

DEVELOPMENT OF YOUTH CREATIVE ABILITIES OF SCHOOLCHILDREN BY USE OF BYOD TECHNOLOGY

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***Abstract.** Modernization of the modern primary education system of Ukraine is aimed at developing creative abilities of primary school students. Development of the creative abilities is one of the components of soft skills of an individual, they affect the successful establishment in society. A creative person is able to generate new ideas, think original, make non-standard decisions, confidently achieve their goals. Creativity is an integrative multicomponent quality that covers various areas of students' activity. Due to the digitalization of the educational process, information and communication technologies are being rapidly implemented in primary school. Accordingly, the authors of the article analyzed the features of the use of innovative technology BYOD ("bring your own device") for the development of creative abilities of students, identified its positive aspects, outlined ways to use it by teachers. The purpose of the article is to reveal the educational potential of BYOD technology for the development of creative abilities of junior schoolchildren. An experimental study was conducted, the respondents of which were students of primary school in Vinnitsia region and determined the leading level of development of their creative abilities. The results of lessons observation in primary school on the use of innovative technologies for the formation of creative abilities of primary school students are analyzed. The results of the survey of primary school teachers on the use of innovative BYOD technology in the educational process are presented. It is proved that the use of smartphones in primary school*

lessons promotes the development of creative abilities of primary school children and their imagination, and change of the educational vector of primary school from reproductive learning to creative understanding of information and competent growth (formation of digital competence and organization of students' independent research).

Keywords: *creative abilities, educational process of primary school, innovative BYOD technology, junior schoolchildren.*

Introduction

Reforming the modern education system in Ukraine and its integration into the European educational space necessitate the improvement of the content of education through the application of innovative approaches to learning. Accordingly, there is need to form a creative personality of a child who is able to make original decisions, see the problem and find ways to solve it, create something new, build their own strategies for solving unusual situations. The today's public demand is a flexible, creative person who not only has a set of knowledge and skills, but also thinks critically and creatively. In view of this, the problem of modernization of the educational process aimed at developing each child's creative potential becomes relevant. Therefore, it is important to create favorable conditions for the maximum realization of creative abilities of primary school students. It is the New Ukrainian School that is entrusted with this important task, as the primary school should give every child a basis for creative development and preparation for life.

We believe that special attention should be paid to innovations that improve the organization of the educational process, one of which is the modern technology BYOD ("bring your own device"), which involves the use of high-tech devices in the educational process. Thanks to the use of BYOD as a tool for STEAM education, younger students will develop initiative, creativity, creative and cognitive activity, media literacy, critical thinking, interest in learning, the ability to pose problems and find solutions. Note that BYOD technology is an important means of forming a creative innovative personality.

The purpose of the article is to highlight the educational potential of BYOD technology for the development of creative abilities of primary school students.

During the research we used the following methods: theoretical (analysis, generalization of literature sources to determine the theoretical aspects of the outlined research problem) and empirical (pedagogical observation of primary school lessons on the use of innovative technologies for creative abilities of primary school students, questionnaires, teachers and students' testing).

Theoretical background

The modern system of primary education needs to reconsider the basic views on the organization of the educational process. The problem of transition from passive accumulation of knowledge by students to creative, motivated acquisition of information, during which the students, when seeking the truth, are able to show their imagination, intuition, curiosity.

There is a large number of domestic and foreign works, which consider: features of children's creative abilities through play (Moliako, 2006), methodological support (method of verbal development of literary works' images, verbal drawing) of creative activity of primary school students (Sharofutdinova, 2021); teacher's influence on the effectiveness of the development of creative abilities of primary school students (the need for productive cooperation between teachers and students, the use of problem-based learning, heuristics and research methods (Yusufaliyeva, 2021), stimulating creativity in children and adolescents in family and school environment by forming a serious attitude to work in students, transfer of knowledge that is a necessary basis for creative activity, organization of meetings with creative people, teaching children to make efforts and persevere (Wolska-Długosz, 2015), development of creative thinking skills of primary school students in solving problems with math ethics (Yayuk et al, 2020), determining the impact of the activity approach to learning on the development of creative abilities of primary school students (Nwoke, 2021), the development of creative abilities of students through self-knowledge lessons (Mynbayeva et al, 2018), features of the development of artistic abilities of preschool and primary school children in the digital educational environment (Emanova et al, Usynina, 2021), differences between creative learning and creative teaching (Jeffery & Craft, 2004).

Nowadays, due to the rapid development of computer technology, modern primary school students are able to use touchscreen mobile phones at school. Modern learning has become mobile, i.e. accessible regardless of the subject's location and the time when they learn new information. As a result, the function of the teacher has changed dramatically – the teacher is no longer a translator and the only source of knowledge – primary school teachers today must create conditions for students to acquire knowledge independently, organize research activities of younger students, interest them in finding information. It is known that the learning process organized this way contributes to a stronger assimilation of knowledge, increasing the level of positive motivation of younger students to the cognition process and development of their creative abilities. However, according to the experience and results of our observations, the vast majority of primary school teachers in Ukraine prohibit the use of phones in class due to students being distracted by games or correspondence with friends in messengers.

Currently, this issue is being updated in accordance with the requirements of the Concept of the "New Ukrainian School", according to which the educational vector of primary school is changing from the acquisition of knowledge to the formation of competencies; the central idea are those of child-centeredness and partnerships with participants of the educational process (children and their parents); organization of students' independent research activities; development of creative thinking, the pervasiveness of the education process, the result of which is formation of a person capable of self-education, self-realization, self-determination, self-awareness in the realities of modern life; formation of qualities necessary for creative activity (Vyshkivska & Shykyrynska, 2019).

In this context, the use of BYOD technology in the educational process of primary school becomes relevant. The term BYOD stands for "bring your own device". This technology was launched in the field of IT in 2009. Intel's executives, noticing the trend among employees to bring their own laptops, tablets and smartphones to the workplace for corporate use, allowed them to use their own devices for professional tasks. Over time, this approach was transferred to the field of education. BYOD was first mentioned in 2005 university work of Raphael Ballagas (Ballagas et al, 2005). In our opinion, the use of BYOD technology in the educational process of primary school in order to develop the creative abilities of younger students can be quite effective. It is worth noting that the European schools (SCHOLA EUROPEA) in September 2021 launched the project "Bring your own device" (BYOD) for all students in grades 4-7. The main goal of the project "Bring your own device", as stated on the website of European schools, is to develop digital skills and competencies to become effective, active, critical, creative and responsible students and users of digital technologies.

Methodology, organization and results of the research

In the course of this study we used the following methods: theoretical: analysis of scientific sources to determine the state of research on the development of creative abilities of primary school students in the world, synthesis, systematization and generalization of theoretical principles of the problem; empirical: pedagogical observation of children's and teachers' class and extracurricular activities, conversations with third-graders about the reasons for their use of smartphones during breaks, conversations with primary school teachers about children's use of devices in class, questioning educators and testing third-graders to find out the level of their speed, flexibility and originality of creative thinking.

In general, we were monitoring the educational process in six third-grader groups of the primary school in Vinnytsia for three months (March-May 2021). We

monitored children's activities during lessons, breaks and extracurricular activities. As a result of the observation, it was noticed that teachers offer children to put their phones / smartphones / tablets in a special box, saying that the phone should rest. The teachers also put their own phones in such a box, thus encouraging the children. During breaks, children actively used telephones, mainly for games or correspondence, a small number of children were engaged in active recreation.

We used a modified Guilford test to determine the degree of development of creative abilities of third grade students. A total of 168 third-graders took part in the study. Students were given the following task: to list as many unusual ways to use the subject. Before the test, we offered children an example: "The newspaper is used for reading. You can come up with other ways to use it. What can be done with it? How else can it be used?" The instruction is read orally. Subtest execution time – 3 minutes. Testing was conducted in groups; the children wrote down the answers on their own. The time tracking started after reading the instructions.

The results of the test were evaluated in points by three indicators.

1) **Speed** (speed of ideas reproduction) – the total number of responses. 1 point is given for each answer, all points are summed up. $B = n \cdot B$ is the speed, n is the number of appropriate answers. In the evaluation process, we paid special attention to the term "appropriate answers". They rejected the answers mentioned in the instructions – obvious ways to use newspapers: read the newspaper, find out the news and so on. According to the test results, this indicator was equal to: 2-3 points for 72 students, 4-6 – for 46 students and 7-9 – for only 28 respondents. 22 students had one or fewer relevant answers.

2) **Flexibility** – the number of classes (categories) of responses. All the answers can be divided into different categories. For example, answers such as "you can make a hat, a ship, a toy out of a newspaper", etc. fall into one category – the creation of products and toys. There were 3 points for each category.

The flexibility index was calculated by the following formula $G = 3m$, where G is the flexibility index, m is the number of categories used.

The test showed the following results in regards to the flexibility indicator: $G = 3$ – 67 students, $G = 6-9$ – 56 students, $G = 12-16$ – 45 students.

3) **Originality** – the number of unusual, original answers. The answer is considered original if it occurs once in a sample of 20-30 people. One original answer – 5 points. All scores for the original answers were summed up. The index of originality was calculated by the formula $Or_1 = 5k$, where Or_1 is the indicator of originality, k is the number of original answers. The results of the test showed the original answers of only 27 students. As you can see, the highest is the rate of speed (i.e. the ability of students who participated in the survey to generate ideas is quite high), and the lowest – the rate of originality. Therefore, based on the results of this

test, we can advise teachers to create appropriate conditions for children to show originality of thinking.

In order to find out the level of primary school teachers' awareness of BYOD technology, we developed a questionnaire and conducted a survey of teachers (November 2021). The survey was conducted remotely (the questionnaire was developed in the Google Forms application). A total of 64 Ukrainian primary school teachers from different towns and villages took part in the survey. The range of pedagogical experience of teachers who participated in the survey ranges from 1 to 14 years.

According to the answers received for the first question of the of the questionnaire (Fig. 1) it can be seen that more than half of the surveyed teachers (56.7%) are unfamiliar with BYOD technology and want to learn about its implementation, and only one teacher uses it in their work. However, the positive thing is that 25.4% of teachers are familiar with this technology from the scientific literature / methodological seminars / colleagues, etc., from which we can conclude that there is dissemination of information about BYOD technology in pedagogical circles. Visually, the results of teachers' answers to this question can be seen in Fig. 1.

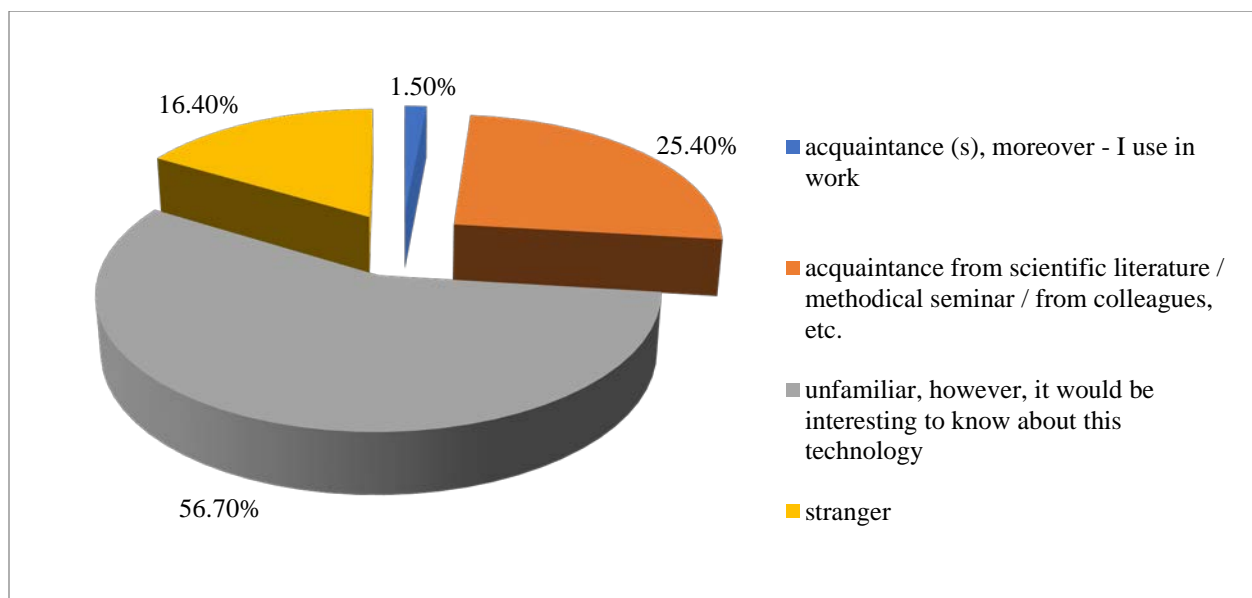


Figure 1 Answers of primary school teachers to the question about their acquaintance with BYOD technology (created by the authors)

Among the reasons why BYOD technology has not yet become widespread (Fig. 2), teachers could choose one or more answers. The following reasons were the most popular: providing all students with their own devices with Internet connection

(63 people), distracting students by games or correspondence with friends in messengers during the lesson (65 people) and negative impact on child’s vision (41 people). Other options we offered (the need to frequently charge the device, the complexity of the educational process, reduced communication with the teacher, fascination with individual forms of work as opposed to collective ones, viewing the prohibited content by the students) were considered by teachers as less important.

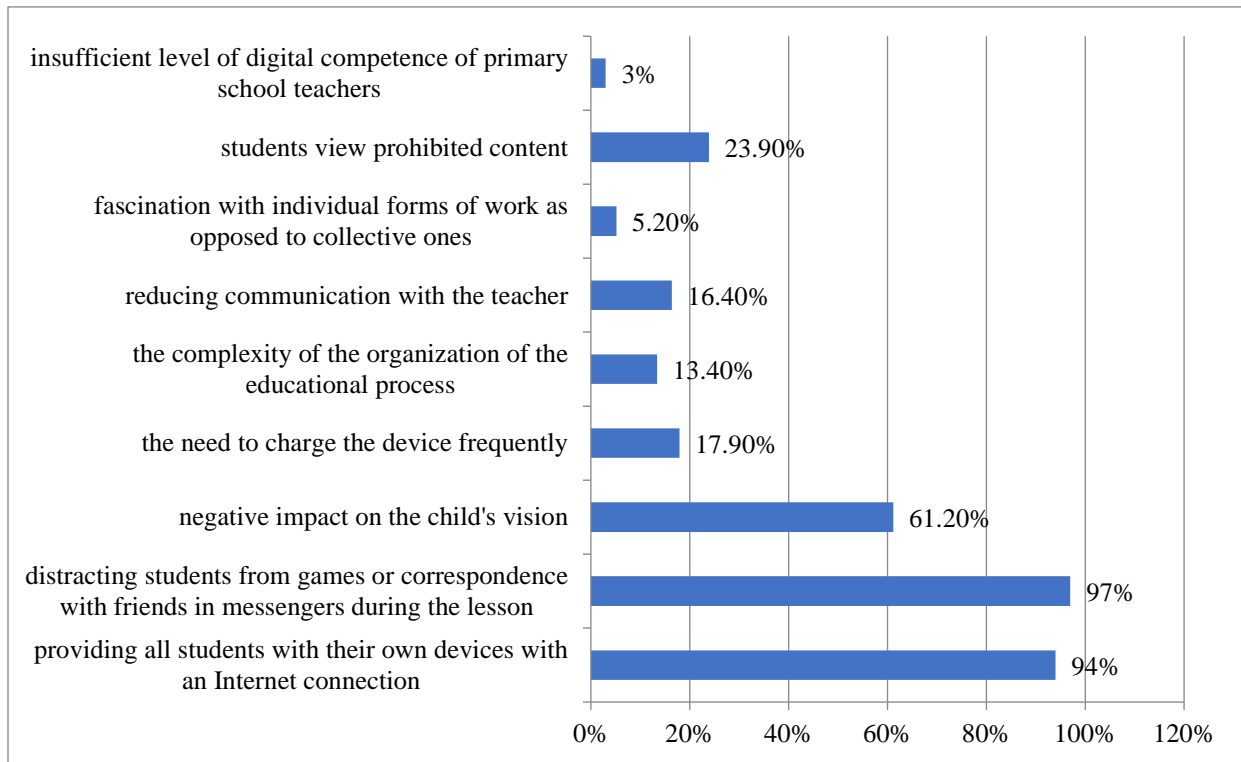


Figure 2 Answers of the teachers to the question about the reasons for insufficient use of BYOD technology in primary school (created by the authors)

The distribution of teachers’ answers to the third question (“How will the use of BYOD technology contribute to the most effective development of creative abilities of primary school students?”) is presented in Fig. 3. Teachers who participated in the survey consider a wide range of applications of this technology (for independent work, as a tool for the QR-codes transition, for working with interactive manuals, for web-quests, to search for visual information), however, most of the teachers see the widespread use of this technology for development of creative abilities in organization of the work of younger students in small groups (42 people chose this option).

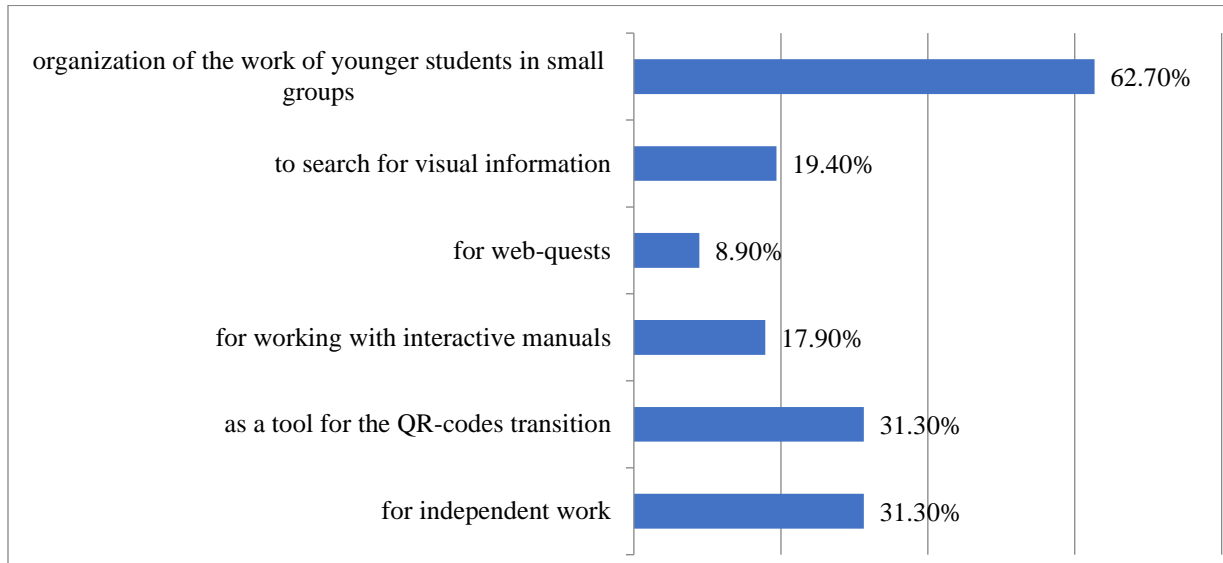


Figure 3 Teachers' answers to the third question (created by the authors)

Summing up the results of the survey, we can say that BYOD technology has not yet become widespread among primary school teachers for the development of creative abilities of primary school children, but many of them are interested in learning more about this technology. We see the teachers' fears about the use of this technology (in the form of negative aspects of the impact – the answer to the second question), so we consider it appropriate to indicate how they can be solved. The problem of harmful effects on vision can be solved by limiting the work with the device to 10-15 minutes per lesson. The problem of distracting children by games or correspondence with friends can be solved by raising the teacher's level of professionalism, trying to be modern, which will make students more interested in learning. Lack of a device can be solved by organizing work in pairs or small groups, designing the task in a way where each student can join a joint project – each student has their own task related to the tasks of the others aimed at achieving a common result. Another option could be implementation of a program of school cooperation with gadgets manufacturers, or involvement of government agencies and private organizations that provide grants for educational programs. The problem of students viewing banned content can be successfully solved by the “Parental Control” functionality. The need to charge the device often will be solved by access to the sockets for each student, and the Internet connection speed – by providing Wi-Fi channels at the required speed.

Here are some examples of tasks for the development of creative abilities of junior high school students using BYOD technology:

Task 1. Compose a riddle with any suggested word (mosquito, beet, iris, mower, screen) and send to a friend, parents, brother or sister, using the social network Viber. Find out how many people gave the correct answer. Present the results in class.

Task 2. Imagine that you are going to your grandmother today, and your mother really wants to know what you did today at school in a Ukrainian language lesson. Record a short video message for her.

Task 3. Call a classmate who was not at school today and arrange a meeting to tell all the news that happened in the classroom and homework.

Task 4. Using the timer on the phone, play the game "Who is faster?" Compete with classmates on the speed of reading the text.

Conclusions

The generalization of the scientific literature and the results of our own empirical research allows us to draw the following conclusions.

BYOD technology in modern conditions of powerful development of computer technologies is not only necessary (increase of cognitive interest of junior schoolchildren, development of critical thinking and digital competence of junior schoolchildren, use of electronic textbooks and manuals where students move to various online learning services, 3D models, educational videos, interactive exercises with the help of QR-codes, which is impossible without the presence of personal touchscreen devices), but also possible in the development of creative abilities of younger students.

Today, in the age of mobile Internet, when the student can find or check any information provided by the teacher, it is almost impossible to interest children without the use of innovative approaches and computer technologies. The task of the modern teacher is to build each lesson in a way where all students have a lasting interest, learning activity and desire to create, formulate and test hypotheses. The use of BYOD technology allows to effectively develop the creative abilities of each child in the classroom by individualizing the educational process: by giving the student a task, the teacher can observe how actively the child works on its solution, which Internet sources are used, how developed the indicators of his creative thinking are – speed, flexibility, originality.

Teaching the future primary school teachers the features of this technology by introducing compulsory or elective subjects in the curriculum should be the strategic goal of higher education institutions. Information on the use of this technology is

also needed by teachers who currently work in primary school (according to the results of our questionnaire).

References

- Emanova, S., Ryleeva, A., Khomutnikova, E., Komarova, N., & Usynina, N. (2021). Development of artistic abilities of preschool and primary school age children in the digital educational environment of additional education. *SHS Web of Conferences*. 106, 1–7. DOI: <https://doi.org/10.1051/shsconf/202110603007>
- Jeffery, B., & Craft, A. (2004). Teaching creatively and teaching for creativity: distinctions and relationships. *Educational Studies*, 1, 77–87. DOI: <https://doi.org/10.1080/0305569032000159750>
- Moliako, V.O. (2006). *Zdibnosti, tvorchist, obdarovanist: teoriia, metodyka, rezultaty doslidzhen* Zhytomyr: Ruta.
- Mynbayeva, A., Galimova, N., & Akshalova, B. (2018). Development of creative abilities in schoolchildren through self-cognition lessons. *The European Journal of Social and Behavioural Sciences*. 1, 28–43.
- Nwoke, B.L. (2021). Enhancing primary school pupils' mathematics creative ability through activity based learning approach. *Malikussaleh Journal of Mathematics Learning (MJML)*. 2, 70–76.
- Ballagas, R., Rohs, M., Sheridan, J.G., & Borchers, J. (2005). BYOD: Bring Your Own Device. In *Proceedings of the Workshop on Ubiquitous Display Environments, Ubicomp*,
- Sharofutdinova, R.Sh. (2021). Methodical support of development of creative activity of primary school students. *TECH-FEST-21 International Multidisciplinary Conference Hosted from Boston, USA. October 1*, 74–76.
- Wolska-Długosz, M. (2015). Stimulating the development of creativity and passion in children and teenagers in family and school environment - inhibitors and opportunities to overcome them. *Procedia – Social and Behavioral Sciences*. 174, 2905–2911.
- Yayuk, E., Purwanto, As'ari, A.R., & Subanji (2020). Primary School Students' Creative Thinking Skills in Mathematics Problem Solving. *European Journal of Educational Research*, 3, 1281–1295. DOI: [10.12973/eu-jer.9.3.1281](https://doi.org/10.12973/eu-jer.9.3.1281)
- Yusufaliyeva, G.A. (2021). The role of the teacher in the development of creative abilities of primary school students. *Innovative technologica*. 5, 54–59.
- Vyshkivska V., & Shykyrynska O. (2019). Orhanizatsiia protsesu navchannia v novii ukrainskii shkoli: teoretyko-praktychnyi aspekt. *Molod i rynek*. 11 (178), 115–119.