INTERACTIVE METHODS IN INFORMATION TECHNOLOGY AND COMPUTER MODELING TRAINING

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Abstract: 21st century children grow up in an environment full of different technology, they are used to getting the information they need, with the help of information and communication technologies, their "normal" daily life includes the obligatory participation of some kind of multimedia device or even a few.

When these same children become students, they have certain expectations that this situation will continue in the school institution. They expect that their training will be filled with all kinds of technologies to upgrade, supplement and modernize it.

In order to meet these expectations, primary school teachers are forced to constantly improve their professional qualifications, to improve the level of their knowledge, skills and competencies. However, this requires serious additional work on their part, as well as some material security, which in some cases may not be available.

The application of interactive methods is one of the solutions that teachers can apply when they want to enrich and upgrade the learning process, as well as increase the motivation of students to participate in it. In the literature can be found descriptions and information about a large number of different types of interactive methods that do not require much prior training on the part of the teacher, as well as additional material security, but this does not mean that a large percentage of educators apply them.

It is this fact that provoked us to conduct a study of the actual implementation of interactive methods, specifically in the training of Information Technology and Computer Modeling. Our aim was to study not only the use of this type of methods by teachers, but also their opinion on the positive and negative effects of their use, the need for innovative methods, their selected software solutions and methodologies, and the availability of the necessary condition for their introduction into the learning process. We were also interested in the level of education, which according to the teachers is the most suitable for the use of interactive methods.

Keywords: interactive methods, computer modeling training, information technology training

The radical changes provoked by the growing application of information and communication technologies in our time, which, as Vlaicu & Neacsa (2018) point out, occur not only in science, technology, and culture but also in the human brain, necessitate a change in the educational environment, continuous updating and modernization of the qualification of pedagogical specialists. "In prosperous schools, learning goes beyond them and through information and communication technologies reaches the village, home, workplace, even transport, using the learner" (Bogdanov & Simov, 2018, p. 131).

The theoretical research we conducted shows that "the interactive learning system based on new information technologies contributes to the renewal of the learning process and the solution of fundamental educational problems" (Gyurova, Bozhilova, Valkanova & Dermendzhieva, 2006, p. 109).

Although the interactive method originated from 1990 (Bakhreddinovna, 2020), it continues to gain popularity to this day. As Korovina, Pushkina & Krivoshlykova (2019) share, interactive methods are proving to be one of the most effective tools for modern teachers. According to Bulvinska & Khanykina (2019), they are even indispensable in the process. "The most promising and most efficient training forms and methods are interactive forms of educational process organization, technologies and teaching methods at practical classes which can be successfully used in order to form and develop the communicative competence" (Symonenko, Zaitseva, Osadchyi & Vynogradova, 2020, p. 2).

These methods are based not only on the simultaneous acquisition of knowledge, the formation of skills, and the building of attitudes by placing participants in situations (Ivanova, 2018), but also "they belong to the group of so-called complex, conceptual methods that set the main framework in which the teacher and the students interact in achieving a certain educational goal" (Kovachka, 2018, p. 62). At the heart of these methods is the idea that students should be motivated to look for the information they need on their own (something that modern children have no problem with), as well as to participate in various communicative situations (Korovina, Pushkina & Krivoshlykova, 2019).

From everything described so far we can hypothesize that interactive methods would find extremely wide applications in the classes of Information Technology and Computer Modeling, due to the large number of software

solutions that could support this process. Whether this is the case, we decided to check with the current survey, conducted online with the participation of 22 Information Technology and Computer Modeling teachers, mostly from Blagoevgrad, Republic of Bulgaria. In addition to the main goal of examining whether educators apply interactive methods in specific subjects, we wanted to check which of them they considered most appropriate. The first questions aimed at a statistical survey of the participants, particularly: the type of institutions where they teach (meinly secondary schools) the quelification they have (meinly graduates of Educational Quelification

teach (mainly secondary schools), the qualification they have (mainly graduates of Educational Qualification Master's degree, Informatics and Information Technology), and their professional experience (the highest percentage of workers in the field between 21 and 30 years - Figure N_{2} 1).



The next question focuses on teachers' preferences for the type of training - traditional, interactive, or a combination of both (Figure $\mathbb{N} 2$). The obtained results clearly indicate the choice of the respondents to combine traditional training with the interactive one. Once we were convinced that the participants in our study applied interactive methods in their classes, we were interested in which type of methods they would prefer - Situational, Discussion, or Experimental methods (Figure $\mathbb{N} 3$). The results we received for the first two types are identical - 86.36% and indicate that they apply both options, while only 63.64% rely on experimentation in the learning process. We hope that this situation will change soon, considering the experimental methods that have already proven to be extremely developing students.



As Bakhreddinovna writes, "the interactive teaching methods contain a lot of effective activities and approaches which are directed to fast the teaching process and get success" (Bakhreddinovna, 2020, p. 77).

The interpretation of interactive methods can also be formulated as "methods of interaction of participants among themselves" (Mamedova & Grib, 2020, p. 1014). In the scientific literature concerning the subject, there are many different characteristics, as well as the pros and cons of these methods. The next three questions aimed to examine the respondents' opinions on these three categories. Figure \mathbb{N} 4 shows the answers to the question "What are the most characteristic features of these types of methods?". Here, the Cognitive and Developing characteristics collect the largest number of choices - 100%, followed by Motivating with 21 answers.



Figure № 4

The next question devotes to the positive aspects that teachers see in these methods (Table N_{2} 1). Here, the answers Activating the cognitive activity of students, Increasing the interest and motivation of students and Students' self-confidence develops, show what is most important for teachers, namely the activity, interest, motivation, and self-confidence of their students. Perhaps because these are the most important problems faced by modern pedagogical specialists in their daily lives - the lack of interest of children in the learning process. This is probably one of the main reasons why they are looking for new and different teaching methods.

Table No 1

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What are the most characteristic positive effects of the application of interactive methods in Information Technology / Computer Modeling classes?	
Activating the cognitive activity of students	19
Increasing the interest and motivation of students	18
Students' self-confidence develops	17
The skills for working in a team of students are developed	14
Cognitive development and critical self-knowledge are stimulated	13
Life skills improve	11
The process of enriching the available information with new one is supported	10
The level of feedback received increases	9
Students are responsible for the results obtained	9
The autonomy of students increases	8

When asked about the negative aspects of interactive methods, the respondents mainly pointed out problems with the lack of good technical provision and material base necessary for the full application of these methods. Only two of them point out as the most serious problem the need for additional time for the preparation and implementation of various methods. Probably some of these difficulties are due to the need to reconcile them with state educational requirements.



Figure \mathbb{N} 5 shows the teachers' answers about the most appropriate level/stage of education they would recommend. Of interest is the fact that to our surprise here elementary education (22.73%) gives way to primary education (36.36%). Before this study, we assumed that the application of interactive methods will prevail in elementary education, due to the appropriate age of students, as well as their great desire to explore the world and its secrets, to obtain the necessary information, conducting their research.



Another crucial question that concerns us was the availability of appropriate working conditions in an interactive environment provided by the institutions. We are pleased to summarize that the majority of respondents (54.55%) are categorical about their security in the institution, followed by those who indicated a partial answer - 40.91%. The only exception is 4.55%, who say that they do not have the necessary conditions to apply interactive methods in the education of their students.

Figure № 7



Figure N_{2} 7 shows the results indicated by the respondents on where their focus falls when applying these types of methods. The largest number of respondents indicate that they actively encourage students to participate in the training, use questions that stimulate answers, discussions, and practical experience. Our opinion is reaffirmed that interactive methods are most often used by teachers in order to motivate and activate children.

When asked which software solutions they use to ensure interactivity in information technology and computer modeling classes, teachers point to a wide variety of options. Among them are: virtual classrooms, software for working with an interactive whiteboard, software for creating video tutorials, educational sites, shared environment, Letterpop, Plezzi, Powtoon, MS Office, G Suite - Classroom, Meet, Google Drive, Zoom, LibreOffice, Paint, Icecreamapps, Moodle, Educational Games, Office365, Envision, Code org and more.

When asked whether the application of interactive methods is necessary specifically in the training of Information Technology and Computer Modeling, the respondents answered "Definitely yes" - 19 people, "Partially" - 3, and no teacher answered in the negative.

With the last question in the survey, we want to check which interactive methods are most suitable for application in the two subjects we chose, according to the participants in the study. Discussion of a real problem, Game and Project method (Figure $N \otimes 8$) turned out to be the most preferred. This does not surprise us, because these methods are one of the most commonly used in other subjects. And the game, in particular, can take on a very different look in computer science classes.



In conclusion, we can summarize that the hypothesis raised by us is strongly confirmed and interactive methods are widely used in classes in Information Technology and Computer Modeling. The majority of respondents freely point out the high number of advantages of these methods, as well as their wide range of applications. The wealth of

software solutions, many of which are completely free and easily accessible with the availability of Internet connectivity, helps teachers to increase the interest, motivation and activity of their students in the learning process.

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