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THE USE OF ELECTRONIC EDUCATIONAL RESOURCES IN THE IMPLEMENTATION OF STEAM EDUCATIONAL TECHNOLOGY AND THEIR IMPORTANCE

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Annotation: This article highlights the use of electronic educational resources in the implementation of STEAM educational technology and their importance.
Keywords: preschool education, multimedia tools, pedagogical software tools, integration of visualization and multimedia.

The use of electronic educational resources in the implementation of STEAM educational technology is the process of effectively organizing the integration of science, technology, engineering, art, and mathematics through digital tools. Electronic educational resources are digital learning materials such as videos and animations, virtual laboratories, interactive tests, and educational platforms.

Methods of using electronic educational resources in the implementation of STEAM technology include: conducting experiments through virtual laboratories; explaining complex processes with the help of simulations; visualizing topics through multimedia tools such as videos and animations; organizing projects and group activities through online platforms; and developing practical skills through 3D modeling and programming.

The importance of using electronic educational resources lies in increasing interactivity, encouraging children to participate actively in lessons, and simplifying complex concepts by presenting them in visual and practical forms. They also provide opportunities for project-based learning and support an individual approach to education.

Electronic educational resources are among the main tools in STEAM education, making lessons modern, interactive, and effective while contributing to the development of children's practical and creative skills.

The use of electronic resources in STEAM education means connecting theory with practice, making learners active participants, and significantly improving the quality of education.

Pedagogical software tools are computer programs and digital technologies designed to organize the educational process and make teaching and learning more effective. They are considered didactic tools intended for the partial or complete automation of the learning process

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through computer technologies. These tools are regarded as one of the promising ways to improve the efficiency of education and are used as modern teaching technologies.

Main functions of pedagogical software tools:

- Explaining educational materials (through text, video, and animation)
- Reinforcing knowledge (through exercises and tests)
- Assessing learners' knowledge (through online tests and evaluation systems)
- Making the educational process faster and more convenient

Pedagogical software tools include software products (a set of programs) aimed at achieving specific didactic goals related to educational activities, as well as technical and methodological support and additional auxiliary tools.

In preschool education, pedagogical software tools are digital programs and applications designed according to the developmental characteristics of children aged 3–7. Through games and interactive methods, they provide education while supporting children's intellectual and creative development in a modern and effective way. These tools are developed with consideration of children's interests, attention span, and age characteristics.

They contribute to the development of children's thinking, speech, and memory, help them learn information through play, enable easy understanding of colors, shapes, numbers, and letters, and encourage independent learning.

Types of pedagogical software tools in preschool education:

- Developmental game programs – logical games, puzzles, and riddles
- Educational programs – about the alphabet, numbers, colors, and animals
- Multimedia tools – cartoons, songs, and interactive stories
- Interactive activity programs – learning through clicking, selecting, and drag-and-drop actions

The purpose of using pedagogical software tools in preschool education is to prevent children from getting bored and to create an engaging learning environment. They help children learn more quickly through visual and auditory input, and they also support the development of attention and memory.

The pedagogical software tools to be developed must meet the following methodological requirements:

1. Pedagogical software tools should be built on the interrelation of conceptual, visual, and action-based components of presenting educational material.
2. They should present learning material in the form of a well-structured, higher-level system, taking into account logical interconnections between different subject areas.
3. They should provide opportunities to assess learners' step-by-step mastery of the learning material through various forms of assessment and control.

Educational-methodological electronic products should have the following characteristics:

- ensuring the delivery of learning activities at a high-quality level of education;
- enabling independent learning and self-assessment;
- supporting the use of various methods for independent information learning;
- developing experimental and research skills;
- promoting the development of learners' creative abilities;

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- providing a non-traditional approach to teaching and saving time in studying learning materials.

The relevance of using information and communication technologies in the educational and upbringing process lies in the following:

Through the use of ICT in the educational process, children are able to:

- acquire deeper and more complete understanding of the presented information;
- increase their interest in learning activities;
- easily and quickly understand and absorb lesson topics in an engaging way;
- become independent thinkers through the use of multimedia tools;
- improve their ability to remember and effectively master lesson content;
- develop memory and attention skills through innovative technologies;
- actively participate in all learning activities within the group.

Requirements:

- strong interaction between the educator and children;
- development of children's independent working skills;
- availability of a specially equipped and development-oriented room to improve computer literacy;
- proper positioning of the monitor at least 70 cm from the child's eyes;
- clear adjustment of contrast and colors to ensure visual comfort for children;
- the most important factor – the child's age.

Methods: Use of ICT includes practical drawing, oral explanation, conversation, visual methods, modeling, and game-based learning. Examples include: "Draw the missing part!", "Complete the shape!", "Help the artist!", "Place the puzzles correctly!", and distinguishing between domestic and wild animals through their real sounds. In preschool education, methodological requirements for pedagogical software tools are criteria that ensure programs are suitable for children's age characteristics, aligned with educational goals, and are effective, safe, and development-oriented.

The main methodological requirements include:

1. Age appropriateness requirement
   - The program should correspond to the developmental level of children aged 3–7;
   - It should not contain complex texts or concepts;
   - It should mainly rely on images, sounds, and animations.
2. Developmental character
   - It should develop thinking, memory, attention, and speech;
   - It should include tasks that enhance logical thinking;
   - It should encourage independent thinking.
3. Game-based organization
   - The learning process should be in the form of games;
   - It should include interesting and interactive elements;
   - It should ensure active participation of the child (clicking, selecting, moving actions).
4. Systematic and consistent structure
   - Materials should be presented from simple to complex;
   - Topics should be logically connected;
   - It should support step-by-step learning.
5. Individual approach
   - It should allow each child to learn at their own pace;

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- It should provide the possibility to adjust difficulty levels.

6. Visualization and multimedia integration
   - Images, audio, video, and animations should be used together;
   - Information should be presented in a clear and memorable way for children.
7. Hygienic and psychological requirements
   - Screen colors should not harm the eyes;
   - There should be no overly fast or sharp animations;
   - It should not negatively affect the child's psychological state.
8. Pedagogical control
   - The educator should be able to monitor results;
   - There should be opportunities for assessment and analysis.

In preschool education, pedagogical software tools should not only be interesting but also methodically well-designed, support children's development, and correspond to educational goals.

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