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Application of Multimedia Technology in the Educational Process

Abstract: - Multimedia technologies have significantly transformed the educational process, enhancing both teaching and learning experiences. The article identifies the possibilities of practical use of multimedia technologies in the modern educational process. The course categories of Moodle platform are used as Learning Management Systems, (https://manas.edu.kg/en).

Using the example of the topic "2D and 3D graphics", developed at the computer department of the Kyrgyz-Turkish University "Manas", the authors share their experience in creating a video lesson: they demonstrate a step-by-step guide to creating a video, describing the entire process of producing educational videos - from script to shooting. To identify the importance of multimedia technologies in education questionnaire research is conducted among students and teachers.

The application of multimedia technologies in education enhances engagement, understanding, and accessibility. By incorporating diverse multimedia elements, educators can cater to different learning styles, making the educational process more effective and enjoyable for students. Authors' own video tutorials are demonstrated in the Kyrgyz language for both ordinary users and experienced developers. In addition, a master class on teaching how to create video lessons for teachers of KTU "Manas" has been developed and master classes are planned to be conducted by us at the university.

Keywords: Authors' own video tutorials, educational process, multimedia technologies, video lesson.

I. INTRODUCTION

In the modern world, education is rapidly changing due to the introduction of multimedia technologies, as in [1]-[3]. One of the most striking examples is the use of video lessons, which are becoming a powerful tool of teachers and students, as in [2].

Let's explore out the importance and possibility of using video lessons in the educational process effectively [4],[5].

Video lessons occupy a central place both in the educational process and advanced training courses [5]. Teachers can use video lessons to explain new material, review and reinforce it, and test knowledge. A video lesson is a type of educational process organization, requiring necessary video equipment like a screen, a projector, etc. The use of video technology thus becomes necessary. These include video cameras and upgraded computers or smartphones. Video lessons are ideal for both group and individual work of students. And this is quite understandable. Firstly, the material is presented in a clear, accessible and understandable language. Secondly, video lessons arouse keen interest and become very popular among students. Thirdly, students can directly observe the scientific process and even participate in it if they have an Internet connection, which is also integral to most video lessons.

The purpose of our research is to identify the possibilities of practical use of multimedia technologies in the modern educational process; to determine the role of video lessons as one of the types of multimedia

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technologies; to demonstrate a simple and accessible technique of creating an educational video for students; to identify methods of using video lessons with maximum benefit for students; to identify ways to develop and use educational videos.

Experience has shown that the approach in the advanced training courses is not effective at all if poor quality training

materials are created. It is enough for the teacher to understand the general idea, and to focus on the content, which is the most essential part of education.

Special attention should be paid to complicated video lessons that are long and large in volume. Students quickly get tired of the abundance of information, and there is no likelihood that they will watch the video lesson to the end. Every teacher knows how difficult it is to develop and deliver an interesting and effective lesson. This is often due to a lack of quality materials and, of course, time. Every teacher wants their lessons to be engaging and productive. However, it takes a lot of effort and time to prepare for them, so it is not always possible to realize all the conceived ideas. It is possible to significantly reduce the time spent on lesson preparation with the help of video-lesson sets and electronic notebooks.

Practice shows that the use of video lessons has both positive and negative sides.

In this article, using the example of the topic "2D and 3D graphics" developed at the Computer Department of the Kyrgyz-Turkish University "Manas", we share our experience in creating a video lesson. We demonstrate a step-by-step guide to creating a video, describing the entire process of producing educational videos – from script to shooting.

We demonstrate our own video tutorials in the Kyrgyz language for both ordinary users and experienced developers, as in [6].

In addition, we have developed a master class on video lesson creation for teachers of KTU “Manas”.

During the lectures, we actively use NetOP School – an interactive computer-based classroom management tool, which is also used for monitoring.

II. WHAT DO YOU NEED TO SHOOT A VIDEO TUTORIAL OR VIDEO ACCOMPANIMENT?

1. Lesson Script Preparation: It’s necessary to prepare a lesson script (plan) carefully. The text of the script should be clear and simple. This will help structure your presentation, think through theses and tips that will make the lesson richer and valuable. Avoid unnecessary pauses; you will always have a “cheat sheet” at hand in case you suddenly get confused and lose your train of thought. The Glavred service will help clear the text of verbal garbage and check for compliance with the information style.

2. Content Collection: It’s important to collect interesting content for the video lesson (text, pictures), using Internet resources, textbooks and other sources, without violating copyright – there are many free repositories on the Internet (for example, https://lifehacker.ru/free-pics/). If you have professional knowledge of computer software programs, you can prepare your own 2D, 3D drawings, animation, high-quality sound, video editing “*et al.*”, as in [6].

3. 3. Technical Equipment Preparation: It’s essential to prepare technical equipment, namely a quality camera, microphone and lighting. It is necessary to create a green background for the shooting location, as we will use the chromakey effect. With its help it is possible to quickly change the videophone to any other possible one. We have a professional video recording studio at the KTU "Manas" (http://mediamanas.kg/).

4. Software Download: It’s necessary to download computer programs – Power Point, Camtasia – software for capturing video from the screen. We can use modern computer graphic and audio editing suites like Adobe, Corel “*et al.*”.

5. Presenter Image: One should think over the image of the presenter. His image is very important for the perception of the video lesson material.

6. Recording in Parts: It is advisable to record video in parts. All that remains to do from the footage is to make a video lesson in Power Point. The optimal duration of a video lesson should not exceed 7 minutes.

7. Electronic Test Creation: It's essential to create an electronic test with branching and feedback. Please pay attention to the following points: Types of questions – we select tasks to accurately test knowledge. Interactive – adding voiceover, video and drag-and-drop to the test. Feedback: setting up branching and hints for incorrect answers.

8. Video Lesson Testing: It's necessary to test the video lessons in the form of a quiz. To do this, send the finished video lesson to the teachers in advance and at the master class they will provide feedback, guide, point out errors in the course, and suggest ways to improve.

2.1 Who can benefit from video lessons?

For teachers

✓ Time-Saving: Video lessons help save time on lesson preparation.

✓ Engaging Material: They provide fascinating video material for students.

✓ Versatility: Different forms of work: group and individual work both in class and at home.

✓ Enhanced Learning Quality: They improve the quality of learning.

✓ Utility: Ideal for open lessons and substitutions.

2.2 For students

✓ Convenience: A convenient form of learning, ideal for independent work at home.

✓ Improved Academic Performance: They improve students' progress, grades, and exam results.

✓ Accessibility: Accessible explanation of the material at any time—both in the classroom and at home.

✓ Support: They help students with homework and exam preparation.

✓ Engagement: An interesting and engaging way of presenting the material.

2.3 Types of Instructional Videos:

1) *Screencast:* A recording from a computer screen with a voiceover that comments on what is happening in the video.

2) *Video Accompaniment* ("Talking Head"): A person sits in front of the camera and reads the text. This format is usually used as an addition to a PowerPoint presentation when you need to comment on the slides.

3) *Video Lesson:* A short training video, similar in format to a TV program.

III. Practical Part: Creating An Interactive Video

After all the preparations, we create an interactive video using the following steps:

Preparation: Using Camtasia, create a splash screen for the video lesson, record video from the computer screen, and add animation and interactive prompts to the video.

Editing: After filming, the next step is editing. Typically, Adobe Premiere is used for this purpose. However, if you want to make a simple video lesson without complex special effects, you can use other user-friendly software.

Combining Video and Slides: For instance, combining video with PowerPoint slides creates an interesting training course. Any presentation you use to train students or employees can serve as the basis for such a course.

Video and Sound Editing: Edit video and sound, and create various effects (wow effect). The finished video visually demonstrates the learning process.

Lighting: Proper lighting is essential for a clear picture. Use three lights: one for the presenter (main lighting and shadow formation), and two for the background. These lamps should be twice as powerful as the one aimed at the presenter.

Backgrounds: Blue and green backgrounds are popular for filming due to the chromakey effect, allowing incredible special effects and virtual scenery overlay.

3.1 Here are some tips for creating effective video lessons:

1) Script Writing: Create a structured script focusing on the core content and eliminating unnecessary details.

2) Filming Location: Ideally, the location should be 100% suitable for the topic of the video lesson.

3) Lighting: Ensure proper lighting to maintain high video quality.

4) Presenter's Clothing: Avoid clothing that may cause technical issues, such as patterns that cause visual distortion.

5) Short Takes: Break the recording into shorter segments for easier management and editing.

6) Video Length: Given the preference for shorter content on social media, aim for an ideal video lesson length of around 7 minutes.

Fig. 1. One of the frames from the video lesson.

Experience has shown that the approach in the advanced training courses is not effective at all if poor quality training materials are created. It is enough for the teacher to understand the general idea, and to focus on the content, which is the most expensive.

Special attention should be paid to complicated video tutorials, which last longer and comprise much information. Students quickly get tired of the abundance of information, and there is no likelihood that they will watch the video lesson to the end. Every teacher knows how difficult it is to develop and deliver an interesting and effective lesson. This is often due to a lack of quality materials and, of course, time. Every teacher wants their lessons to be engaging and productive. However, it takes a lot of effort and time to prepare for them, so it is not always possible to realize all the conceived ideas. It is possible to significantly reduce the time spent on lesson preparation with the help of video-lesson sets and electronic notebooks.

3.2 Practice shows that the use of video lessons has its positive and negative sides.

3.2.1 Positive sides of video lessons include:

1. Visibility, dynamism, replayability, accessibility at any time, possibility of adding subtitles and translating into other languages.

2. The practice of using video lessons has shown that the level of teachers' qualifications in this case is much higher than those who attended regular classes. This suggests that video lessons rapidly increase students' interest in the subject or specific topic.

3.2.2 Negative aspects of video lessons include:

1. Distraction Potential: Video recordings, being more emotionally engaging than audio recordings, can distract students with visual elements, thus diverting their attention from the actual content. Therefore, especially at the initial stage, it is important that students receive a clear assignment before viewing, which they will need to focus on.

2. High-Speed Internet Requirement: Quality playback of videos necessitates a high-speed internet connection, which may not be accessible to all students.

3. Engagement Issues: If the content lacks interest, video lessons can become excessively long and boring, potentially leading to decreased engagement from students.

IV. Results Of A Survey Among Students And Teachers To Identify The Importance Of Multimedia Technologies In Education

To identify the importance of multimedia technologies in education, a survey was conducted among students and teachers. The questionnaire included questions about how often they use multimedia technologies, how useful they find them, and specific advantages and disadvantages. Below is a detailed analysis of the data obtained.

4.1 Results of the questionnaire survey of students

1. Frequency of using multimedia technologies

✓ Daily: 45%

✓ Several Times a Week: 35%

✓ Several Times a Month: 15%

✓ Rarely: 5%

Analysis: The majority of students (80%) use multimedia technologies regularly (daily or several times a week), indicating a high level of integration of these technologies in their learning process. This may be due to the availability of devices and the internet, as well as students' interest in innovative teaching methods.

2. Usefulness of multimedia technologies

✓ Very useful: 60%

✓ Useful: 30%

✓ Neutral: 7%

✓ Not useful: 3%

Analysis: 90% of the students found multimedia technologies useful or very useful. This confirms their positive perception and recognition of the importance of such technologies in improving the learning process.

3. Key benefits of multimedia technologies in education. Fig. 2 shows the survey results.

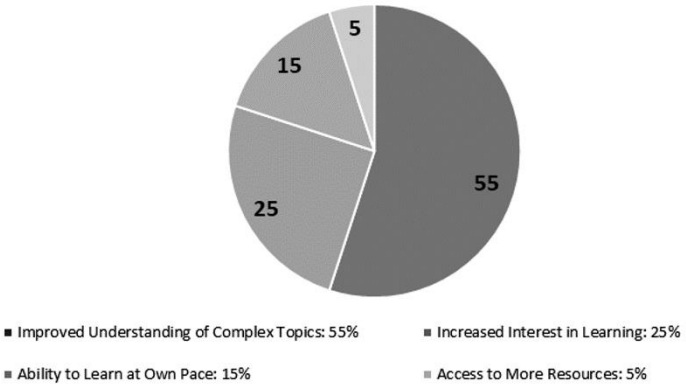

Fig. 2. Key benefits of multimedia technologies in education, based on a survey among students.

Analysis: Improved understanding of complex topics (55%) and increased interest in learning (25%) were identified as the main benefits of multimedia technologies. This emphasizes their role in simplifying complex material and motivating students.

4. Major disadvantages of multimedia technologies

- ✓ Technical problems: 40%
- ✓ Distraction from the learning process: 30%
- ✓ Lack of interaction with the teacher: 20%
- ✓ High cost of equipment: 10%

Analysis: Technical problems (40%) and distraction from the learning process (30%) are the major weaknesses. This indicates the need to improve technical support and develop methods to minimize distractions.

4.2 Results of the questionnaire survey of teachers

1. Frequency of using multimedia technologies

- ✓ Daily: 50%
- ✓ Several times a week: 30%
- ✓ Several times a month: 15%
- ✓ Rarely: 5%

Analysis: Teachers also actively use multimedia technologies, with 80% using them daily or several times a week. This shows recognition of their importance in the educational process.

2. Usefulness of multimedia technologies

- ✓ Very useful: 70%
- ✓ Useful: 20%
- ✓ Neutral: 8%
- ✓ Not useful: 2%

Analysis: 90% of the teachers find multimedia technologies useful or very useful. This shows that teachers see them as having significant potential to improve the quality of teaching.

3. Main advantages of multimedia technologies

- ✓ Improved student perception of the material: 60%
- ✓ Increased student motivation: 20%
- ✓ Ability to use a variety of teaching methods: 15%
- ✓ Facilitation of preparation of materials: 5%

Analysis: Teachers note improved student comprehension (60%) and increased motivation (20%) as the main benefits. This confirms that multimedia technologies contribute to more effective learning and increase students' interest in learning.

4. The diagram of the main disadvantages of multimedia technology, based on a survey among teachers, is shown in Fig. 3.

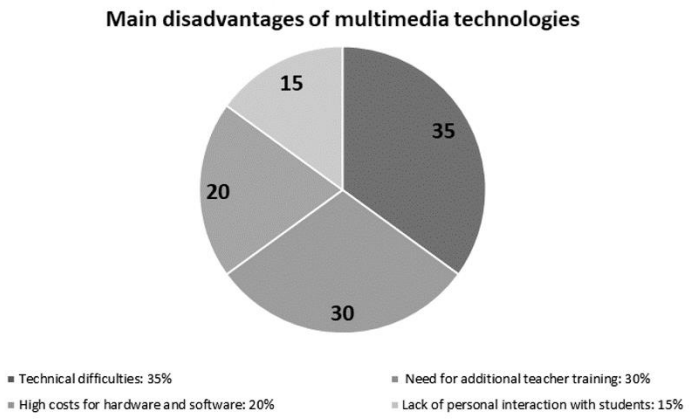

Fig. 3. Diagram of the main disadvantages of multimedia technology, based on a survey among teachers.

Analysis: Technical difficulties (35%) and the need for additional training (30%) were cited as the main disadvantages. This points to the need to improve technical infrastructure and provide professional development opportunities for teachers.

The survey results show that the majority of students and teachers consider multimedia technologies to be very useful for the educational process. Key benefits include improved understanding of complex topics and increased interest in learning. However, both students and teachers face technical difficulties and sometimes feel a lack of personal interaction. These results highlight the importance of multimedia technologies in education and show directions for their further development and improvement.

1) *High frequency of use.* The majority of students and teachers regularly use multimedia technologies, which indicates a high degree of their integration into the learning process.

2) *Usefulness of technologies.* Both students and instructors recognize the usefulness of multimedia technologies, noting their positive impact on comprehension of material and motivation to learn.

3) *Benefits.* Major benefits include improved understanding of complex topics, increased interest in learning, and the ability to learn at one's own pace.

4) *Disadvantages.* The main challenges are technical difficulties, distractions from the learning process, and lack of personal interaction. This indicates the need for better technical support and strategies to minimize distractions.

These results confirm the importance of multimedia technology in education and emphasize the need for further development and improvement to enhance the quality of the learning process.

V. CONCLUSION

Our video lessons are created by experienced teachers and professional technicians, which enhances the quality of student learning. The process of watching video lessons is so engaging for students that it often doesn’t even feel like learning.

At the same time, there is no need to make extra efforts to motivate students, as the very format of presenting the material sufficiently holds their attention and interest.

Interactive resources open up new opportunities for teachers and students; even when working independently with multimedia, the student is given the opportunity to interact with the material. Educational resources created using modern digital technologies are distinguished by high quality sound, image, compatibility and can be used in various educational systems and information media. The pedagogical value of multimedia resources lies in the harmonious combination of individual elements: the topic that the teacher wants to reveal through multimedia. Learning becomes possible in a playful manner that stimulates cognitive abilities, promotes effective assimilation of information, and allows individual adaptation to the pace of work.

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