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MEDIA TECHNOLOGIES IN INFORMATICS CLASSES IN GENERAL EDUCATION SCHOOLS

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Abstract
This article discusses the use of media technologies in informatics classes in general education schools. The article also analyzes ideas about interactive table, media technologies and visual education. Conclusions are given about the advantages of using interactive table in 5th grade of schools, as well as about the existing disadvantages, aspects that are important to pay attention to when organizing lessons.

Keywords: media technologies, interactive table, visual learning, demonstration principle.

The modern school is tasked with preparing students for life in a rapidly changing information society. The main role in solving this problem is played by the modern man's possession of information and communication technologies. Information culture and computer literacy of students are a necessary condition for modern education.

Time sets tasks for the teacher:

• teach children without coercion;
• develop in the child a steady interest in knowledge and the need for their independent search;
• make teaching joyful.

As life shows, these problems cannot be solved with the help of individual methodological findings, a systematic approach is needed .. Modern teaching tools allow to diversify the educational process, make it more accessible, vivid, memorable, and, therefore, more productive.

It turns out that the use of media technologies is a task set for the school by the time itself.

Research work on the introduction of information and communication technologies in education, the use of media technologies Rakhmatova D. [1], Bespalko V.P. [2], Vorobyova G.N. [3], Tursunova Ch.A. [4], Yakovlev D.A., Savina A.V. [4], Makhmudova D.M., Tadjibaev B.R., Dusmurodova G.Kh. [6], Mukhamedov G.I., Makhmudova D.M. [7], Makhmudova D.M. [8]. However, the problem of using media technology in computer science classes taught in general secondary schools for 5th graders has not yet been fully explored.

Many teachers note the broad potential of e-learning materials, thanks to which the following didactic tasks are successfully solved:

• presentation of educational information;
• information and reference support for all types of classes;
• modeling and demonstration of the studied objects, phenomena and processes;
• support for various active forms of training;
• training of various skills and abilities.

They also note the shortcomings and reasons that prevent the widespread use of e-learning materials in the educational process:

• the content of e-learning materials is either a complete retelling of traditional textbooks, or, on the contrary, has nothing to do with the curriculum;

• in electronic editions there is a lack of simulators, practical and test tasks, tests are primitive and monotonous;

• methods and scenarios for conducting classes using electronic training materials have not been developed;

• the available electronic publications for educational purposes are not adapted for use in the lesson: the teacher does not have the opportunity to select the information he needs and put it together at his own discretion;

• there are no unified approaches to the installation of electronic publications for educational purposes and to work with them.

Now almost all schools have an information technology room (KIT), it is also possible to conduct computer science lessons in it, using various teaching, monitoring and training programs. However, the lessons conducted at KIT have their own characteristics:

1. Due to the fact that in grade 5 schoolchildren almost do not know how to use a computer (not everyone has it at home), when drawing up a lesson plan held in a computer class, it is necessary to allocate time for explaining and learning how to work with a computer, and with a specific task.

2. When preparing for the lesson, it is also necessary to take into account the hygienic requirements for the time of working with a computer. Pupils from 5 to 6 grades at the computer screen in the lesson can be no more than 15 minutes.

3. Thus, there is time that can be used before or after the period of working with the computer. At these stages of the lesson, teachers usually use material that could be shown on the screen using a multimedia projector (for example, a presentation), even if there was no urgent need for this (if we were to conduct a lesson in a computer class, then I wanted to use the full capabilities of the office).

It turns out that the teacher develops a lesson for conducting information technology in the office, but it is necessary that it was the other way around - information technology should help in conducting the lesson.

Teachers also emphasize the hardiness of media technologies and their benefits: BV Gromova claims that together with a computer, he uses a multimedia projector and an interactive whiteboard in the classroom. An interactive whiteboard is a touchscreen connected to a computer that is transmitted to the whiteboard by a projector. Thus, everything that happens on a computer monitor is demonstrated on an interactive whiteboard. In addition, it can be used, like an ordinary blackboard for solving problems and exercises, only instead of chalk we write with a special electronic pen (electronic pen), with which you can change the thickness and color of the pen.

The entries are bright and colorful. You no longer need a rag, you can use special operations to erase what is written from the interactive whiteboard. However, you can save to a file on your computer, and then later review and discuss with students. Such a board allows you to write by hand over open documents and remove what was written without changing the

document itself. Interactive whiteboard software provides ample opportunities for more effective organization of the educational process.

The interactive whiteboard can also be used at many stages of the lesson:

1. Use ID to check homework and do oral exercises. Previously, verbal counting tasks had to be written on the board at every break, often in a hurry because there was not enough time. Then everything was wiped off. Now you can pre-type the oral exercises on the computer and move them to the board at any time. If it is difficult to type text on a computer (there are many formulas, fractions, etc.), then on the screen of the interactive whiteboard you can write text by hand and save it, and in the lesson you just have to open the required file.

2. With the use of ID, educational independent work is carried out more effectively. Next to each task, you can write its solution. But the guys see only the text of the assignment in front of them, and the solutions are hidden behind an opaque screen (one of the possibilities provided by the ID), as if behind a curtain (except for an opaque screen, there are many other ways to hide and show what is written). Time timer (also one of the many ID functions), beeps when the work is finished. When you need to check the answers, you can "Open" the opaque screen, check the solutions. Fifth graders see their mistakes and correct them immediately. The concentration of attention increases, the understanding of the material improves. For controlling independent work, any text written in the ID can be printed out to each student.

3. Conducting lessons in the form of presentations increases the amount of information for assimilation. Making presentations is creative, fun, but time consuming process. IDs make it easy to create slides. On the ID I write the condition of the problem. If you do not find a suitable illustration on the Internet, then you can make a colorful drawing yourself or ask schoolchildren in advance, they will be happy to draw everything that is needed on the blackboard. Then you can move it all from the ID screen to the slide. Text and graphics usually take up a third of the slide. In the lesson, they open a slide, read and analyze the problem together with the students. On the clean territory of the slide, write the solution with an electronic pen. The solution can be "erased", the slide is ready for use again. When you turn on the “Record Video” mode, the interactive whiteboard allows you to record everything that happens on the whiteboard to a file. You can then watch the saved video file, replaying the entire whiteboard process. Thus, you can create entire video tutorials.

4. Using the ID as a computer screen, it is possible to explain to fifth-graders how to work with a computer using various teaching and monitoring computer programs, which prepares students in advance for the subsequent visit to the information technology classroom and effective work in it at the computer.

With interactive whiteboards, you can always work in this mode - first, develop a lesson, and then, using the ID and a computer, prepare the material necessary for the demonstration. The use of ID reduces the teacher's time to prepare for the lesson. Lessons become easier for learners to perceive, difficult moments become more understandable.

Informatics Europe and the ACM Europe Council set up and funded in 2013 a Committee on European Computing Education (CECE) to undertake a study that would capture the state of Informatics education across the countries of Europe. This was seen to parallel the highly influential US study “Running on Empty” 1 . It gathered data from 55 administrative units

(countries, nations, and regions) of Europe (plus Israel) with autonomous educational systems, using questionnaires and a wide network of reliable contacts and official sources.

A report on that work was published in 2017, with an unprecedented level of detail and information2 . While the report confirmed that across Europe there is a growing awareness of the importance of offering young students the opportunity of sound education in Informatics, it also showed a highly variable level of effort and achievement across countries and education autonomous regions. In particular, the report showed that in several countries/regions, students can graduate from secondary schools without having ever been exposed even to the basic principles of Informatics. On the basis of this and other findings, the first and foremost recommendation was that all students must have access to ongoing education in Informatics in the school system. Informatics teaching should start in primary school.

The CECE report identified that the provision of Informatics education was quite uneven across Europe: only in 22 out of 50 educational regions was Informatics available to all pupils; in a further 10 regions it was available to just some students; in several noticeable cases no Informatics teaching was available at all. When students could elect for Informatics there was evidence of poor uptake, often as low as 10%.

In the US, the "Every Student Succeeds Act", approved by the Congress in 2015 with bipartisan support, introduced Computer Science among the "well rounded educational subjects" that need to be taught in schools "with the purpose of providing all students access to an enriched curriculum and educational experience". In January 2016 President Obama launched the initiative "CS For All" whose goal was "to empower all American students from kindergarten through high school to learn Computer Science and be equipped with the computational thinking skills they need to be creators in the digital economy, not just consumers, and to be active citizens in our technologydriven world".

In September 2017, the White House issued a directive to the Department of Education to spend at least $200m annually to help teachers in realising this vision. In addition, US industry committed an additional $60 m per year for 5 years.

The UK Royal Society published in January 2012 a widely known report (Shut down or restart? The way forward for computing in UK schools) arguing that it was essential for all school pupils to gain some familiarity with the science underlying digital systems. It called for the recognition of the great importance to the future careers of many pupils of teaching computer science in schools. On this basis, the English Department of Education published in September 2013 statutory guidance for a national curriculum in England on computing; this term was to include both computer science and computer systems as well as their responsible usage.

The Royal Society then surveyed in November 2017 the status of computing education in the UK calling for a "swift and coordinated action by governments, industry, and no-profit organizations … [to avoid] … damaging both the education of future generations and UK economic prosperity"3 . In fact, while it was noted with satisfaction that all students from age 5 to 14 had regular weekly hours of computing lessons, it was also noted that a majority of teachers were unfamiliar with the subject they taught and did not have adequate support. The report called for "unhindered access to a structured and ongoing programme of professional development … [which] … must support teachers in all schools across the country".

This situation is particularly relevant since it shows that having a curriculum in place is a necessary but not sufficient condition to ensure reaching the goal of widespread and effective informatics education; teacher preparation is also essential.

Today's world is digital. Informatics, as the science underpinning the development of the digital world, has brought about the radical and transformational development of professions, scientific disciplines, and social life. As a distinct scientific discipline Informatics is characterised by its own concepts, methods and body of knowledge.

The purpose of the Informatics for All initiative is to establish Informatics as an essential discipline for all, a subject available at all levels throughout the educational system. The vision is that learning Informatics will enable all students to understand, participate in, influence and contribute to the development of the digital world in general; simultaneously, it will provide a significantly improved opportunity for recruiting and educating the large number of IT specialists Europe needs to maintain and improve its position in the digital world economy.

In addition to its importance in its own right, Informatics is essential to education in all areas in the twenty-first century. It supports research, innovation and development across all sectors and provides radical and enhanced opportunities for the teaching of all disciplines, and for education in general. It is important to take advantage of this, even with children of an early age. As a consequence, all students and teachers have to be not only digitally literate, but also educated in fundamental aspects of Informatics.

Moreover, it is important that all citizens receive an appropriate level of Informatics education, enabling them to actively participate in the digital society in an informed way and to more safely and critically navigate and contribute to a fast expanding infosphere consisting more and more of algorithms that may be biased or information that may be flawed or incomplete.

The Informatics for All initiative is based on the long-term recommendations of the report "Informatics Education in Europe: Are We All In The Same Boat?" which presents the state of relevant education, and related teacher training, across Europe. Its conclusions highlight the serious need for an initiative such as Informatics for All.

In the industrial era, competencies in reading, writing and mathematics were identified as fundamental and necessary skills needed by all in order to learn, act and excel at any subject in school and to participate in a profession in society. In the digital era, these three fundamental competencies must be supplemented by Informatics.

With its capacity to precisely describe how information can be automatically managed and processed, Informatics provides cognitive insights and a useful common language for all subjects and professions. The educational role and position of Informatics must reflect this societal importance.

Informatics education is not just about educating more specialists who can develop and design the ever-increasing digital world and who can accommodate industry's needs and maintain productivity, innovation and growth. First and foremost, it is important to ensure that technological development is directed towards the achievement of a better, safer, fairer and just society.

More specifically, all people—regardless of their special interests, area of expertise and future profession—need to be educated in Informatics and apply the knowledge and skills as an integrated competence in all subjects and professional contexts.

This suggests a two-tier strategy for Informatics education at all educational levels: as a specialisation, i.e. a fundamental and independent subject in school and in study programmes in higher education; and as the integration of Informatics with other school subjects and study programmes. For both approaches well-educated and skilled teachers are a vital requirement.

The core aspect is to rethink how to teach Informatics to all. It is fairly well understood how to teach Informatics as a specialised subject in higher education, i.e. to would-be professionals. But teaching Informatics to all, both as an independent subject and integrated in other subjects, calls for a need to rethink in overall terms what to teach (both breadth and depth) and how to teach it. This is not a trivial task and is depicted in Figure 1. Here the expertise in the specialization is seen to flow down to high school and primary school levels and also across becoming integrated with other disciplines at all educational levels.

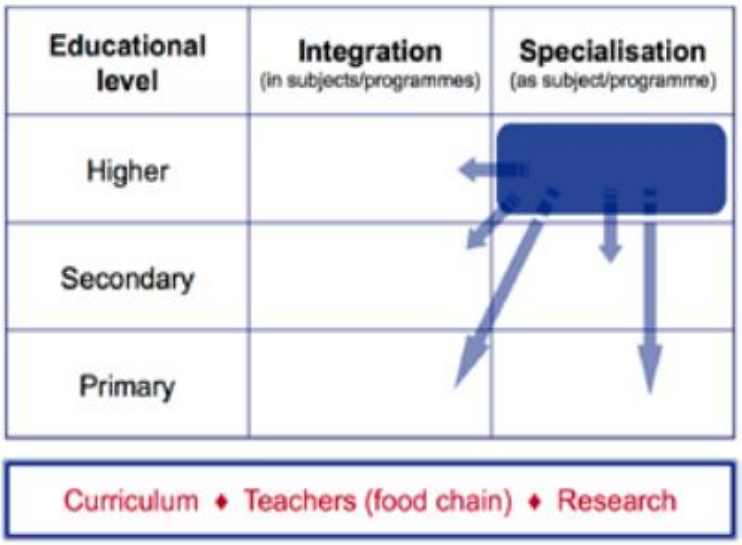

Figure 1: The grand educational challenge

It is most important to find effective teaching methods for the different school levels, and explore the use of methods that will support the teaching and learning processes, assisting teachers in their endeavours, like for example the use of augmented intelligence (i.e. the ability of computers to exhibit increased forms of "intelligent" behaviour) in educational environments.

Although ongoing research of Informatics education has taken place for many years, most of it refers to high education / college or high school; there is still not enough evidence as to how to teach the subject effectively at all levels in schools. Further re search is required to address the issues, particularly in primary and lower secondary school.

Research of effective teaching methods has shown that high quality teaching can have an impact on students' choice of the subject in school and later on recruiting for the subject in higher education; this is very important in times when we try to engage more students in the Informatics disciplines and later in industries.

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