

# Digital tools in education: improving the project method

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**Keywords:** Education, Digital tools, Project, Information and communication technologies, Teamwork, Motivation, Project-based learning, Student, Teacher.

**Abstract.** The relevance of the studied problem is determined by the need to improve creative teamwork skills among students by the usage of information and communication technologies (ICT). The purpose of the study is to identify the level of future physical education and sports teachers' motivation for project activities using ICT. Research methods of studying and analysing pedagogical literature on the problem were used to reveal the level of a scientific problem development. A student survey "Assessment of future teachers' motivation level to use ICT in educational projects" developed by the authors made it possible to identify the level of students' motivation for project-based learning. The study presents a pilot educational project "Sport adventures", its content, methods and criteria of assessment. As a result of the study a special electronic course "Development and implementation of an educational project in physical education and sports" was developed and tested. The pilot pedagogical experiment demonstrates the superiority of experimental student group over control group in project skills. The survey reveals that future physical education and sports teachers have a high level of motivation and 84% of them are confident that the use of ICT helps to develop, organize and implement educational projects. The materials of this article can be used by researchers in the field of pedagogy.

## 1 Introduction

Modern education in the sphere of "Physical Culture and Sports" is aimed at the effective training of competent teachers, taking into account the requirements of the new educational standards. At the same time, the school urgently needs teachers who have both professional competencies and teamwork skills, analytical abilities, and the ability to use information and communication technologies (ICT) in teaching activities. The contradiction

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that arises between the need to use such effective pedagogical technologies as project technology in combination with ICT and the lack of research in the field of motivation diagnostics for project activities of future physical education and sports teachers - actualizes the related scientific problem - what diagnostic methods are the most effective way to reveal the motivation level of future physical education and sports teachers for project activities using ICT.

The purpose of the study is to identify the level of motivation for project activities using ICT of future teachers of physical education and sports. The goal determines the following research objectives: to investigate the level of a scientific problem development; to prepare a questionnaire to collect empirical data and conduct a survey of students; to analyse the received data; to organize a pilot quest project for students; to summarize the educational and practical activities of future teachers and draw conclusions.

## 2 Methods

Theoretical methods of study, generalization, analysis of pedagogical scientific literature and pedagogical experience were used in the study. A questionnaire survey of students of the Kazan Olympic Reserve School revealed the motivation level of future physical education and sports teachers to participate in the development of an educational project in the process of studying the optional electronic course “Development and implementation of an educational project in physical education and sports using ICT.”

## 3 Results and discussion

### 3.1 Literature review

Pedagogical science has been exploring the use of project technology in teaching for several decades and has accumulated a fairly large theoretical base and practical experience. Problems associated with project-based learning attract the attention of scientists and teachers even today. Antyukhov A V [1] and Turlo E M [2] analyse the problems and prospects of project-based learning in higher education. Dybkova L N [3], Kirichenko D V [4] research methods for assessing an educational project at a university and improving ways to monitor the readiness of master’s students for educational activities using projects. Vasiliev A A [5], Krotova E A [6], Prokofieva O N [7] consider project-based learning as a means of developing students’ cognitive and creative activity. Gubareva L I [8], Janice Yu A [9] and Petrukhina M Yu [10] believe that project-based learning in secondary vocational education is an effective way to organize the educational process in order to improve the professional competencies of secondary vocational students. Shagivaleeva G A [11] concludes that the technology of project-based learning helps to increase the efficiency of organizing independent work in secondary vocational education.

Polish scientists Przybysz-Zaremba M, Maciej Kołodziejski M [12] lay the practical foundations for the application of the project method in education. Spanish scientists Fuertes-Camacho M T, Graell-Martín M, Fuentes-Loss M, Carmen Balaguer-Fàbregas M [13] reflect on the possibilities of sustainable development of professional competence of future educators and primary school teachers using the project method.

Researchers view project-based learning as an effective means of developing students' cognitive skills to determine goals, to search information, to develop plans, summarize and draw correct conclusions [14].

In the pedagogical literature, the use of project-based learning is considered as a means of forming and developing motivation for educational activities, independence, and

research competence of students. We agree with the scientists that working on a project will help a student to use multidisciplinary knowledge, combine theoretical knowledge and practical skills [7], [10]. As project-based learning for future teachers should be professionally oriented, students will master their future profession with the help of pedagogical support from physical education school teachers.

### **3.2 Study of future teachers' motivation to use digital tools and the survey results**

At the first stage of the pedagogical research, it was necessary to reveal the level of motivation of future physical education and sports teachers to use ICT in the development and implementation of an educational project. For this purpose, the survey method was used. Since second-year students undergo internships in secondary educational institutions in the fourth semester, the survey was conducted in the third semester using a Google form, which allows to use different types of questions. The advantage of using Google Forms is that the tool is free and comes with many functions, such as collecting information, accessing feedback, and even the ability to test what you have learned. In addition, the interface is easy to use and allows online research without downloading, sending files to students with its own gallery of templates. Moreover, the Google form can be saved on Google Drive, and it is available for work not only on a computer, but also from various devices without losing functionality. For our research, it was important that tables and graphs were formatted automatically, which made it possible to analyse the data obtained conveniently.

To obtain empirical data 45 second-year students of Kazan Olympic Sport School took part in a survey. The developed questionnaire contained closed questions:

1. Do you know about the use of the project method in education?
2. Have you ever participated in the development of educational projects?
3. Do you think that the project method involves the creative, cognitive and professional development of future teachers?
4. Would you like to participate in the development of an educational project during teaching practice?
5. Will ICT help you in the development, organization and implementation of an educational project?
6. What kind of ICT can contribute to a successful learning project?  
d) Combination of all types.
7. Rate your theoretical knowledge of the development, organization, implementation and analysis of the results of an educational project on a five-point scale.

The survey results revealed the following data:

35% of respondents know the project method well (26% are familiar with the method to some extent; 39% are not familiar with project-based pedagogical technology);

48% of students took part in educational projects (52% have never taken part in educational projects);

51% of respondents believe that the project method contributes to the creative, cognitive and professional development of future teachers (37% believe that the project method does not contribute to solving all pedagogical problems and is aimed only at developing teamwork skills; 12% are not confident in the effectiveness of the project method )

72% of respondents would like to participate in the development of an educational project in the process of teaching practice (28% answered negatively)

84% of students answered positively to the question whether ICT would help them in the development, organization and implementation of an educational project, 16% gave a negative answer);

28% of future physical education and sports teachers noted that gaming ICT could contribute to a successful educational project (24% rely on demonstration ICT, 12% chose educational ICT, 36% believe that a combination of all types of ICT can contribute to a successful educational project);

43% of students rated their theoretical knowledge of the development, organization, implementation and analysis of the results of an educational project on a five-point scale as excellent (35% - good; 16% - satisfactory; 6% – by 2 points).

### **3.3 Students' participation in the pilot educational project "Sport adventures": e-course practical implementation**

Two students' groups were formed based on the results of the survey of future physical education and sports teachers. The experimental group (26 students) with students, who demonstrated a desire to explore the advantages of using project-based learning in school education, were given the opportunity to study the electronic course "Development and implementation of an educational project in physical education and sports using ICT" (Eight academic hours). The electronic course included four lectures-webinars and four practical classes. E-course topics included:

1. Development of the project pedagogical goal and educational objectives, principles and content development rules.

2. Development of criteria for assessing students' educational project activities.

3. Use of ICT in the process of development and implementation of an educational project in physical education and sports.

4. Monitoring the process, summing up, analysis of results and their presentation.

The control group students mastered project-based pedagogical technologies as an individual work. As an assignment, students were asked to develop a physical education and health quest for the fifth-grade students - "Sports Adventures" using ICT. During the development process, future physical education and sports teachers used such sites as Childrenart.ru, Nportal.ru, Lesson.rf, videouroki.net. The results of the work of creative groups were demonstrated using a tool - the TRELLO board (<https://trello.com/ru/guide/trello-101>). On the board (A) the teacher posted a project roadmap indicating intermediate results and evaluation criteria. On the information space of the board, the teacher monitored information coming from students. Columns (B) were the place where the teacher placed task cards, organized according to progression through each step of the process, as well as for storing information. Organizational tasks for students on the educational project are to register on Trello; stage-by-stage placement of all project materials on the information board; remote consultation with a teacher; implementation of the teacher's recommendations posted on the board. Some pedagogical tasks for students to develop, organize and conduct a quest were included.

To evaluate the educational and practical activities of future teachers, criteria were identified and a ten-point scale was established with a maximum number of points - 50.

1. Effective teamwork (10 points)

2. Professional physical education, sports and pedagogical competence (10 points)

3. Timely completion of tasks (10 points)

4. Friendly psychological atmosphere and positive emotional coloring (10 points)

5. High-quality presentation of results using ICT (10 points)

The final result of the participation of students in the control and experimental groups in the development of the educational project is presented in table 1.

The experimental group received a higher score for participation in the development of a project - a physical education and health quest for fifth-grade students, which indicates the effectiveness of using the project-based learning method using ICT in preparing future

physical education and sports teachers for practice, which determined the prospects for further research.

**Table 1.** Assessment of project activities of future teachers in physical education and sports.

№	Criteria for evaluation	Control group/score	Experimental group/score
1	Effective teamwork (10 points)	4	10
2	Professional physical culture and sports competence (10 points)	7	9
3	Completing assignments on time (10 points)	10	10
4	Friendly psychological atmosphere and positive emotional coloring (10 points)	9	10
5	High-quality presentation of results using ICT (10 points)	8	10
	Total	38	49

Summing up, firstly, it is necessary to determine the most popular areas of educational projects, establish the specifics, functional orientation, levels, form and type of projects for future physical education and sports teachers. Secondly, it is necessary to develop a diagnostic complex for monitoring and assessing student participation in project activities. Thirdly, it is important to justify effective methods and conditions for implementing an educational project, taking into account the specifics of the academic discipline and the use of digital technologies.

## 4 Conclusion

The research allows us to draw the following conclusions:

1. Project-based pedagogical technology effectively solves the problems of education. Despite the sustained scientific interest in this problem, many of its aspects, such as the use of ICT in the development of educational projects, have not been sufficiently studied yet and require further consideration.
2. Project-based learning in the educational process of a physical education school can be defined as the process and result of educational actions aimed at obtaining new competencies and increasing the educational motivation of students.
3. In the process of project-based learning, the formation of professional competence of teachers in physical education and sports is realized through the properties of this pedagogical technology and the use of information technologies.

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