachers' value orientations as for the development and implementation of CDGs

№	Values that were subject to ranking	Ranking indicators	
		development	using
1	Achieving professional success	4	6
2	Developing personal strengths and abilities	4	5
3	Acquiring professional and information competencies	4	9
4	Providing material comfort	13	13
5	Achieving recognition and respect in professional sphere	10	11
6	Improvement of social status	14	14
7	Striving to new achievements	9	7
8	Self development and self improvement	2	4
9	Recognition and respect of managers	12	12
10	Achieving students' respect	11	10
11	Developing students' interest in computer sciences	2	1
2	Possibilities to show one's potential	7	7
13	Possibility to improve pedagogical skills	8	3
14	Possibilities to introduce new methods and forms of activities	1	1

Such results may mean that teachers do not fully realize the possibilities of improving professional and information competencies in using CDGs and do not comprehend all possibilities and ways for improving their teaching skills. It may be assumed that computer science teachers are sufficiently oriented in the process of implementing new methods and forms of works in the classroom. They know how to develop students' interest in computer science, to improve teaching skills and strive to self-development and self-improvement aimed at achieving professional success in acquiring corresponding competencies in the sphere of CDGs. Additionally, there is a lack of care for material comfort, improvement in social status, recognition in the professional sphere, and achievement of respect. However, computer science teachers were also observed to be more oriented towards professional realization and improvement, which dominated their requirement for recognition and respect, improve social status, ensuring material comfort.

The motivation for achievement favours an increase in persistence, self-esteem, regulation of activities, the formation of readiness for the development of CDGs and their implementation into the educational process. The results of the survey of computer science teachers show that following the methodology "Diagnostics of motivation for success and fear of failures" (A. Rean [14]), 59,2% of teachers have motivation on the average level, 21,4 % of teachers have a high level of motivation, and 19,4% of teachers have a low one. The

motivation for achievement activates subjective efforts of computer science teachers, directed to the desired outcome in personal and professional development.

Formation of computer science teachers' readiness for the development and implementation of CDGs into the educational process has to be based on practically oriented knowledge and skills, which are components of professional competency. The indicators of *the cognitive-activity criterion*, which reflects the content and the technology of development and implementation of CDGs, as well as individual and psychological peculiarities of teachers' readiness, are: the field knowledge, the abilities to use the field knowledge for professional purposes and the cognitive activities.

The estimation of professional achievements, however, does not fully reflect the level of computer science teachers' knowledge in this sphere, as it is a pretty formal indicator of their readiness for the development and implementation of CDGs. Therefore, we additionally used the method of monitoring quiz (oral and written) in the study. The average results of the quiz show that computer science teachers' knowledge in theory of CDGs development and implementation is as follows: high – 4,2% and 24,8%; average – 11,2% and 46,5%; low – 84,6% and 28,7% (see Figure 2, Figure 3).

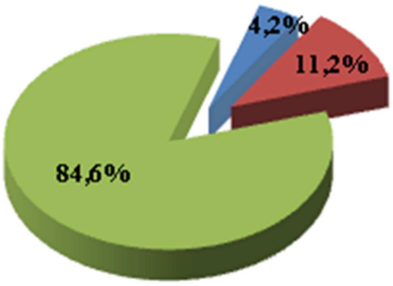


Figure 2. Average results of computer science teachers' knowledge in CDGs developing theory (high level – 4,2 %, average – 11,2 %, low – 86,4 % of teachers)

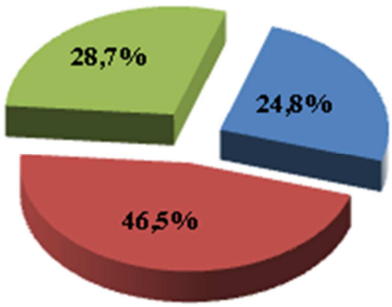


Figure 3. Average results of computer science teachers' knowledge in CDGs implementation theory (high level – 24,8 %, average – 46,5 1%, low – 28,7 % of teachers)

Identifying the indicators of the cognitive-activity criterion we assumed that computer science teachers understand the process of development and implementation of CDGs as a focused and result-based management of the professional activities and life-long learning that simulates abilities to predict outcomes, plan, control, evaluate, monitor and manage this process, overcome difficulties at the time of achieving tactical and operational purposes as well as strategic goals.

So, the results of the tests reveal that the computer science teachers' ability to self-governance is on the average level. The percentage distribution by ability levels is as follows: 35,7% – high, 53,0% – average, 11,3% – low level (see Figure 4). These data show that computer science teachers are fully ready for the improvement of competencies level in CDGs development and their implementation into the educational process.

The study shows that the formation of the readiness of computer science teachers to develop CDGs and implement them into the educational process is impossible without the corresponding knowledge and abilities in these spheres, such as: knowledge of CDGs' tools of development and implementation (classification, functional possibilities, didactic characteristics, development requirements), skills in selection of topics, design development,

knowledge of psychological peculiarities of students' age groups, etc. (see Table 2). The efficient management of this process demands knowledge of problem analysis, a clear vision of the situation, and the ability to forecast and plan future actions.

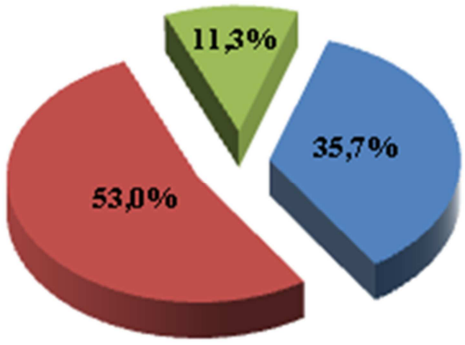


Figure 4. Percentage distribution of computer science teachers by levels of the ability to self-governance (high level – 35,7 %, average – 53,0 %, low – 11,3 % of teachers)

Table 2

Indicators of cognitive-activity criterion of evaluation of computer science teachers' readiness to develop CDGs and implement them into the educational process

№	In the sphere of CDGs development		In the sphere of CDGs implementation	
	indicator	ranking	indicator	ranking
1	I am aware	1	I am aware	1
2	I have knowledge	7	I have knowledge	3
3	I have skills	8	I have skills	4
4	Able to develop	10	Able to use	5
5	Realize didactic peculiarities	8	Realize psychological peculiarities	12
6	Realize basic functional possibilities	6	Realize basic functional possibilities	10
7	Realize basic requirements to development	11	Realize basic requirements to implementation	8
8	I know how to select topics	2	I know how to select games aimed at attaining lesson's goal	2
9	I can develop design	12	I know how to select games aimed at realization of person-centered approach	11
10	I know specifics of psychological influence on age groups of children	4	Implement with the aim to ensure cross curriculum connections	8
11	I know how to classify games	3	I know how to classify games	5
12	I know the basic classes of software	5	I know which software to use in this sphere	7

The cognitive-activity criterion for the evaluation of computer science teachers' readiness for development and implementation of CDGs characterizes the level of theoretical knowledge, ability to use and create activities that are of significant importance in the professional practice of computer science teachers.

The study shows that computer science teachers fully understand the process of development and implementation of CDGs, know how to choose games aimed at achieving

lesson objectives. They have knowledge, skills and are able to use CDGs in the educational process but have little experience in their development.

In their professional activities, computer science teachers also face difficulties in understanding the psychological specifics of using CDGs by students. Teachers also have to deal with the issue of the definition of the main functionalities of CDGs, since their selection directly influences the realization of the student-centered approach.

The personality-reflexive criterion of computer science teachers' readiness for the development and implementation of CDGs is characterized by the determination of the teacher's personal style of activities, the awareness of the content of activities, the abilities to evaluate outcomes and consequences, the skills of self-education, self-realization in the professional activities, and the life-long learning. The indicators of this criterion are: the ability for self-analysis, self-control, self-organization; the availability of the personal style of activities; understanding the scope of the activities on CDGs developing and implementing; self-education skills.

The study enabled us to set up the following system-creative factors that determine the ability of computer science teachers for self-control: restraint, sense of duty, will power, disciplined manner, and responsibility.

The research results show that the average values of self-control quality levels of computer science teachers were distributed as follows: high level – 39,8%, average level – 51,5%, low level – 8,7% (see Figure 5). In our opinion, such results may be explained by job requirements and social context.

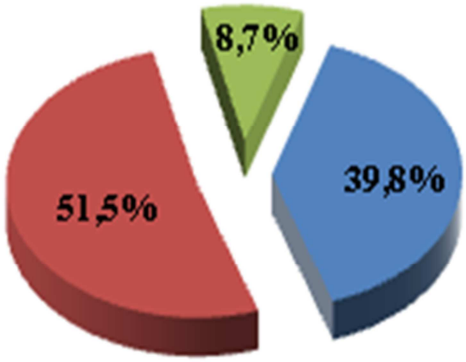


Figure 5. Percentage distribution of computer science teachers by levels of the ability to self-control (high level – 39,8 %, average – 51,5 %, low – 8,7 % of teachers)

Hence, as average indicators of the personality-reflexive criterion of computer science teachers' readiness to develop and implement CDGs show, the highest rank belongs to teachers' striving for strong performance in this area, for awareness of shortcomings and sincere endeavor to improve performance (see Table 3).

It is extremely important to use the scientific approach to the organization of properly targeted training for computer science teachers in this sphere. Teachers also do not consider it necessary to improve the acquired competencies in CDGs development and implementation, though they make attempts to discover new methods, ways and forms in this sphere. It basically concerns the improvement of subjective resources of self-efficiency and self-improvement of computer science teachers, their ability to self-control in setting and achieving a goal, planning, using positive self-stimulation, distribution of efforts, support of their personal activities and reestablishing working capacity.

Table 3

Indicators of personality-reflexive criterion for evaluation of computer science teachers' readiness for CDGs development and implementation

№	In the sphere of CDGs development		In the sphere of CDGs implementation	
	indicator	ranking	indicator	ranking
1	I am a qualified developer	7	I am a qualified user	4
2	I strictly determine a purpose of the development	5	I strictly determine a purpose of implementation	2
3	I work much to improve competencies	6	I work much to improve competencies	6
4	I want to achieve high results	1	I want to achieve high results	1
5	I know my weaknesses and strive to improve them	2	I know my weaknesses and strive to improve them	3
6	I constantly search for new methods, forms and ways for realization	4	I constantly search for new methods, forms and ways for realization	5
7	I know what to work with and what to learn in the nearest future	3	I know how to use the necessary means and look for them	7

5. CONCLUSION

1. The results of the study show the necessity to increase the readiness of computer science teachers to develop CDGs and implement them into the educational process, thus promoting life-long learning activities and personal development. The readiness of computer science teachers involves a quest for knowledge of scientific principles and standards in this sphere, basic experience in using environments for developing computer games and skills to use them during the process of their development.

The readiness of computer science teachers to develop and use CDGs is to be understood as a feature that allows teachers to carry out the innovation activities in implementing CDGs into the educational process independently, enables them to acquire necessary knowledge and skills, make adequate decisions in challenging situations, organize educational environment, ensure self-control, self-regulation and self-improvement during their efficient implementation.

The readiness of computer science teachers to develop and use CDGs in the educational process is a complex integrative personality-professional formation, consisting of motivational-value, cognitive-activity and personality-reflexive components, which are specified in their corresponding criteria, indicators, and levels (low, middle, high). The indicators of the motivational-value criterion, which characterizes a set of motives and the awareness of these motives, are defined as: the interest in training and CDGs, the interest in the professional activities, the awareness of the importance of readiness to develop and use CDGs for successful professional activities. The indicators of the cognitive-activity criterion, which reflects the content and the technology of development and implementation of CDGs, as well as individual psychological features of teachers' readiness, are: the field knowledge, the abilities to use the field knowledge for professional purposes, and the cognitive activities. The personality-reflexive criterion, which determines the teacher's personal style of activities, the awareness of the content of activities, the abilities to evaluate outcomes and consequences, the skills in self-education and self-realization in the professional activities, and the life-long learning, has the following indicators: the ability for self-analysis, self-

control, self-organization, the availability of the personal style of activities, understanding the scope of the activities on developing and implementing CDGs, and self-education skills.

2. The results of the study show that computer science teachers are not sufficiently familiar with methods of CDGs development and their implementation into the educational process. The key reason for that is that this technology is not sufficiently analyzed in higher educational establishments; it is underestimated both by university lecturers who train prospective computer science teachers and by computer science teachers who work at schools. As a result, teachers do not know rational methods of development, selection and implementation of computer didactic games.

The data obtained during the study indicate the dominance of the average level of components that make up the readiness of computer science teachers to develop CDGs and implement them into the educational process. It was found that computer science teachers have a lower level of competencies needed in the field of CDGs development than those needed for their use in the educational process. Accordingly, components that determine the level of computer science teachers' readiness to develop CDGs are formed at a lower level. The study demonstrated that the field of CDGs development and implementation into the educational process is underestimated by computer science teachers.

3. Based on the results of the study, the following ways to increase the readiness of computer science teachers to develop CDGs and implement them into the educational process are determined:

– encouraging computer science students to develop CDGs and implement them into the educational process;

– enhancing the interaction between teachers, lecturers and advisors in this area to ensure their efficient participation in the formation of computer science teachers' readiness to develop CDGs and implement them into the educational process;

– use of innovative pedagogic technologies for the formation of computer science teachers' readiness to develop CDGs and implement them into the educational process.

Our pedagogical study does not cover all aspects of the researched issue. Particular attention should be paid to international practices in the development of CDGs and their implementation into the educational process. It is equally important to examine ways for improving the professional competency of computer science teachers in the system of post-diploma education and improving qualifications in this area, etc.

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ГОТОВНІСТЬ УЧИТЕЛЯ ІНФОРМАТИКИ ДО РОЗРОБКИ ТА ВИКОРИСТАННЯ КОМП'ЮТЕРНИХ ДИДАКТИЧНИХ ІГОР В ОСВІТНЬОМУ ПРОЦЕСІ

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Анотація. У роботі досліджується готовність учителів інформатики до розробки та впровадження в навчальний процес комп'ютерних дидактичних ігор. Сучасний учитель інформатики повинен удосконалювати і набувати фахових компетентностей відповідно до сучасних тенденцій високотехнологічного інформаційного суспільства. Застосування комп'ютерних дидактичних ігор є однією з інноваційних форм навчання, що надає можливість підвищити інтерес учнів до навчання, сприяє розвитку їхньої творчості, креативності. Автори звертають увагу на те, що готовність учителів інформатики до застосування комп'ютерних дидактичних ігор потребує опанування методологією педагогічного пошуку, методиками ігрових технологій в освіті, зокрема вимагає пошуку більш ефективних шляхів досягнення педагогічних цілей, добору засобів комп'ютерних дидактичних ігор та пошуку шляхів їх успішної реалізації в професійній діяльності. Розробка комп'ютерних дидактичних ігор учителем інформатики передбачає опанування ним методологією та стандартами в цій галузі, а також оволодіння базовими знаннями використання середовищ розробки комп'ютерних дидактичних ігор та вміннями їх застосовувати в процесі розробки комп'ютерних дидактичних ігор. Під час дослідження ми з'ясували, що вчителі інформатики в закладах загальної середньої освіти використовують комп'ютерні дидактичні ігри епізодично, недостатньо знайомі з методиками їх розробки та використання в освітньому процесі. Головною причиною цього є недостатнє їх вивчення майбутніми вчителями інформатики в закладах вищої освіти. Ця сфера залишається недооціненою як викладачами, що здійснюють професійну підготовку майбутніх учителів інформатики, так і самими вчителями інформатики. Наслідком цього є незнання вчителями інформатики технологій розробки, добору та впровадження комп'ютерних дидактичних ігор. Теоретичний аналіз застосування комп'ютерних дидактичних ігор, їх використання в освітньому процесі залишається поза увагою вчених, хоча останнім часом ця проблема привертає все більше уваги. На основі вивчення готовності вчителів до розробки та використання комп'ютерних дидактичних ігор в освітньому процесі ми пропонуємо шляхи підвищення рівня готовності вчителів інформатики до цієї навчальної діяльності.

Ключові слова: готовність; вчитель інформатики; комп'ютерні дидактичні ігри; освітній процес; професійна діяльність; навчання впродовж усього життя.

ГОТОВНОСТЬ УЧИТЕЛЯ ИНФОРМАТИКИ К РАЗРАБОТКЕ И ИСПОЛЬЗОВАНИЮ КОМПЬЮТЕРНЫХ ДИДАКТИЧЕСКИХ ИГР В УЧЕБНОМ ПРОЦЕССЕ

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Аннотация. В работе исследуется готовность учителей информатики к разработке и использованию в образовательном процессе компьютерных дидактических игр. Современный учитель информатики должен совершенствовать и приобретать профессиональные компетентности в соответствии с современными тенденциями высокотехнологичного информационного общества. Использование компьютерных дидактических игр является одной из инновационных форм обучения, обеспечивающих возможность повышения интереса учащихся к обучению, содействует развитию их творчества, креативности. Авторы обращают внимание на то, что готовность учителей информатики к использованию компьютерных дидактических игр требует овладения ими методологией педагогического поиска, методиками игровых технологий в образовании, в частности, требует поиска более эффективных путей достижения педагогических целей, выбора средств компьютерных дидактических игр и поиска путей их успешной реализации в профессиональной деятельности. Разработка компьютерных дидактических игр учителем информатики предусматривает овладение им методологией и стандартами в этой области, а также овладение базовыми знаниями использования сред разработки компьютерных игр и умениями применять их в процессе разработке компьютерных дидактических игр. В процессе исследования мы выяснили, что учителя информатики в средних общеобразовательных школах используют компьютерные дидактические игры эпизодически, недостаточно знакомы с методиками их разработки и использования в учебном процессе. Главной причиной этого является недостаточное их изучение будущими учителями информатики в высших учебных заведениях. Эта сфера остается недооцененной как преподавателями, осуществляющих профессиональную подготовку будущих учителей информатики, так и самими учителями информатики. Следствием этого является незнание учителями информатики технологий разработки, отбора и внедрения компьютерных дидактических игр. Теоретический анализ компьютерных дидактических игр, их применение в учебном процессе остаются пока вне поля зрения ученых, хотя в последнее время данная проблема привлекает все больше внимания. На основе исследования готовности учителей информатики к разработке и использованию в учебном процессе дидактических компьютерных игр мы предлагаем пути повышения уровня готовности учителей информатики к данной образовательной деятельности.

Ключевые слова: готовность; учитель информатики; компьютерные дидактические игры; учебный процесс; профессиональная деятельность; обучение на протяжении всей жизни.