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THE TECHNOLOGY OF USING MEDIA TOOLS IN DEVELOPING CREATIVE THINKING SKILLS OF STUDENTS IN MEDICAL HIGHER EDUCATION INSTITUTIONS

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INTRODUCTION

It is well known that the socio-economic development of any society is determined by human thinking, intellectual potential, spirituality, and culture. These attributes are directly formed and nurtured within educational institutions. Therefore, educating the younger generation, developing their intellectual capacities and thinking, and providing them with continuous support are considered vital social needs. This issue stands as one of the primary tasks facing the continuous education system of the Republic of Uzbekistan.

The current pace of global civilizational development, the ever-increasing dynamics of natural and social genesis, the high intensity of human life, and the complexity of the restructuring and reform processes occurring in our country serve as factors for various emotional, psychological, and mental stressors in individuals. Consequently, an essential task of modern education is to nurture a well-rounded individual capable of withstanding such factors—one who can think positively and dialectically, perceive ongoing events correctly, and possess realistic optimistic forecasts, which altogether constitute creative thinking.

As the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, noted: "To raise the knowledge and level of not only young people but also all members of our society, we first and foremost need education, enlightenment, and high spirituality. Where there is no science, there will be backwardness, ignorance, and, of course, deviation from the right path. As Eastern sages said, 'The greatest wealth is wisdom and science, the greatest inheritance is a good upbringing, and the greatest poverty is ignorance!'" [7, p. 13]. Therefore, acquiring modern knowledge, true enlightenment, and high culture must become a permanent lifelong necessity for all of us.

The main direction of the strategic tasks consistently implemented in the field of education during Uzbekistan's new stage of development is characterized by the training of specialists who can think rationally and clearly define development perspectives necessary for the interests of

AMERICAN ACADEMIC PUBLISHER
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ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

society and the individual. This, in turn, creates a critical need to develop students' creative thinking skills and work out its innovative pedagogical foundations.

It is not accidental that 2023 was declared the Year of "Attention to People and Quality Education" in Uzbekistan to accelerate the work initiated by President Shavkat Mirziyoyev toward further advancing science in our country, educating our youth to possess deep knowledge, high spirituality, and culture, and building a competitive economy. Shavkat Mirziyoyev emphasized that improving the quality of education is the sole correct path for the development of New Uzbekistan.

"We must continue the reforms initiated in this sector, visit educational institutions, communicate more with teachers and mentors, and jointly resolve the issues they raise regarding quality improvement. We will include all matters raised by our people, along with concrete solutions, into the next year's State Program. In these processes, I urge deputies and senators, mahalla representatives, intellectuals, youth, entrepreneurs, and our wide public to be active and propose new ideas and initiatives," said the head of state [1].

LITERATURE REVIEW

Due to the rapid advancement of science today and the improvement of modern teaching technologies and tools, the task of widely implementing digital educational technologies into the continuous education system has been prioritized. The application of digital technologies in the educational system can be achieved primarily by developing students' competence in working with computer software tools and designing various didactic learning materials based on them.

Research concerning the theoretical and practical training of future informatics teachers and the improvement of teaching methodologies for informatics disciplines within our country, the Commonwealth of Independent States (CIS), and foreign higher education institutions has been conducted by scholars such as A.A. Abduqodirov, N.I. Taylakov, M.X. Lutfullaev, F. Zakirova, M. Allambergenova, S.Q. Tursunov, J.J. Karbozova, E.A. Pervyshentseva, Ye.V. Chernobay, D.A. Shuklin, L.F. Adriana, J.V. Campenhout, U. Gasser, C. Haythornthwaite, J. Ivanoff, M.S. Luis, R. Marois, S.T. Narle, C. Nass, E. Ophir, J. Palfrey, and N.N. Philomena. Furthermore, investigations into creating software tools and applying them to education have been pursued by scientists such as A.G‘. Hayitov, M.X. Lutfillaev, I. Isoqov, V.V. Grinshkun, and R.X. Qodirov.

Creativity characterizes an individual as a whole or specifies particular attributes such as mental acuity. Creativity also manifests as a crucial component of talent. A pedagogue does not become creative automatically; creative ability is formed over a period of time through consistent learning, research, and self-improvement.

Creativity (derived from Latin/English *create* – to produce, *creative* – inventive, imaginative) refers to an individual's creative ability to produce new ideas and constitutes an independent factor within the structure of giftedness.

An individual's creativity manifests in their thinking, communication, emotions, and specific types of activities. It defines either the person as a whole or their unique traits. Creativity acts as a critical driver of talent. Moreover, creativity dictates mental agility and "ensures the active engagement of students' attention within the educational process."

Creativity is the capability to produce something new and unique; it is a cognitive process that leads to innovative thinking, original ideas, and solutions. As evident from this definition, creativity—much like initiative and an imaginative approach to work—does not necessarily have to be an innate, divine gift. Since creativity is a cognitive process, endless paths and methods definitely exist to elevate, develop, and utilize the infinite capabilities of the human mind.

In this regard, we can also trace the interpretation of creativity within the philosophical views of the great thinker Abu Ali ibn Sina (Avicenna). In his views, a teacher cannot guide a

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

student toward creative thinking without first identifying their inclinations, aspirations, activity, capabilities, talents, and skills.

The principle of visual demonstration in education enhances the quality of the teaching process and facilitates learning for students. J.A. Comenius referred to it as the "golden rule" of didactics. According to this rule, human sensory organs must be utilized during education. He stated: "If we wish to instill true and clear knowledge in students, then we must pursue learning through personal observation and sensory experience. If a certain object can be perceived simultaneously by several senses, let it be studied by several senses at once."

Four essential components are listed for the creative activity of any individual:

- Domain-relevant skills;
- Creativity-related processes;
- Task motivation (enthusiasm);
- A conducive, favorable environment.

In terms of creative thinking, the primary task of education is to shape the skills within a student that will be required today and in the future to live a successful life in society. Creative thinking is an essential asset that today's youth must possess. This skill helps them adapt to a continuously and rapidly changing environment that demands professionals with modern competencies extending beyond basic literacy. Generally speaking, tomorrow's student will work in industries that do not even exist today; shaping their creative thinking skills allows them to solve increasingly complex local and global problems through unconventional approaches.

Like other skills, creative thinking can be developed through practical and targeted approaches. Some educators believe that developing a student's creative thinking happens at the expense of other disciplines in the curriculum. In reality, students can think creatively across all subjects. Creative thinking holds special significance when developed during knowledge-oriented lessons via approaches that encourage research and invention rather than rote memorization.

Teachers must be able to distinguish creative thinking, understand the appropriate conditions required for it, and help students adopt a more imaginative approach to thinking. A sophisticated understanding of how creative thinking occurs, in turn, reminds teachers that generating creative ideas during the educational process requires a certain amount of time. The assessment of creative thinking skills is established based on empirical evidence, linking what students do, read, and create on digital platforms with multifaceted skills.

Currently, various modern technological methods exist aimed at developing high-quality electronic learning tools. These include diverse multimedia educational assets, presentations, interactive learning resources, and others. Students must interact with modern electronic learning tools and remain highly attentive to the educational process itself. They can explore the educational resources they are interested in and repeat them as many times as necessary, which aids in more effective retention and comprehension.

The utilization of high-quality multimedia tools allows the educational process to become flexible depending on the social and cultural differences among students, their individual learning styles, speeds, and specific interests. One of the modern electronic tools entering the educational field is educational web technologies, which deploy advanced technologies to deliver data to students. One such framework is Web 2.0 technology.

There are several approaches to utilizing Web 2.0 technologies in education. According to the first approach, the core principles of this technology are interactivity, syndication, and socialization. Interactivity implies the ability of users themselves, not just developers, to shape resource content. Syndication allows using various Internet services as sources of information

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

(for instance, via different RSS technologies). The socialization function facilitates the creation of specific online communities.

The second approach involves an educational framework concept that creates conditions to fully unlock each student's personal potential, developing their personal entrepreneurship and self-education skills.

Currently, most available multimedia didactic tools do not yet satisfy all the requirements imposed on them. Therefore, it is expedient for higher education institutions to develop these tools independently. Simultaneously, textbooks should be as close as possible to the specific features of the higher education curriculum regarding the resource content, and secondly, they should help students master the skills required to build high-quality programs. This will undoubtedly prove beneficial in their professional activities after graduation.

The content and design of a multimedia learning tool must ensure an increase in educational motivation and maintain high performance levels in students through expertly structured dialogue and user-friendly interfaces. Just as normal dialogue expresses meaning not only through words but also through gestures and facial expressions, a computer dialogue uses similar elements—such as icons for questions, exclamations, or restrictions, color highlighting for specific words, or character styling. However, excessive brightness causes distractions and can disrupt perception; thus, an optimal combination of color design and selected elements must be determined. Information visualization in multimedia learning tools must comply with requirements regarding image color, clarity, contrast, reading efficiency, symbolic data display, and spatial arrangement on the screen.

The teacher must be capable of working with the multimedia learning tool and monitoring the stability of the student's actions, the speed of software operations, protection against unauthorized actions, minimization of user action time, and overall operational efficiency.

The deployment of multimedia technologies in teaching executes several primary methods of pedagogical activity, which are traditionally divided into active and passive principles of student-computer interaction. Passive multimedia products are designed to manage the process of presenting information (lectures, presentations, practical exercises), while interactive multimedia tools involve an active student role, allowing them to independently select sections within a topic and determine their learning sequence.

Research regarding the integration of Web technologies into the education system, the creation of electronic learning tools, and methodologies for their effective utilization has been analyzed by domestic and foreign scholars. Specifically, scientific investigations have been conducted by Lin Qingsong [2], Jiajun Wu [3], V.P. Djadja [4], J.S. Drevich [5], V.M. Monakhov [6], and others. Lin Qingsong, a researcher from Nanyang Normal University in China, analyzed the teaching model of multimedia technology in web education and its necessity in his study titled *"The Application of Multimedia Technology in Web Education"*.

The study emphasizes that Web education utilizes modern information technology as the main direction for innovative teaching. Jiajun Wu, a scientist from the Massachusetts Institute of Technology, envisioned applying multimedia technologies to explore the physical properties of unstructured video sources. In V.P. Djadja's research, theoretical foundations of thematic immersion were developed for teaching mathematics in a computer classroom equipped with an interactive whiteboard based on a comprehensive multimedia approach, and theoretical principles were applied by developing a multimedia framework for the topic. J.S. Drevich's dissertation abstract explored using multimedia technologies when studying the "History of Information Technology" in pedagogical higher education institutions.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

Through the collaborative efforts of educational personnel, scientists, programmers, multimedia educational tool manufacturers, and practicing teachers, a new information-educational environment has been established. In this environment, integrating educational and informational approaches into the content, teaching methods, and technologies has assumed a decisive significance. One of the foundational elements of this new information-educational environment is multimedia technology. Multimedia technologies stand as one of the most promising and popular directions in the sector [7].

RESEARCH METHODOLOGY

Multimedia tools have long been used in information technology classes. However, an analysis of the quality of education in certain general secondary schools today indicates that the use of interactive electronic information-educational resources is low [1]. These resources ought to clarify learning materials using information and communication technologies in accordance with state education standards and curricula, facilitate effective subject mastery, support independent learning, include video, audio, animation, tables, text, and dictionaries, and provide supplementary materials to enrich the core content.

This low utilization is due to several reasons:

- **Firstly,** the absence of necessary equipment or appropriate software in classrooms, and the execution of information technology classes in non-specialized rooms. Furthermore, some IT teachers in secondary schools lack digital technology competency and the skills to quickly master modern software interfaces.
- **Secondly,** animation models of multimedia technology are insufficiently incorporated into the IT educational process, which is tied to inefficient methodologies of their application. On one hand, poorly conceived model designs do not allow taking full advantage of visual aids; on the other hand, teachers are not fully prepared to use traditional and modern didactics in combination.

All these factors indicate the necessity of creating tools that are convenient for IT teachers to use during lessons, along with carefully planned, effective methodologies for their application.

When analyzing the most popular interactive training courses on information technology available on the Internet, it becomes clear that effective IT teaching requires the following capabilities:

- The ability for a teacher to prepare for a lesson quickly and display the learning resource at any time and place;
- Time-saving opportunities when learning new material through rapid modification of the presented data;
- Providing interactivity, including creating conditions for organizing the "presentation of new knowledge" stages;
- Dynamism in the presented text and graphic materials;
- The ability to study processes as a whole or broken down into parts;
- The capability to demonstrate processes and phenomena that are otherwise difficult to show full-scale within an IT classroom;
- The ability to influence the course of a specific process or phenomenon by changing the parameters of an animation model;
- Visual depiction of mathematical structures using dynamically changing graphs, including functional dependencies of physical quantities;
- The provision of supplementary learning materials, among other assets.

ANALYSIS AND RESULTS

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

When teaching certain topics in information technology, multimedia computer technology and network technology can be integrated closely to deploy multimedia learning resources via various online web platforms. Generally, multimedia is a combination of text, graphics, animation, video, sound, special effects, etc. Because it encompasses boundless spatial dimensions, it alters not only the questions we study and understand but also changes the method of information distribution. The development and rapid dissemination of network technology has exerted an efficient influence on the educational system.

Building multimedia learning materials, managing multimedia information resources, and training a primary multimedia information resource system that includes the main functions of multimedia resource applications form the material basis of multimedia teaching in schools. Multimedia-driven, student-oriented teaching and the configuration of learning environments are improving step-by-step.

MULTIMEDIA PROCESSING SOFTWARE

When developing a multimedia educational framework, a series of processes must be executed. These include selecting the educational field, analyzing the necessary disciplines, choosing the best software for recording video lectures, and editing the recorded lectures. Several programs record video lectures, notably Webineria, UltraVNC Screen Recorder, Captivate, BB FlashBack Express, Camtasia Studio, and Jing. They capture actions on a computer screen, record microphone audio, and convert them into video formats that computers can process.

Among these tools, Camtasia Studio stands out due to its interface, numerous format options, the ability to add symbols and annotations to video files, and its capacity to generate menus for lessons. Audio files can also be created using this software. During lesson recording, it is possible to highlight specific areas of the screen. Because of these advantages, Camtasia Studio was selected as the lecture-recording software. Camtasia Studio is an excellent utility program that records screen imagery and movements and saves them to computer memory in various extensions. Additionally, recorded videos can be edited and displayed using dedicated players. The program captures actions and audio from any part of the screen and typically saves them in the .AVI standard.

Video documents created with this software can be exported to programs supporting the following formats: AVI, SWF, FLV, MOV, WMV, RM, GIF, and CAMV. Moreover, any video can be compiled into a standalone *.exe file with a built-in player. A range of effects and extra options facilitate creating files suitable for distance education, delivered through user-friendly operations via the program's straightforward interface.

Camtasia Studio consists of four utility components: Camtasia MenuMaker, Camtasia Player, Camtasia Theater, and Camtasia Recorder. The core component of the software package is undoubtedly Camtasia Recorder. All lessons were created using this specific program. At the bottom of the Camtasia Studio interface is a workspace known as the *timeline*, through which various operations can be performed on audio and video files. These operations include joining files together and cutting out unnecessary parts. The center of the main window houses the "Clip Bin" section, which displays the list of files the program can interact with. These files can be viewed in the video player on the right. This small Camtasia Player executes just one task—displaying AVI files.

The **Task List** contains the available feature categories. In this section, windows for audio recording and applying created files to PowerPoint can be opened.

- Under the **Add** section, the following options are located:
  - *"Import media"* – opening ready-made video files;

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

- *"Title clips"* – adding text overlays to the video files under preparation;
- **"Voice narration"** – recording voiceovers;
- *"Record camera"* – opening windows to edit files captured via video camera.

- Under the **Edit** section, the following features are located:
  - *"Audio enhancements"* – processing sound and removing noise;
  - *"Zoom-n-Pan Properties"* – processing the current file in various dimensions and scales;
  - *"Callout Properties"* – adding and editing various automated shapes and callouts;
  - *"Transitions"* – adding diverse transition animations;
  - *"Open captions"* – defining the initial state of subtitles for files;
  - *"Flash quiz and survey Manager"* – opening windows to integrate projects designed in Macromedia Flash.
- Under the **Produce** section: Options to save the prepared project in various formats and burn them onto DVD/CD discs are available.

In the digital technology landscape, there are online authoring platforms of all configurations, such as Google Classroom, through which a virtual educational process can be organized.

In a virtual classroom similar to the Google Classroom platform, a teacher can remotely assign educational exercises and assessment tasks to monitor knowledge. Students can complete their entries and lesson assignments during their free time. Any document type, presentation, spreadsheet, or image can be uploaded here. For example, lesson announcements, documents, YouTube educational video resources for studying, presentation materials for exploring topics, etc. Generally, Google Classroom stands out because it is accessible to everyone. There are two ways to use Google Classroom:

1. Using an account created by an educational center under the educational center's domain;
2. Accessing Google Classroom through an existing Google account platform without creating a new one.

Figure 1. Google Classroom window in the user interface

Through Google Classroom, a teacher can assign individual tasks to each student and provide assignments for independent work. To achieve this, once the student enters their credentials, the main page of the platform is displayed, revealing all classes previously set up by the teacher. Along with the class/subject title, the name of the instructing teacher is shown. If there are multiple instructors, the folder must be accessed for verification.

Each of these classes is linked to a Google Drive folder, where all documents related to the class can be uploaded. All information saved in Google Drive is entirely private, and no one—not even the teacher—can access it arbitrarily outside assignment pathways. Within the Google Classroom environment, assignments for learning information technology can be completed via the "Classwork" (*Zadaniya*) tab in the course interface created under the teacher's account.

CONCLUSION AND RECOMMENDATIONS

Currently, to organize the educational process effectively and deliver quality education to students, shaping the methodological provision for independent learning based on web technologies is considered vital. Particular attention must be paid to organizing learning materials based on didactic, scientific-methodical, pedagogical-psychological, aesthetic, and hygienic requirements. Specifically, electronic multimedia assets within the Google Classroom environment proposed in this article must highlight subject matter in accordance with the aforementioned student requirements and influence efficient mastery of relevant discipline concepts.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 05. MAY ,2026

New opportunities open up when organizing the educational process through multimedia technologies, as well as when developing students' creative capacities. To implement active learning methods effectively, major initiatives must be taken to equip classrooms with sufficient digital technologies and prepare the methodological and information database for organizing the educational process.

When selecting a multimedia educational tool, each instructor must consider the specific nature and unique characteristics of a given academic subject, ensuring the exploration of its conceptual apparatus, core laws, and methodological properties. Furthermore, the advantages of multimedia technologies as educational instruments are undeniable. These include: the ability to combine logical and imaginative methods of absorbing information; activating the learning process by enhancing visualization; and interactive engagement that allows controlling data presentation within certain limits—such as adjusting settings individually, studying results, and responding to program prompts according to specific user choices. Students can also establish the flow rate and number of repetitions that match their personal academic needs.

Consequently, the educational process deploying multimedia technologies (network technologies, electronic manuals, etc.) transforms the student into a subject of communicative dialogue with the teacher, cultivating independence and creativity in their educational endeavors. In conclusion, it can be stated that today's modern educator must not only provide quality education to students but must also be highly proficient in working with advanced technical equipment and modern digital technologies.

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