

# Use of computer program in the development of students' theoretical knowledge in physical education lessons

N. Melentyeva

*Department of Theoretical bases of the physical education and sports  
Vologda State University  
Vologda, Russia*

E. Peskova

*Institute of Economics and Information technologies  
Kazan State Power Engineering University  
Kazan, Russia*

**Abstract**—The improvement of capabilities and the numerous release of computers in modern times leads to the creation of new and diverse technologies in all spheres of human activity. One of these areas is education. The article deals with the main aspects of the use of computer technology in education, including the lessons of physical culture. The opinions of experts on the implementation of information and communication technologies in education are presented. Possibilities and features of application of the computer program "LEARNINGAPPS" in formation of theoretical knowledge are opened. The question of application of the computer program "LEARNINGAPPS" for the development of theoretical knowledge in students of 8 classes on the subject of physical education in secondary school (program content "Volleyball"). Computer testing in the form of a quiz using the program "LEARNINGAPPS" was developed. The results of computer testing determining the level of theoretical knowledge of students at the beginning and end of the pedagogical experiment are presented. At the beginning of the experiment, the average result of correct answers to the test questions was 33.3%, at the end of the experiment – 76.4%. A series of exercises in the program "LearningApps" was developed and tested to improve the level of theoretical knowledge of students in 8th grade on the program content of "Volleyball". Possible tasks of the computer program "LEARNINGAPPS" are offered at mastering of theoretical material. The results of the pedagogical experiment, proving the effectiveness of the computer program "LEARNINGAPPS" in the development of theoretical knowledge of physical culture (section "Volleyball") eighth grade students. Practical recommendations for teachers of physical culture on implementation of the computer program "LEARNINGAPPS" at lessons of physical culture at formation of theoretical knowledge of the trained are formulated.

**Keywords**—*physical education lessons, theoretical knowledge, computer program, students, testing, volleyball*

## I. INTRODUCTION

A distinctive feature of the modern education system is the deep penetration of information and communication technologies in various types of educational activities. Information technology is developing and spreading very quickly, it is inevitable for modern society, and the best and most practical means of collecting, processing and transmitting information is a computer. It facilitates and accelerates the work of all mankind, is able to increase the intellectual abilities of man, to expand cognitive capabilities. Therefore, computer technology is an integral part of modern

society. Automated training and learning-control systems help to master new material, control the level of knowledge, as well as contribute to the preparation of new material by the teacher. With the creation and active popularization of personal computers and in connection with their use in educational institutions, a new pedagogical direction is computer technology in education. The use of educational software has become widespread since the early 1980s, just when computers began to be used [1].

As a means of learning a personal computer opens up resources such as: the ability to make decisions by the student, the activation of the educational process, increasing interactivity and visibility in the study of new material, raising students' interest in the discipline and the ability to move from theoretical knowledge to practice. In order to use all possible resources of computer technology it is necessary to provide a computer to each student. In normal classroom learning, the most important thing is the perception, memorization of educational material orally, while the student does not necessarily have to be active and work in the classroom, thus the teacher is not able to organize and monitor the work of each student. The lesson is passive; with the organization of knowledge control in the work of the lesson includes only 20-30% of students. If the training is carried out in a computer class, it is possible to stimulate the activity and test the results individually for each student. In the classroom using the software is determined by the level of knowledge and in accordance with this selected theoretical material, questions, tasks, as well as tips and help. Many teachers push away the difficulties in the development of computer programs, as it is easier to give theoretical material in the usual oral form. Computer technology, of course, can motivate absolutely any subject. The use of programs allows students to motivate the development of new knowledge: there are encouraging phrases, replicas, in which the program as it evaluates the level of knowledge of students and motivates for further and better work. These expressions can be informal, thus creating a comfortable emotional atmosphere in the classroom. It is also possible to use elements of computer games and competitions in training individually and in groups, for example, comparison of results and points, light and sound when evaluating various results, counting defeats and wins [2, 3].

As in any other discipline, and in the subject of "physical culture" a large amount of theoretical material, but it is studied in most cases mainly in practical classes in the course

of studying those, so that the knowledge of students are at a minimum level. With the use of computer technology greatly facilitates the process of transfer and assimilation of new material on the subject, and the quality of the knowledge easily evaluated by means of computer theoretical testing. The use of various computer programs makes it possible to make the process of learning the subject "physical culture" interesting, high-quality and effective. One of these training programs is the program "LearningApps", which is an application to support learning and teaching through interactive modules.

## II. METHODS

Object of the research: the use of computer programs in education.

Subject of the research: the use of computer programs in physical education lessons in the development of theoretical knowledge.

Objective: to study the possibility of using a computer program "LearningApps" in the development of theoretical knowledge in physical education lessons on the program content of "Volleyball".

Research problem:

1. To study the state of the studied question on the basis of the literature data.

2. To create a quiz with the help of the program "LearningApps" to identify the level of theoretical knowledge of students in 8th grade on the program content of "Volleyball".

3. To develop and test a series of exercises in the program "LearningApps" to improve the level of theoretical knowledge of students in 8th grade on the program content of "Volleyball".

4. To identify the dynamics in the level of development of theoretical knowledge in students of 8th grade on the program content of "Volleyball".

To solve these problems, the following research methods were used: the method of analysis of literary sources, the method of studying documents, the method of computer testing, pedagogical experiment.

### A. *Basic theories of the use of computer programs in teaching*

Modern information and technological progress and the speed of the emergence of new tools of pedagogy suggest the improvement of the educational system through the introduction of computer technology. Before teachers the task of search of various approaches to the organization of educational process on physical culture is set.

The study of physical culture at the level of secondary (complete) education has the following objectives:

- development and improvement of physical qualities and capabilities of the body, health promotion;
- education of respect for their own health, the need for systematic physical education;

- mastering the system of knowledge about physical culture, the role and importance of sports and recreational activities in the formation of a healthy lifestyle;

- enriching the experience of physical exercises and various sports.

There are several areas of use of technology in education: the use of computer as a means and tool of learning, improving the process of teaching the subject, through which it becomes possible to develop the creative learner and the rapid process of control and correction of knowledge. With the help of computer technology, it becomes possible to master the most complex action, by its full awareness.

When creating and developing the technology of using a computer in physical education lessons should be guided by the following principle: use computers only in obtaining knowledge and skills that are difficult to form using the traditional form. The computer expands the possibilities in providing information using color, graphics, animation, sound.

In the field of information and communication technologies reveals the specifics of physical education lessons using a computer, as well as the structure of the teacher's actions in this lesson. At the lesson with the use of a computer for the teacher it becomes more important not how to tell the training material, but how to show it. Otherwise, the lesson planning is built, in which it is necessary to use a computer [4].

The basic school lays the foundations of specific motor action techniques, so the overall task is to master the basis of the technique of the studied motor action, which in turn begins with the creation of a General idea of the motor action [5]. This task can be implemented from several days to many months, depending on the complexity of the motor action. The use of the computer in the study of new material makes physical education lessons more meaningful and exciting. The teacher only coordinates, directs the learning process, and the computer describes and presents new material.

Computerization technologies can be used at any stage of training. At the stage of consolidation of knowledge, the computer performs a function that is expressed in individual knowledge accounting, and also contributes to the correction of the acquired skills in each case.

The rational frequency and duration of the use of computer technology in the learning process are determined by the age of students and the appropriateness of their use. It is advisable to use technology at the beginning of the study of each section of the program on physical culture to form a visual image of new motor actions and consolidate associative thinking. The effectiveness of computer technology also depends on the stage of the lesson [6].

The effectiveness of computerization of education in General depends on the ability of the subjects of the educational process to use the opportunities provided by means of information technology. They contribute to the formation of the creative personality of students; help to make the lesson more versatile, interesting and memorable.

The technological component of the processes of development of information – specialized computer software. It should have a set of functional capabilities, using which

the teacher will acquire a tool to find ways to improve the quality of its educational and training activities. Evaluation, discussion, expert evaluation, automation tools, optimization of communication between specialists – all this is the basis for the functioning of a permanent system of scientific and methodological support of pedagogical activity [7].

It should be noted that the process of introduction of computer technologies in modern educational environment is not effective enough. The key problems are: lack of specialized computer classes, lack of necessary software, low level of teachers' qualification in the field of information and communication technologies [8].

Programme LearningApps.org it was founded in Switzerland as part of a research project of the Center of the Pedagogical College of Informatics of education PH Bern with the support of the University of Mainz and the University of Zittau/gerlitz, as well as in close cooperation with a large number of teachers. The application involves the use of test images, audio and video materials in the classroom during training. The high quality of multimedia content is involved, the borrowing of video materials comes from the video hosting site YouTube, which provides users with services of storage, delivery and display of video. Audio and video can be published in learningapps.org after creating training modules for your own exercises.

Service LearningApps.org allows you to create interactive tasks for independent work of students, and there is a possibility of creating a virtual classroom. Let's list other attractive features of the program:

- Russian interface, knowledge of foreign languages is not required;
- quick creation of interactive unit;
- instant verification of the correctness of the created exercise;
- the ability of the teacher at any time to evaluate, adjust, publish the created tasks, and students to evaluate each other's work and communicate in the application;
- individualization of the learning process;
- increase motivation and cognitive activity through diversity and interactivity;
- ability to create a job in html-page;
- ability to share, store, share created interactive tasks;
- the application features more than 14 different interactive blocks, some of them in the form of a game;
- easy registration and authorization.

Working with the program LearningApps.org allows the teacher to assess the abilities and knowledge of students more fully. Exercises in the application can be created and used for any discipline, on various topics.

### *B. Organization of the study*

To solve the following problems of the study, we studied the working program Of V. I. Lyakh [9]. On the basis of the work program was studied thematic planning for the sport "Volleyball" in 8 classes. Students of the 8th grade should describe the technique of playing techniques and actions,

know the rules of the game of volleyball and be guided by them, characterize the technique and tactics of the relevant game motor actions, exercise self-control and mutual control in the performance of game actions and call the mistakes in technology. On the basis of the program of physical culture adopted in the school, it was found that the study of the program content of "Volleyball" begins with the 5th grade (5-6 grade – introduced elements of volleyball). From the 7th grade a more deep study of volleyball, including the study of theory begins.

Computer testing is developed in the form of a quiz, which is compiled using the program "LearningApps" to identify the level of theoretical knowledge on the program content of "Volleyball". The quiz included 20 questions with the choice of the correct answer (answers in the quiz ranged from 3 to 6). The quiz questions corresponded to the content of the theoretical section "Volleyball". Computer testing was conducted twice on the basis of the "Secondary school №9" in Vologda, which was attended by students of 8 "b" class consisting of 24 people. Initial testing was organized on September 17, 2018, in order to determine the level of theoretical knowledge before the introduction of the developed exercises of the program "LearningApps". Repeated testing was conducted on October 26, 2018 to check the level of theoretical knowledge after the introduction and testing of a series of exercises of this computer program.

The quiz questions corresponded to the content of the theoretical section "Volleyball". Let's list the directions of the quiz questions: the inventor of volleyball, in what year and the country appeared the sport of volleyball, the goal of the game, the rules of the game, the size of the volleyball court, the name of the line under the grid, which divides the field into 2 equal parts, the line marking volleyball court (lines of attack and side), where the serve in the game is, the concept of the ball "outside" the court, how you can play with the ball, the number of players on the court, an explanation of winning the party, the studied technical elements, violations in the game, errors when performing the transfer of the ball from above with two hands, errors in the performance of receiving the ball from the bottom with both hands, the correct location of the players' areas on the site, the characteristics of the technical element of the block, violation of the rules of the game in the implementation of the filing, who has the right to take the serve.

### III. RESULTS

At the beginning of the study, the test result was an average of 33.3%, i.e. 6.5 correct answers out of 20. This result allows us to note the low level of knowledge of theoretical knowledge of students on the program content of "Volleyball".

During the period of the pedagogical experiment, a series of exercises of the computer program "LearningApps" was tested. Used exercises application "Vote", "Chat", "Audio/video content", "Rate", as well as to test the knowledge created "Quiz with the right answer". Exercise "Voting" implies a choice of the correct answer at the same time the whole class by voting. In this form about 30 questions with the choice of one correct answer were presented to students. After answering the question, it is possible to summarize and discuss the correct answer to each

question separately. Students can submit questions in strict order, or in random order. Before the user, after he opened the exercise, an icon appears with the task, which the developer writes, in this case, the task: "Vote for the answer!". Once the user has agreed to start the exercise by clicking on the "OK" button, the questions themselves are opened, where you need to click on the button with the correct answer.

After the answers to all the questions appear the results of the vote, which was attended by the whole class. The results are summed up by the approximate ratio of colors. For example, when asked about the height of the net for women's volleyball, more than half of the students (60%) said that its height is 2.24 meters; about 25% believe that the height of the net is 1.24 meters; about 6% believe 3 meters and 9% - 4 meters. As a result of voting, it is possible to assess the knowledge of students in General. Students, answering the question, are not afraid to make a mistake and get a bad mark, answer the question as they see fit. Only the student will know about the error. Exercise "Voting" is quite an effective application block for training. The teacher is given the opportunity to evaluate at the same time the entire class in an unlimited number of people and immediately summarize. Students liked this exercise (interactive, practical, color and easy to use). Voting can be carried out in various forms, for example as a game between teams.

"Audio/video content" was used on theoretical lessons several times. In this exercise, we have the opportunity to view the video or listen to the audio, but while watching or listening to POPs up the insert with the task, which can be represented as a simple question, which could be solved verbally in conversation with a teacher, or any other existing exercises. During the lessons on physical culture was used showing of training videos on the program content "Volleyball". Before viewing, the task was also presented, and during viewing, various tasks appeared to check the mastered material.

In the program "LearningApps" you can coordinate videos and exercises in a single unit, in order to periodically distract students from long-term video viewing and control knowledge. Exercise is convenient because when watching training movies, you can easily go to any other exercise, the display can be carried out both on a common projector when jointly solving tasks, and on individual computers individually.

Exercise "Estimate" was presented in the form of a game. You can play as teams or individually against the computer. During the game, students are asked to answer questions; the decision must be recorded independently. With the correct answer, or with the closest result to the correct answer, 1 point is awarded, with the wrong answer 0 points. The issue can be presented in the form of pictures, assignments or videos. After pressing the "OK" you can choose to play with friends or alone. Total questions in the game can be no more than 30. At the end of the last question, the program automatically calculates the status of points and announces the winner. The exercise is selected to test knowledge in a playful way after watching the training video.

The "Chat" exercise was also applied. It was an auxiliary element in the selection of the correct answer by a group of students. In the "Chat" students can correspond, consult on

the choice of the answer, keeping silence in the classroom, especially when working in teams. Chat, in turn, is created only for a certain group of people and is stored for a long time, it is possible to return and continue working again already with organized teams.

These exercises were implemented in the physical education lessons of the theoretical unit and conducted in the computer class of the school.

When retesting, the average result of correct answers was 76.4% (15.3 correct answers out of 20), which is 43.1% higher than in the primary testing. The minimum result of the correct reports in the initial testing was 10%, and in the second one-55%. It should be noted that the students were satisfied with their results, increased not only the level of theoretical knowledge, but also the implementation of simple technical elements of volleyball, too, and was correct.

#### IV. DISCUSSION

Thus, we can conclude that the use of a computer program "LearningApps" gives tangible results in the development of theoretical knowledge in physical education lessons. When studying the theory in the conventional oral form, students lose interest, and when using an interactive form, each student is actively involved in the work. The teacher when using this program has the opportunity to control the work of each student and adjust his knowledge individually. Service LearningApps is really a tool that helps to form knowledge on the subject, to support the process of learning, to develop cognitive processes of students.

We list the recommendations on the use of the service "LearningApps" to create interactive exercises, their use and use in the educational process.

Teachers do not always need to create new exercises for each lesson, you can use the previously created blocks. Thus it is necessary to select carefully exercises depending on the studied subject, to be wary of the exercises created earlier as those in turn can contain mistakes. Exercises created by users are not checked for theoretical correctness by developers.

It is recommended to plan in advance in what form students will work in the application, for example, when organizing work on one computer in pairs, individually, teams. It is necessary to think over in what form it will be (a game form or it will be as a homework, for this purpose each pupil should be formed login and password).

For more organized teamwork, it is recommended to immediately create a virtual classroom (v-room), which will automatically create data to log on to the site of each student. Also in the v-room will be displayed those tasks that need to solve a particular class; there is no need for students to look for a job on the website of the program, where there are a lot of them. The teacher, in turn, will be comfortable to work with a large number of students and classes separately. In the virtual classroom there is an internal mail and chat site, with their help through the application LearningApps correspondence of the teacher with the student and between students.

Both the student and the teacher should take into account the fact that the LearningApps program works only through an Internet connection, so it is necessary to plan the work in

the application in advance. All users of the program need basic knowledge of the computer and the Internet, respectively.

When creating exercises, it is recommended to make tasks not only in the form of text, but also in the form of pictures, video materials, videos, in turn, are borrowed from the library of the YouTube video hosting site, without exiting the program via an external link.

It is recommended that in the preparation of complex tasks to create tips and guidelines for more details of the issue. Instructions can be added to each question individually and to the exercise as a whole.

Work in the application is "LearningApps" it is always interesting to students, particularly in the conduct of intellectual games between the teams, the teacher should use the internal capabilities of the site and create a chat for correspondence students with the aim of preserving silence in the class.

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