



Article

Didactic Possibilities of Using Software in Textile Materials Science Education

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Abstract: This article aims to integrate software tools, digital technologies, and methodologies in textile materials science lessons to organize the learning process interactively and effectively, and to in-depth mastery of students' knowledge about textile types, their properties, and applications based on visual, practical, and independent analysis. The article highlights the role of digital visualization tools, multimedia resources, virtual simulations, and interactive learning platforms in improving students' conceptual comprehension and practical skills. Special attention is given to the use of software-based demonstrations, digital laboratories, and independent analytical tasks that encourage active student participation, critical thinking, and problem-solving abilities. Through visual and hands-on learning approaches, students are enabled to analyze textile structures, compare material characteristics, and evaluate their suitability for various industrial and consumer applications. Furthermore, the study emphasizes the importance of integrating independent learning activities supported by digital technologies, which foster self-directed learning, creativity, and professional competence among students.

Keywords: Oral Method, Modular Educational Technologies, Cooperative Learning, Project, Interactive Learning, Digital Learning, Integration, Skills

1. Introduction

In the present day, the rapid development of science and technology, the constant evolution of technologies and the speed of information dissemination have made the analysis process more efficient. This can be achieved through the use of modern teaching aids in the educational process, based on contemporary pedagogical principles and information technology[1].

In today's world, the study of technology requires modern didactic materials, multimedia and media resources, as well as innovative pedagogical technologies to improve the quality of education.

Innovative technological solutions are being used to improve the efficiency of electronic learning and virtual stendlar technology, enabling complex technological processes to be completed quickly and effectively, and providing an opportunity for accelerated learning[2].

Each fango has a designated electronic learning tool that can be used for teaching, training and monitoring purposes. In modern teaching and didactic materials, the latest achievements in science and technology, such as audio, video, telecommunications and technology, are of great importance. For this reason, familiarising oneself with their

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didactic capabilities and learning to use them in lessons will be of great help to teachers in their future activities[3].

Didactic materials can be familiar, things we encounter in our lives, or even materials we use. Not all of them have to be tools developed specifically for education. For example, if we take television, it while in our lives it is a means for recreation, it is also a mass medium for conducting propaganda among the population. However, it is also widely used in education, and in distance learning it is employed as a didactic tool.

Analysis of literature

Effective use of didactic materials in the educational process is being researched by our republic's scholars in this field, namely N.A. According to Muslimov, electronic textbooks must meet the following requirements:

It must meet the requirements for publishing curricula and teaching-methodological materials (it is approved by the faculty's scientific-methodological council). The textbook is either being presented for the first time in a specific subject area or is a previously published methodological guide. that it is prepared as an electronic version of the manual and pertains to general, special, and elective faculty standards;

- Having a volume sufficient to present the content of a specific course (or a part of it) and to allow for the achievement of the instructional objectives;
- Visual elements that support the achievement of pedagogical objectives (the ability to make maximum use of the computer's multimedia capabilities);
- The material was developed with consideration for its display on a monitor screen or distribution across a network;
- The presence of hyperlinks in the text, with references to web sources and other information resources provided where necessary;
- The presence of control questions that allow the learner to independently assess their level of material mastery;
- Support for multiple languages, as well as accommodations for students with disabilities.

The e-book meets the following requirements: simultaneously expanding the circle of communication between instructors and learners, the time the student spends on a particular topic, the time spent mastering it, It is necessary to provide the ability to monitor the level of mastery, the student's knowledge level at the start of the course, and the knowledge level at the end of the class[4].

Teaching based on modern educational and didactic materials, increasing students' opportunities to acquire knowledge, They have a positive effect on developing students' independent work capabilities and practical skills levels.

The most widely used e-textbooks in the educational process must incorporate several organizational components. To implement an electronic textbook in the educational system, it must have its own interface. An e-textbook or instructional manual has a distinctive external appearance — an “interface.” In turn, the primary requirement for an interface is its intuitiveness. The interface's control elements should be user-friendly. be user-friendly, not distract the user from the text or necessary content, and the controls for navigating the book must be present on every page[5].

In fact, despite the many types of e-books, they are all based on hypertext. Currently, the most widely used e-books are resources in the form of hypertext. In the process of creating an electronic textbook for specialized vocational education subjects, psychological-pedagogical, technical-technological, aesthetic, and ergonomic requirements are imposed. Both the electronic textbook and the printed textbook must meet the didactic requirements set for traditional educational publications such as teaching and methodological manuals.

As a result of organizing the modern learning process using information technologies, electronic learning materials, Complex technologies can be mastered quickly and thoroughly through virtual booths, enabling remote instruction. In the exercises conducted during the learning process, we only

We use all types of learning materials, not just the oral method or explanation. These can be in numerical and written, audio and visual, spatial and kinetic, electronic and other formats. Therefore, if we understand the capabilities of each didactic means, we can learn which task is more effectively accomplished with each one[6].

Didactic tools are divided into three categories, namely didactic materials, and the methods for using them can be classified into three categories: didactic materials, didactic media for their use, and collections designed to implement instruction with the aid of didactic materials and media. For each category, there are corresponding types. In instructional activities, those given to students, those demonstrated, to be performed and demonstrated, and all types of instructional information like these, we call didactic materials. We classify them into separate groups depending on when and for what purpose we use them. We use didactic aids when applying and preparing these materials.

For example, posters, transparencies, photographs, audio, television and video materials, information technology-based materials, etc. In turn, we classify the media according to their structure, operating principles, and didactic possibilities. Based on this, we will use several types of didactic materials during the lesson, utilizing the corresponding didactic tools. These, together, constitute the set of didactic tools developed for this lesson.

In connection with the above, an electronic textbook must have a “slightly higher intellect” than a regular (paper) textbook, because

computer can support several aspects of teaching activity (providing advice when necessary and in the appropriate places, helping to reinforce the knowledge acquired, etc.) to simulate. At the same time, it must fully cover the necessary (additional information) learning materials for the subject being studied.

Various teaching methods can be used during a lesson. At the same time, the teacher's actions should not distract the students, but rather help them concentrate, ...must be aimed at preventing fatigue and boredom during the lesson.

2. Methodology

According to the structure of the didactic process, teaching methods are divided into 3 groups:

1. Methods for organizing and carrying out learning activities;
2. Methods for stimulating and motivating learning;
3. Methods for monitoring and self-monitoring (control).

By the form of knowledge transmission:

1. Verbal methods
2. Visual methods
3. Practical methods

Oral method: A method that holds an important place in the system of teaching methods, and is itself divided into the following types:

- Storytelling
- Conversation
- Explanation
- Lecture

Demonstrative Method: Considered one of the most effective methods, it forms the basis of modern education. The demonstrative method is divided into 5 types:

- Demonstration
- Demonstration
- Field trip
- Film
- Graphic materials

The practical work method: This is considered the most essential method for applying our theoretical knowledge in practice.

- Exercise
- Laboratory
- Practical work

The oral presentation method can exist in two forms:

1. Monologic exposition, in which only the teacher speaks, while the students perceive and understand his speech. In manual labor classes, explanation and storytelling take the form of instruction.
2. Dialogic presentation is a conversation between the teacher and students.

Storytelling is the lively and vivid presentation of the program material. In this case, the teacher personally delivers the new knowledge. Sometimes during the conversation, to determine how much the students understand what is being explained, the teacher asks them questions. It is appropriate to ask questions to determine how well the students are assimilating what is being explained. The story becomes much clearer if it is presented with demonstrations of the tasks performed, examples, drawings, photographs, and the like. When presenting new material, it is important to keep in mind that students do not all have the same capacity for assimilation.

3. Results and Discussion

During the research, the didactic effectiveness of the comprehensive use of software educational tools, multimedia resources, and innovative pedagogical technologies in teaching textile materials science was analyzed. It was determined that lessons organized based on e-textbooks, multimedia presentations, video clips, virtual booths, interactive assignments, and project-based activities positively influenced students' level of knowledge acquisition[7].

During the experiment, it was observed that in lessons organized using digital and software tools, students' interest, engagement, and independent work skills increased significantly. In particular, the use of visual materials when studying types of fabrics, their physical and mechanical properties, structure, and areas of application facilitated understanding of the topics and supported the long-term retention of knowledge.

The teacher's narrative should meet the following requirements: In terms of content, it must clearly and completely cover all the learning material intended in the program;

The presentation must be clear, comprehensible, logical, and use simple wording;

The material must be engaging and stimulate students' thinking, drawing their attention to the main elements of the new information;

In the story, the teacher must base it on facts and concepts that the students already have. If the language is not simple and clear, students' interest in the story, and subsequently in the subject, may fade[8]. The teacher's narrative should include terms that enrich the students' vocabulary with new words, and their meanings must be explained at that very moment;

Modernizing the education system in our country based on targeted programs aimed at developing the education sector, the retraining and upgrading of personnel

qualifications, The informatization of the educational process and the creation of modern information environments are of great importance. The gradual implementation of these directions -stage implementation will contribute to the establishment of a new national education system, the enhancement of human capital, and the strengthening of the country's economy. Regularly updating the knowledge and competencies of pedagogical staff, as well as, creating the necessary conditions to improve the entire education system is of great importance[9]. The introduction of innovative technologies into the educational process is important for applying modern approaches to teachers' professional activities and for improving the quality of education. modernization of the education system serves to increase the level of providing learners with relevant and practical knowledge. The modernization of the education system also reflects changes in the learning activities of students[10].

The emergence of multimedia and internet technologies has opened up broad avenues for the use of information technologies in the education and upbringing of general education schools, opening up broad avenues for their use as effective tools in communication processes. Information technologies play a vital role in developing a well-rounded individual, in their independent career choice, and in their professional self-development.

Shaping, and enhancing professional skills, and the role and impact it is playing in this process cannot be denied[11]. The integration of technology into teacher preparation programs has changed how teachers are prepared for the classroom. Tools such as learning management systems (LMS), virtual simulations, and online collaboration platforms have changed how teachers are prepared for the classroom. "gives instructors the opportunity to try out and implement digital teaching methods.

1. Information and Communication Technologies (ICT) - this is the collection, storage, transmission of information, processing and delivering it to the user.

2. Modular instruction is an instructional technology in which the learning process is organized into separate modules (i.e., self-contained topics or units), each module is aimed at developing specific knowledge, skills, and competencies. This technology allows students to work independently, conduct research, while also enabling an individualized approach and step-by-step development.

3. Small group work technology (or cooperative learning) - is a teaching method aimed at students acquiring knowledge through collaborative work in small groups, while engaging in interaction with one another[12]. This technology helps develop skills such as communication, collaboration, critical thinking, and problem-solving in students.

4. Problem-based learning technology - this helps students develop independent thinking, analyzing, identifying the problem, and solving it. It is no exaggeration to say that this is an educational method aimed at developing students' independent thinking, analysis, and problem-solving skills. The teacher does not give students ready-made knowledge, but rather guides them to acquire it for themselves by solving problem situations.

5. Project-based learning - this teaching method directs students to solve real-life problems and perform practical tasks. Within this methodology, students work on a specific project and, in the process, reinforce their knowledge and skills. Project-based learning helps develop students' creative thinking, effective communication, collaboration, and problem-solving skills[13].

6. Interactive teaching technologies - this increases student engagement, They are educational technologies aimed at increasing students' activity, their interaction, independent thinking, and critical approach. These methods ensure students' direct participation in the learning process. Interactive technologies turn students from passive listeners into active participants[14].

7. E-learning and digital education - new forms of education are emerging with the help of modern technologies, which helps to significantly enhance the learning process in terms of efficiency, convenience, and opportunities. In particular, Electronic and digital educational tools are of great importance in establishing a distance learning system, creating the opportunity for students to acquire knowledge from anywhere.

8. Integrated Educational Technology - is a technology aimed at creating an effective learning environment by combining several methods and approaches in the educational process[15]. This method allows students to develop holistically, as it incorporates various teaching styles and technologies. Integrated educational technology encourages students to learn in multiple areas simultaneously and achieve targeted results.

4. Conclusion

The integrated use of modern educational-didactic materials, multimedia and media tools, and innovative pedagogical technologies in teaching the science of textile materials science increases the effectiveness of education, the use of modern educational and didactic materials, multimedia and media tools, as well as innovative pedagogical technologies in a coordinated manner, is an important factor in increasing the effectiveness of teaching the science of textile materials, developing students' independent thinking, and forming their professional competencies. Therefore, future technology teachers must have sufficient knowledge, skills, and competencies in the use of modern information technologies. Furthermore, the educational process organized based on innovative pedagogical technologies develops important skills such as teamwork and information analysis, forming professional competencies in students, making the right decisions in problematic situations, such as teamwork and information analysis. The effective use of information and communication technologies in teaching textile materials science lays the foundation for preparing competitive specialists in the future who possess modern knowledge and skills.

Therefore, future technology teachers must have sufficient knowledge of using modern information technologies, and skills, and be able to make effective use of interactive methods, electronic learning resources, and digital educational platforms during lessons. This, in addition to improving the quality of education, plays a crucial role in enhancing the continuous education system and preparing pedagogical personnel that meet the demands of the modern era.

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