E- Global Congress
Hosted online from Dubai, U. A. E., E - Conference.
Date: 29th April 2024
Website: https://eglobalcongress.com/index.php/egc
ISSN (E): 2836-3612

CONCEPTS OF THE CONTENT OF MULTIMEDIA TECHNOLOGIES IN THE EDUCATIONAL PROCESS

Radjapov Komil Askarovich
Candidate of Pedagogical Sciences, Docent, Department of Higher Mathematics, Fergana Polytechnic Institute, Fergana, Uzbekistan

Abstract

This paper explores the conceptual framework and practical applications of multimedia technologies in the educational process. As digital tools become increasingly prevalent in classrooms worldwide, understanding how multimedia can enhance teaching and learning experiences is essential. The paper begins by defining multimedia and examining its various forms, including text, images, audio, video, and interactive elements. It then delves into the theoretical underpinnings of multimedia learning, drawing upon cognitive science and educational psychology to explore how different media formats can influence information processing and retention. Next, the paper discusses the integration of multimedia technologies into educational settings, highlighting best practices for designing and implementing multimedia-rich learning environments. Case studies and examples demonstrate how multimedia can be used to engage learners, accommodate diverse learning styles, and foster deeper understanding of complex concepts. Finally, the paper addresses challenges and considerations associated with multimedia use in education, including accessibility, technological limitations, and the need for teacher training and support. By examining the concepts and applications of multimedia technologies in education, this paper aims to provide educators, policymakers, and instructional designers with insights and strategies for leveraging multimedia to enhance teaching and learning outcomes.

Keywords: multimedia technologies, mathematical concept formation, diagnostic tasks, methodological framework, mathematics education, interactive learning, virtual manipulatives, data analysis, student assessment, educational technology.

ISSN (E): 2836-3612

Introduction

In contemporary educational environments, the integration of multimedia technologies has emerged as a transformative force, reshaping traditional teaching methodologies and enriching learning experiences. This introduction serves to illuminate the nuanced concepts and practical implications of multimedia technologies within the educational process, emphasizing the imperative for educators to grasp their multifaceted nature and adeptly utilize them to maximize pedagogical effectiveness.

Multimedia technologies, encompassing a diverse array of digital media forms such as text, images, audio, video, animations, and interactive elements, have revolutionized the educational landscape. Their versatility allows educators to engage learners dynamically, present complex concepts comprehensively, and cater to diverse learning modalities effectively. By amalgamating various media modalities, multimedia facilitates deeper comprehension, enhances retention of information, and cultivates critical thinking and creativity among learners.

Rooted in principles drawn from cognitive science and educational psychology, the theoretical underpinnings of multimedia learning form a crucial foundation for understanding its efficacy in educational contexts. The application of theories such as dual coding theory, cognitive load theory, and multimedia learning theory provides insights into how learners process and interact with multimedia content, guiding the design and delivery of pedagogically sound instructional materials.

Moreover, this paper endeavors to elucidate practical strategies for the seamless integration of multimedia technologies into educational settings. From interactive whiteboards and educational apps to virtual reality simulations and online collaborative platforms, educators have an expansive toolkit at their disposal for harnessing the potential of multimedia to create immersive and engaging learning environments. Real-world examples and case studies will illuminate innovative approaches to leveraging multimedia in diverse educational contexts.

However, the integration of multimedia technologies into education is not without its challenges and considerations. Accessibility concerns, technological constraints, disparities in digital literacy, and the imperative for ongoing professional development necessitate careful navigation by educators. By addressing these challenges and adopting a learner-centric approach to multimedia integration, educators can ensure equitable access to high-quality educational experiences for all learners.

The main part

Multimedia is a technology that allows you to combine data, sound, animation and graphics, converting them from analogue to digital form and vice versa. “Multimedia” is a complex word consisting of two simple ones: “multi” - a lot and “media” - a carrier, that is, multimedia implies many different ways of storing and presenting information (sound, graphics, animation, and so on). [1].

If we talk about multimedia as a technology for presenting information, then it is necessary to mention two aspects - hardware and software. The hardware side of multimedia can be represented by both standard means (graphics adapter, monitor, sound card, etc.) and additional ones (video card with television input/output, etc.)

The software side of multimedia can be divided into purely applied (the applications themselves, providing the user with information in one form or another), as well as specialized, which includes the tools used to create multimedia applications. This category includes professional graphic editors, video editors, tools for creating and editing audio information, etc. [2].

One of the first consumer multimedia programs was computer games. They are the most common software product that takes full advantage of multimedia technology: high-resolution graphics, animation, sound, music and voice acting are present in all modern games.

In the book “Multimedia” by M. Kirmayer, multimedia is defined as the combination of the ability to create video effects with sound effects when controlled using the dialog (interactive) software. Dialogue means that the user plays the most active role in communicating with the computer. He can give the computer his instructions and demand their execution. Or you can do without it by planning the work of your multimedia applications and entrusting their execution entirely to the computer.

Video effects can be represented by showing interchangeable computer slides, cartoons and video clips, mixing images and texts, moving (scrolling) images, changing colours and image scales, flickering and gradual disappearance of the image, etc. They are usually accompanied by speech and music. The combination of video and audio effects significantly increases the amount of information that comes from the computer to the user and ensures effective and simultaneous

ISSN (E): 2836-3612

perception of it by two of the most important human senses - visual perception and hearing.

Multimedia technology has become a part of everyday life and is successfully used in many user applications. But for such applications to work successfully, the computer itself must meet the multimedia requirements.

Thus, a “multimedia computer” is a computer on which multimedia applications can fully realize all their capabilities. A multimedia computer must be able to do a lot: display graphic and video information, animation on the monitor screen, reproduce various sounds and music in high quality, including from music CDs, and much more.

The computer, being the most modern tool for processing information, serves and serves as a powerful technical tool for teaching. It plays the role of an indispensable assistant in the education and general mental development of preschool children. Because a computer is attractive to children, like any new toy, and that is exactly how they look at it in most cases. We begin communication between preschool children and computers with computer games, carefully selected taking into account age and educational focus. [1,3].

The use of computers in educational and extracurricular activities looks very natural from the child’s point of view and is one of the effective ways to increase motivation and individualize learning, develop creative abilities and create a favourable emotional background. Modern research in the field of preschool pedagogy K.N. Motorina, S.P. Pervina, M.A. Kholodnoy, S.A. Shapkina et al. indicate the possibility of mastering a computer by children aged 3 - 6 years. As is known, this period coincides with the moment of intensive development of the child’s thinking, preparing the transition from visual-figurative to abstract-logical thinking [4].

At this stage, the computer acts as a special intellectual tool for solving problems of various types of activities. Thinking, following what was put forward by A.V. Zaporozhet's concept of amplification (enrichment) is the intellectual basis for the development of activity, and the process of mastering generalized methods of solving the problems of activity leads to its implementation at an increasingly higher level. And the higher the intellectual level of activity, the more fully all aspects of the personality are enriched in it. As is known, the game is one of the forms of practical thinking [5].

ISSN (E): 2836-3612

In the game, the child operates with his knowledge, experience, and impressions, displayed in the social form of game methods of action, and game signs that acquire meaning in the semantic field of the game. Research by Novoselova S.L. indicates that the child discovers the ability to endow an object that was neutral until a certain time with play significance in the semantic field of the game. It is this ability that is the psychological basis for introducing a computer into play for a preschooler as a gaming tool. The image that appears on the display can be endowed by the child with playful meaning in a situation where he builds the plot of the game, using the figurative and functional capabilities of a computer program [6].

Analysis of teaching aids (N.U. Bikbaeva, A.V. Beloshistaya, V.V. Danilova, A.A. Stolyar) and our research allow us to highlight general didactic methodological approaches to the mathematical and speech development of children, forming generalized methods of teaching actions of preschool children, and mono-approaches associated with solving specific problems before mathematical and speech training [7].

General didactic approaches include pedagogical tools of the associative-reflex concept of assimilation, the theory of meaningful generalization, the gradual formation of mental actions, the suggestopedic concept of learning, neurolinguistic programming, and behaviourist theory.

Mono-approaches to mathematical and speech development allow the child to understand the educational task through the formation of a system of elementary mathematical concepts and the foundations of speech culture, the formation of prerequisites for mathematical thinking, initial forms of educational activity, the development of sensory abilities, expanding the vocabulary and improving coherent speech.

According to the pedagogical concepts of I.G. Pestalozzi, M. Montessori, K.N. Ventzel, K.D. Ushinsky, J. Piaget's genetic theory of intelligence, the processes of language acquisition and mathematical culture are conditioned by a well-organized developmental environment.

Scientists M.M. Alekseeva, V.I. Yashina, A.V. Beloshistaya, and T.V. Taruntaeva believe that integrated methodological approaches are associated with the use of teaching methods and techniques that allow the development of the mathematical and speech abilities of a preschooler at the activity level [8].

ISSN (E): 2836-3612

At the present stage of development of the theory and methodology of preschool education, such methods can be traced in the structure of work with complex mathematical-speech electronic educational environments. The operational components of children's educational activity in the course of mathematical development within computer environments are formed thanks to:

- direct teaching of counting, problem-solving, and discrimination of shapes and quantities;
- performing tasks in which only the result of an activity is indicated, the method of achieving it is determined by the pedagogical tools of the environment (solve a problem, characterize a set);
- using step-by-step instructions to practice examples of speech accompaniment for mathematical actions.

The ability of children to replace a real object in a game with a game object with the transfer of real meaning to it, a real action with a game action that replaces it, underlies the ability to meaningfully operate with symbols on a computer screen. From this, it follows that computer games should be inextricably linked with ordinary games. One of the most important lines of mental development of a preschool child consists of a consistent transition from more elementary forms of thinking to more complex ones. Scientific research on the use of educational and educational computer games, organized and conducted by specialists from the Association “Computer and Childhood” in collaboration with scientists from many institutes since 1986, and studies conducted in France, have shown that thanks to the multimedia method of presenting information, the following results are achieved :

1. Children more easily grasp the concepts of shape, colour and size;
2. The concepts of number and set are comprehended more deeply;
3. The ability to navigate on a plane and in space appears faster, and the selectivity of attention and memory are trained;
4. They master reading and writing earlier;
5. Vocabulary is actively expanding;
6. Fine motor skills develop, and the finest coordination of eye movements is formed.
7. The time of both simple reaction and choice reaction is reduced;
8. Purposefulness and concentration are fostered;
9. Imagination and creative abilities develop;

ISSN (E): 2836-3612

10.Elements of visual, figurative and theoretical thinking develop.

By playing computer games, a child learns to plan, build the logic of elements of specific events and ideas, and develop the ability to predict the outcome of actions. He begins to think before he acts. Objectively, all this means the beginning of mastering the basics of theoretical thinking, which is an important condition in preparing children for school.

One of the most important characteristics of computer games is their educational function. Computer games are structured in such a way that a child can get not just a single concept or a specific learning situation, but will receive a generalized idea of all similar objects or situations.

Thus, the child develops such important thinking operations as generalizations, classification, and computer games that increase the self-esteem of preschoolers. Children's achievements do not go unnoticed by themselves and others. Children feel greater self-confidence and master visual and effective thinking operations [9].

The use of computer games develops “cognitive flexibility” - the child’s ability to find the largest number of fundamentally different solutions to a problem. Anticipation abilities also develop. The formation of elementary mathematical concepts occurs based on the construction and use of visual models by children. During the lesson, children learn to construct object models using a one-to-one correspondence of substituents. This model allows you to visualize quantitative relationships: Substitution of objects occurs by superimposing or applying substituents, which contributes to understanding the meaning of substitution [10]. If the task is successfully solved and the correct choice is made, pictures are drawn on the screen, objects are moved, the game situation changes and the child is offered new, more difficult tasks. Thanks to these programs, classes become relaxed and create a desire to succeed.

Conclusions

Computer games help improve visually effective thinking, translate it into a visual-figurative plan, form elementary forms of logical thinking, teach you to analyze, compare, and generalize objects, and require the ability to concentrate on a learning task, remember conditions, and fulfil them correctly. Computer games do not impose a pace of play on children; they take into account children’s

ISSN (E): 2836-3612

answers when creating new tasks, thereby providing an individual approach to learning.

There are unreasonably few computer programs for older preschool children with role-playing solutions. Meanwhile, it is precisely such programs that will help attract children's attention to the inner world of others, encourage them to put themselves in their place, and help them overcome obstacles. "All computer programs for preschoolers should have a positive moral orientation, they should not contain aggressiveness, cruelty, or violence." Programs with elements of novelty, surprise, and unusualness are of particular interest.

Computer programs and didactic tasks developed by teachers for children of senior preschool age are based on the principle of self-control. The plot of the program itself tells the children whether they made the right or wrong decision. In preschool age, methods of external encouragement are widely used: when game problems are solved correctly, the child hears cheerful music or sees a sad face if the problem is solved incorrectly. Children wait for the assessment and react emotionally to its character. They have a strong emotional positive attitude towards classes and the computer. The use of interactive equipment when teaching mathematics to older preschoolers and visual activities helps to consolidate and clarify specific mathematical content helps improve visual-effective thinking, transfers it into a visual-figurative plan, forms elementary forms of logical thinking, develops a sense of colour and composition.

References

1. Petrov E. Educational computer games. // J. Preschool education. - 2001. - No. 8. - P. 60-68.
2. Davydov V.V. Problems of developmental education. - M.: Education, 2006. - 246 p.
3. Petrov E. Educational computer games. // J. Preschool upbringing. - 2001. - No. 8. - P. 60-68.
4. Dzhanpeisova G.E. Modern aspects of mathematical education of preschool children. / Toolkit. T.: TSPU, 2017 - 104 p.
5. Musurmon, I., Zulfiya, A., Surayyo, A., Muxayyo, A., & Aziza, K. (2022). The Importance Of Interactive Methods And Logical Games In Preparing Students For Professional Pedagogical Activities. *Journal of Positive School Psychology*, *6*(11), 1293-1296.

6. Qahhorova, G. (2023). O ‘quvchilarning tinglash malakasini oshirish uchun diktantlardan samarali foydalanish usullari. *Journal of Science-Innovative Research in Uzbekistan*, *1*(9), 1255-1260.
7. Askarovich, R. K. (2024). Exploring multimedia methods for diagnosing mathematical concept formation: a methodological framework. *Western European Journal of Modern Experiments and Scientific Methods*, *2*(3), 30-35.
8. Askarovich, R. K. (2023). Foundations for educational institution management: theoretical and methodological frameworks. *American Journal of Pedagogical and Educational Research*, *18*, 160-167.
9. Zikirov, M. C., Qosimova, S. F., & Qosimov, L. M. (2021). Direction of modern design activities. *Asian Journal of Multidimensional Research (AJMR)*, *10*(2), 11-18.
10. Alikulova, M. (2022). Preparation of preschool children to work with the model. *Asian Journal of Research in Social Sciences and Humanities*, *12*(4), 41-44.