

айтарлықтай кеңейтеді. Оқытудағы барлық негізгі ақпараттық технологияларды үш санатқа бөлуге болады:

- интерактивті (аудиовизуалды тасығыштар),
- компьютерлік оқыту (мультимедиа құралдарын қоса алғанда),
- телекоммуникация құралдары (видеоконференциялар, форумдар).

Мультимедиялық жүйенің түрлі әдістерін шебер қолдану тыңдаушылардың назарын үнемі қолдауға, сондай-ақ аса маңызды және маңызды сәттерді бөлуге мүмкіндік береді. АКТ-ны сабақта қолдану тұрғысынан бұл сабақтарды бес топқа бөлу орынды. Сабақтың қандай да бір топқа қатыстылығы техникалық шарттарды және оны өткізу үшін тиісті бағдарламалық қамтамасыз етудің болуын қамтиды. Бүгінгі таңдағы ақпараттық қоғам аймағындағы оқушылардың ойлау қабілетін қалыптастыратын және компьютерлік оқыту ісін дамытатын жалпы заңдылықтардан тарайтын педагогикалық технологиялардың тиімділігі өте жоғары деп айта аламыз.

Сөз соңында айта кетейін бұл бағдарламаларды осы саланы терең білгендіктен емес, осы бағдарлама арқылы өз әріптестеріммен тәжірибе алмасып, сол арқылы өзіме де, өзгелерге де пайдасы тиетін құнды бағдарламамен бөлісу.

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THE USAGE OF INTERACTIVE DIGITAL RESOURCES TO IMPROVE MATH-TEACHING PROCESS OF THE STUDENTS

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Many researchers were investigating the factors that has an effect on the quality of education. In general, they come up with the conclusion that methodology takes the first place among other factors.

Teaching technique plays an important role in student's achievements. In most cases, it is difficult for students to understand the concepts from the first time. Mathematics itself is one of the difficult studies in which the majority of students struggle with even simple concepts. Today, we have so many opportunities to improve learning skills. For this purpose, teachers are using digital resources that include illustrations, videos, and different platforms with learning materials. The main task of teachers is to find the effective way of teaching in which they make it possible to understand the concepts.

Interactive digital resources are divided into 2 groups. One that is available through website and contains video-content, practical exercises, illustrations. For example, Khan Academy that will be discussed later. The second group is what we call "Math Apps" that can be installed to the mobile phones. For example, "Algebra touch", "Desmos" and GeoGebra. Such kind of apps facilitate the work of both students and teachers. From these resources, the video-lessons play a key role. The importance of them can be explained by illustrating the case. For example, student could not understand the topic. However, when teacher makes it compulsory to watch certain video providing the link then he or she can pause the video at any place to make sure whether it was understandable or not. In the classroom teacher is the main person and whole class is on the same wave with him. However, not everyone is following him. There could be many students who do not understand what is going on. Nowadays, there are many different video materials on the net. One of them and one of the most popular website is "Khan Academy" that provides many learning materials for free.

It is important to note the wide opportunities of the Khan Academy. It provides us with video materials that explain the concepts of each topic step by step. After watching the video students should do some practice exercises. After completing one problem they will be provided with another new problem (Light 2014). Thus, they are not watching, but also involved in the problem solving. Thus shows us that students gain a skill to apply a knowledge taken from the video to the problem solving. The advantage of math problems rely on their dynamicity. For example, two students cannot have the same task at the same time. The students take the feedback automatically and their answers will be pointed out based on the correctness. Moreover, these task are just like a game. For example, if the student answers correctly to the five problems of the same row, then it will be considered that the first level is achieved. Even if he incorrectly solves only the last question the learner will not pass the level (Light 2014). Thus, it will arouse passion of the students and they will to so their best. Furthermore, another key point of this platform it that in each exercise the students can get s hint to help them. It is very important because if they only provide a right answer learners will block their minds to think, and at least to try to answer. According to (Light 2014) it is efficient that Khan Academy do not just provide with answers but gives step-by-step hints that helps the students to understand in which part of the way they did a mistake. Also, in mathematics topics are related to each other and sometimes you need to revise previous material. In Khan Academy, it is already provided with needed links to a video material related to the current topic you are learning (Light 2014).

The "Bilimland" is the platform that is analogous to Khan Academy. Currently it is widely used by teachers and students and becoming the effective learning device. This platform overcomes the main problem that is based on the lack of Kazakh version of many resources. There we also have video materials that are followed by practice exercises. By earning points to the right answers the students will see their level and further work on it. It is a new platform that needs improvements and a lot of efforts to reach the level of Khan Academy. In the future I am planning to create video contents for this platform.

According to the (Cuncka 2012) interactive digital resources create an active learning environment. Digitalization provides alive teaching process. One fact that should be considered is that they lead students to the independent study. As I mentioned before, many students lag behind the teacher and do not understand the concept. However, this problem is overcome if we use digital resources. Student is not limited in time and speed. People perceive information differently: one can

easily understand the topic once, but others need some time to digest the information. That is why the new method involving digitalization improves the learning process. Furthermore, such method helps to develop critical thinking, creativeness, evaluation and practical skills (Cunška 2012). By solving problems and evaluating their own progress students will be able to work effectively next time. It must be highlighted that by evolving students, motivating them to study and earning points leads to the formation of competition conditions. According to the researches, it is a key part to arouse the interest of students.

Another important task that faces to teachers is the ability to provide with the elementary understanding of complex topics, progress of knowledge, and dynamic self-development (Cunška 2012). In most cases, the video material are full of illustrations and it helps students to understand what comes from. They always use pictures and demonstrations in the video. Thus, the learning process will be more visual, attractive and colorful (Cunška 2012). Furthermore, I have mentioned about the math apps. Let's consider the GeoGebra. This digital resource have many perspectives. One of them is that learners can change parameters of the graph for example, and see how it changes (Cunška 2012). Thus, they will be visualize how the functions depend from one another and how the changes can differ the graph. Interactive digital resources provide useful tool for teachers. They can monitor the progress of student: how they are doing and oversee the whole class (Cunška 2012). They can check how many attempts and hints each student had used. Also, teacher can monitor how many times the student has spent on each exercise (Light 2014). In the following way, it will be possible to see the individual and class progress.

Nowadays, there are many digital resources and teachers should able to combine traditional teaching method with the new method and construct to course material. For this purpose they should master the ability of "Professional Noticing" (Fernández 2012). The teacher should be able to see how the students are handling with problems. For example, each student solves the problem by his own strategy but in general they do the same common mistakes. The task of teacher is to analyze what kind of mistakes the students can make and try to improve it. According to (Fernández 2012) there is given one example. There might be such mistakes that are common to the majority of class. For example, students were mistaken by choosing and additive thinking instead of multiplicative, and otherwise. This shows that teacher needs to find such misunderstandings and try to solve it (Fernández 2012). If the majority of students are concerning about the same mistake then it means that the teacher should explain the topic in a different way. Research shows that illustrations helps to explain the concept in a simple way.

After analyzing the methods of using interactive digital resources, I was interested much and I have conducted an experiment with one of my classes of 8th grade. During one month I was testing students' knowledge by providing different kinds of examinations. As mentioned above I was investigated how students solve certain problems via considering their strategy. During teaching the course materials all the mentioned aspects were taken into account. In the next month I have incorporated the use of interactive digital resources to the learning objectives. We used Khan Academy, Desmos, and Bilimland. Thus, I was able to test the effectiveness of the new method and check whether it helps to improve the students' achievements in mathematics class. In this class there were 22 students. The progress of each student was analyzed individually. According to the results we got the general picture that is shown in Table 1. Overall, in the first month the involvement of students in the classroom activities was low resulting 56% of the whole class. One of the possible and the most convenient reasons for such case may be the misunderstanding of the concepts. My working experience shows that the lack of knowledge of students forces them back from interacting to the class discussions and activities. However, when we started to use digital resources, starting from the mid of the second month the growth was observed. Comparing to the previous month the involvement increased to the 16%. For this short time it is considered as high growth. Moreover, I have observed that due to the use of digital resources the number of students who is properly doing homework assignments have

increased much resulting in 87%. This proves the effectiveness of the new method that evoked the interests of students in math and helped to provide the concepts.

Evaluate	First month results (without digital resources)	Second month results (with digital resources)
Classroom activity	56%	72%
Homework assignments	65%	87%
Motivation	62%	72%
Examination	68%	79%

Table1. The results of experiment

Furthermore, comparing motivation level during two months I have also seen the increase. If it was about 62% then after the new method have been integrated this number was equal to 72% (Table1). Finally, digital resources showed positive impact of their usage on the achievements in the exam. The percentage has increased from 68% to 79%. I have also observed some positive impacts of the use of digital resources. Previously, the two students out of 22 were not paying an attention to the class. However, after we shifted to the combined method they were all engaged. Thus, it illustrates that digital resources increase the interest of he students.

In conclusion, we have seen that the first important thing of the teaching process is to evoke students' interest and motivate them. The use of interactive digital resources help to deal with this task. This method forms alive environment for the learning, increases intellectual activity of students, improve the effectiveness of the study and makes it interesting to learn mathematics. We saw that digital resources facilitate the student-teacher co-operation. I have mentioned the wide range of opportunities that can be provided by the new method. Thus, I think that if the teacher picks up the right combination of both traditional and digital lessons then the method will be effective for the teaching.

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METHODOLOGICAL EXCEPTIONS OF THE USE OF COMBINATORAL ELEMENTS FOR PROBABILITY CALCULATION

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