ISSN NO: 2770-2367
Date of Publication: 10-05-2023

# Digital Intellectual Educational Resources and Their Classification

**Rustamxon Yusuf ug'li Mexmonov**
Tashkent state pedagogical university named after Nizami
Lecturer at the department of higher mathematics and information technologies in education, Uzbekistan.
E-mail: rustammexmonov@gmail.com

**Abstract:** In this article, the use of information technology and computer systems in the educational process gives students the opportunity not only to use graphic illustrations, increase the speed of information transfer and increase the intensity of understanding, but also develop their intellectual abilities. In the information age, many higher educational institutions of the world conduct large-scale scientific research on information technologies, information and communication technologies and their modeling tools, motivational mechanisms for the development of the competencies of many teachers. The emergence of electronic devices and global telecommunication environments has led to the creation of educational software tools using hypertext, multimedia and hypermedia technologies, virtual systems. The use of such systems has made it possible to digitize many electronic programs, reference books, books and other resources in information storage systems. This article presents analytical data aimed at enriching intellectual educational resources with the help of information technologies based on the principles of openness, the network principle, the principle of control, the principle of adaptation, the principle of computer support and the principles of data collection.

**Keywords:** educational, theoretical lessons, examples, auxiliary references, insert, the principle of networking, the principle of control, the principle of adaptation.

## 1. Introduction

The transition of the educational system to a new modern level can be realized only by creating computer packages (that is, electronic information educational resources, manuals, simulators, virtual stands and educational test editor). They create a single computerized environment in the form of a computer for a special audience of an educational institution, or in dormitories equipped for students' independent work, as well as on a personal computer at home. Based on the official definition of electronic products, textbooks and manuals, it is necessary to expand and clarify the concept of electronic information and educational resources. Therefore, it is one of the urgent issues to clarify the basic concepts related to electronic information and educational resources. Electronic information educational resource is the methodological basis of distance education, a new form of education. Concepts of electronic information and educational resources are being analyzed in different ways. For example, text and educational materials on diskettes, a presentation, etc.

Electronic educational products consist of graphic, text, number, sound, music, video, photo and similar information. The electronic educational product is displayed in various electronic sources in magnetic (magnetic tape, magnetic disk, etc.) and optical (CD-ROM, DVD, etc.) forms, as well as in the information storage databases of the electronic computer network (Internet).

## 2. General aspects of electronic education textbooks

The electronic educational product consists of systematic materials on a specific scientific and practical field of knowledge, and ensures that students and pupils acquire the necessary knowledge and practical skills in this field in a creative and active way. Electronic educational products should be distinguished by high quality of execution and artistic formation, completeness of information, quality of methodological equipment, quality of technical execution, openness, logic and connection sequence [1].

ISSN NO: 2770-2367
Date of Publication: 10-05-2023

The electronic information learning resource and the printed textbook have the following aspects in common:

- educational material is described in a certain field of knowledge [2];
- educational material is covered at the level of modern achievements of science, technology, technology and culture [3];
- the educational material is systematically described in the textbooks, that is, it describes the entire finished work, which ensures the integrity of the textbook, consisting of many elements with meaningful relations and connections [4].

An electronic learning resource (even the most well-designed one) cannot and should not replace the traditional printed book. Just as the adaptation of a work is considered a new genre, the electronic information educational resource is a completely different genre of educational literature [5].

The electronic information educational resource should have the following properties:

- ensuring high-quality training sessions [6];
- creating opportunities to create and evaluate knowledge itself [7];
- bringing lectures and practical trainings closer to each other [8];
- to have a harmonious classification of the development of informational and educational resources [9];
- textual and other information materials should be updated (hypertexts) and illustrated (multimedia tools, pictures, tables, diagrams, etc.) [10].

Electronic information education resources should be different from the usual textbooks in the educational process, involving the capabilities of the human brain, in particular, auditory and emotional memory, as well as using computer efficiency to facilitate understanding, remembering existing concepts and examples as much as possible [11].

The following types of e-learning resources are available[12]:

Electronic information is divided into two types according to the use of educational resources:

1) Electronic information educational resources intended for public use should not require large system resources of a computer, since they are often installed on servers and can be accessed through a computer network.
2) Electronic information educational resources for individual use are designed for studying educational material with or without the participation of the student.

Both types of e-learning resources can be used in lectures. Regarding the delivery of study materials: this type of e-textbooks does not allow you to move to the next section or module without mastering the study material of one section or module [13].

According to the update of educational information and materials, it can be divided into the following:

1. Continuously updated electronic textbooks are mainly placed in electronic educational databases (portals, websites, etc.) or electronic libraries.
2. Periodically updated electronic textbooks mainly describe various types of electronic data carriers (diskettes, SD-disks, etc.)

It is also necessary to determine the category of electronic information and educational resources. Electronic information educational resources are divided into the following four types:

- educational materials are presented mainly as verbal text, they have hypertexts and glossaries, as well as 2-dimensional (2D) graphics-diagrams, pictures (up to 25% of the educational material).
- educational materials are partly in the form of text with hyperbola and 2D graphics and 3-dimensional (3D) graphics (up to 25% of the educational material).
- educational materials have text, 2D graphics, video and audio animations and 3D effects (up to 50% of the educational material).
- the electronic information educational resource is created in a virtual environment, using modern network technologies, connected with the teacher through a computer network (Internet) at the level of distance training.

ISSN NO: 2770-2367
Date of Publication: 10-05-2023

Each category of e-learning resources has its own requirements. However, there are a number of requirements that apply to all categories [14]. They consist of:

- the text of modules (paragraphs and topics) should not exceed 4-5 monitor screens (2 pages, preferably);
- hypertexts should not exceed 3 levels, because it is impossible to deviate from the main topic;
- the product system must meet the requirements of computer technology;
- following the recommendations of psychologists and ergonomics experts when creating pages of different colors.

The classification of electronic information and educational resources by categories is based on the following set of requirements [15]:

- pedagogical requirements: these include didactic and methodological requirements;
- psychological requirements;
- technical requirements.

Categories of electronic information and educational resources are marked with "*" (asterisk). The number of stars increases as the quality and complexity of e-textbooks increases. Electronic information educational resources are classified according to four categories. High-category electronic information-educational resources are marked with four asterisks "****", low-category electronic information-educational resources are marked with one asterisk, "*".

Electronic information educational resource should serve to maximally ease the process of understanding and memorizing the most basic concepts and examples by engaging the ways of receiving the human brain (sound, emotional memory, computer tests) than a normal textbook [16]. The text part should be limited, because there are simple textbooks for this, and paper and pencils should be used for deeper learning of computer materials.

Table 1 lists the categories of electronic information and educational resources based on the above requirements.

Therefore, it is necessary to use several principles and approaches in the process of creating electronic information and educational resources.

**The principle of quantization:** dividing the material into sections consisting of modules of minimum size.

**Principle of completeness:** Each module must contain components:

- theoretical lessons;
- theoretical questions;
- examples;
- problems and examples for independent solution;
- questions with answers for the entire module;
- control work;
- auxiliary references;
- commentaries.

**The principle of openness:** Each module should have visual frames that facilitate the acquisition of new concepts and methods [17].

**The principle of branching:** Each module is connected with other modules by hypertext applications, which implies a sequence of information acquisition [18].

**Management principle:** the student manages the exchange of personnel by himself, he can open examples of the required level of complexity and check himself [19].

**The principle of adaptation:** the electronic textbook should meet the needs of the student at a certain time of the educational process [20].

**The principle of computer support:** it is possible to get computer support at any time when using an electronic information educational resource (complex mathematical calculations, vocabulary, checking one's knowledge level, etc.) [21].

**The principle of collection:** it should be done in the format of placing in single electronic complexes and libraries and expanding them with new sections and topics [22].

ISSN NO: 2770-2367
Date of Publication: 10-05-2023

Table 1
Categories of electronic information and educational resources

| **Indicators** | **Categories** | | | |
|---|---|---|---|---|
| | * | ** | *** | **** |
| Coverage of interactive learning material % | 15 | 25 - 45 | 50 - 85 | 86 - 100 |
| Test questions in each section or module | + | + | + | + |
| Level of answers in tests | 1 | 1 | 2 | 3 and more |
| Time limit for answers | - | - | + | + |
| Amount of explanation | - | - | + | + |
| Taking into account the evaluation rating | - | - | + | + |
| Virtual processes and objects | - | - | + | + |
| Hypertexts | + | + | + | + |
| Audio monitoring of educational material:<br>- in some illustrations;<br>-partly in lecture sessions or in educational materials of practical sessions;<br>- fully systematic application. | - | + | + | + |
| Video animations:<br>- in some illustrations;<br>- fully systematic application of partial lectures or practical exercises in educational materials. | - | + | + | + |
| Psychological requirements | | | | |
| Size of screened pages on the topic being studied | up to 5 | up to 4 | up to 3 | up to 3 |
| Musical observation | - | Allowed | Allowed | Allowed |
| Glowing gamma background of pages | Light color does not participate | Light color does not participate | Light color does not participate | Light color does not participate |
| Technical requirements | | | | |
| Consideration of teaching time | - | - | - | - |
| Go to the required page | + | + | + | + |
| Structured presentation of educational material | + | + | + | + |

Electronic information educational resource is necessary for independent work of full-time, part-time and remote students, because:

- learning materials will be facilitated due to the use of other methods (increase of reception methods) in addition to printed textbooks;
- adapts to the student's requirements and readiness, intellectual level;
- conditions for deeper mastery of science are created due to saving time in complex calculations;
- wide conditions are created for self-examination at each stage of work;
- conditions are created to print the completed work in a modern form on a file or printer;
- Acts as a patient coach, providing an unlimited number of clarifications, repetitions, and supporting materials.

## 3. Principles of creating electronic information educational resources

Based on the above, it is recommended to follow the following principles when creating

ISSN NO: 2770-2367
Date of Publication: 10-05-2023

electronic information and educational resources:

**The principle of quantization:** It is necessary to divide the educational material into parts (modules) that are small in size, but have a whole content.

**The principle of completeness:** Each created section (module) consists of the following elements: a theoretical part, structured control questions for testing theoretical knowledge, tests, tasks for independent solving, and exercises aimed at learning practical skills and should consist of historical comments.

The principle of visuality: each section (module) should consist of a sequence of small frames that make it easy to understand and remember new concepts, ideas and methods.

**The principle of branching:** each section (module) should be connected to other sections by means of hyper-text links in such a way that the user can freely choose to switch to other sections at any time. The principle of branching does not limit the materials of the studied subject, but envisages a step-by-step mastering of the subject.

**The principle of control:** Students should be able to independently control the exchange of screen frames, to display any topic or information, concepts, ideas, illustration materials and multimedia on the screen. Students will have the opportunity to test their knowledge and skills by answering control questions and tests and completing practical exercises.

**The principle of adaptability:** the e-learning resource should adapt to the needs of the specific user during the learning process, a practical way depending on the depth and complexity of the material being studied and the future educational stage of the learner. should create an opportunity to change direction. Users should be able to create additional illustration materials according to their needs, interpret the studied concepts graphically and geometrically.

**Computer-assisted principle:** In this principle, learners should use the computer to look for and complete tasks and problems that encourage them to focus on the essence of the learning material at any time during the learning process.

The computer must not only perform complex substitution operations, various calculations and graphs, draw pictures and diagrams, but also perform operations of various complexity levels. It is necessary to check the previously studied and obtained results not only at the response stage, but also in optional cases [15].

**The principle of flexibility:** Electronic information education allows expanding and replenishing the resource with new departments and topics, science and technology innovations, and electronic libraries in special and separate subjects or learners, (it (in accordance with the specialty and course) should form private electronic libraries of teachers or researchers.

## 4. Results, and Discussion

Stages of creation of electronic information educational resources:

Stage 1. To acquaint teachers with available electronic information and educational resources in this field, to acquaint them with the requirements;

Stage 2. Forming a working (creative) group to create electronic information and educational resources;

Stage 3. Structuring the educational module (lectures, materials);

Stage 4. Creation of an electronic information educational resource based on a plan and script, rets

Stage 5. Enzymization and expertise;

Stage 6. Approval of the electronic information educational resource in the scientific council and its distribution as a program.

The technology of creating an electronic information educational resource includes the following steps:

- determining the goals and tasks of development;
- development of the structure of the electronic textbook;
- development of the content of the textbook by sections (modules) and topics;
- preparation of individual structure scenes of the electronic textbook;

ISSN NO: 2770-2367
Date of Publication: 10-05-2023

- programming;
- testing;
- improving the content of the electronic textbook according to the test results;
- preparing a methodical manual for use.

## 5. Conclusion

It is known that a person can remember 5 times more information received with the help of the organs of vision compared to the organs of hearing. Unlike the hearing organs, the information received from the organs of vision is not recoded, but goes directly to memory and is stored for a long time. Not only its content, but also factors such as size, appearance of letters, color and movement of the image can play an important role in receiving information. Therefore, the text of the e-textbook should have its own characteristics, for the students to receive the information, the e-textbook's special features, i.e. highlighting, highlighting, underlining yish, sound can be affected.

It can be seen from the practice of teaching in this way that teaching with the help of multimedia tools is doubly effective. It is known that a quarter of the heard material remains in the memory, if the material given to the listeners is made through video, the possibility of retaining and imagining the information increases by 35-70 percent. Also, if these educational programs are delivered to listeners in the form of audio, video and graphics, retention of the material in memory increases by 70-95 percent.

## References

1. Juraev, R. H., & Karakhanova, L. M. (2021). Model of organization of research activities of 10th grade students in teaching physics and biology. International journal of discourse on Innovation, integration and education, 2(1), 295-299.
2. Mamarajabov M.E. Технологии цифровой дидактики. Европейский международный журнал междисциплинарных исследований и управленческих исследований , 2022 (04), 78–84. https://doi.org/10.55640/eijmrms-02-04-16
3. Yusupova G.Y. Компетентность педагогов: профессиональное развитие, оценочная компетентность и концептуальная основа. Международный междисциплинарный исследовательский журнал Galaxy, 2022, 10 (10), 147–150.
4. Juraev, R. H., & Ganiev, E. G. (2012). Optimal location of the network of comprehensive schools of the region. Pedagogical Sciences, (3), 15-17.
5. Juraev, R. H., & Karakhonova, L. M. (2013). Media education as a factor in improving the quality of schoolchildren's education. Lifelong Education: Continuing Education for Sustainable Development, 11(2), 322-323.
6. Temirov, A. A., and D. S. Habibulloyev., J.G. Ghulomov."Masofaviy ta'limning boshqaruv tizimlari va xizmatlarining umumiy tuzilishi." *Academic research in educational sciences* 2.1 (2021): 203-212.
7. Juraev, R., & Tailakov, N. I. (2004). Informatized education environment as a means of increasing the effectiveness of learning. Uzluksiz talim, (9), 3.
8. Gorbatovskaya, N. A., Muslimov, N. Zh., & Dzhumabekova, G. B. (2015). Influence of legume flour additives on the physical properties of wheat dough. Young Scientist, (6), 141-143.
9. Muslimov, N., Usmonboeva, M., Sayfurov, D., & Turaev, A. (2015). Fundamentals of pedagogical competence and creativity. *Tashkent-2015*.
10. Karimova, N. N., & Muslimov, N. A. (2011). The essence of the competence-based approach in the formation of personal qualities of the future teacher. Young Scientist, (11-2), 162-164.
11. 11.Temirov, A. A., and H. R. Salimova. "Use of modern information and communication technologies in the training of teachers." *Proceedings of the Republican scientific-practical conference" Innovations in the development of information and communication technologies." Karshi*. 2019.
12. 12.Negmatovna, Alimdjanova Dilbar. "The System Of Introduction Of Pedagogical Technologies In The Didactic Processes Of Higher Education On The Example Of Young

ISSN NO: 2770-2367
Date of Publication: 10-05-2023

Psychology." *Eurasian Journal of Learning and Academic Teaching* 3 (2021): 12-16.

13. 13.Gulomov, J., and N. Khikmatov. "Analysis of Electronic Information and Educational Resources Aimed at the use of Innovative and Pedagogical Software." *International Journal of Development and Public Policy* 2.5 (2022): 105-112.
14. Yusupova, G. "Model of development of model competences of a future teacher of informatics." Экономика и социум 9.88 (2021): 1022-1031.
15. Yusupova G., and F.E. Mukhamadieva. "Methods and models of distance learning." JournalNX 6.06 (2020): 81-87.
16. Temirov A.A., Sohobiddinov A. Mamlaktimiz ta'lim tizimida axborot kommunikatsiya va innovatsiyon texnologiyalardan foydalangan holda bilim olish. WORLD SOCIAL SCIENCE (2019): 15-16.
17. Yusupova G.Y. Современное развитие и повышение личностно-профессионального качества учителя информатики. Spectrum Journal of Innovation, Reforms and Development , 2023, 13, 63–66.
18. 18.Djuraev, R. X., J. B. Baltaev, and U. B. Alimov. "Methods of Determining Reference Signals for One and Multichannel Signatural Analyzer of Microprocessor Systems." (2018): 1.
19. Djuraev R.X., S. Y. Djabbarov and T. Q. Toshtemirov, "Analysis Of The Relationship Between The Indicators Of Controllability And Reliability Characteristics Of Data Transmission Systems," *2019 International Conference on Information Science and Communications Technologies (ICISCT)*, 2019, pp. 1-4, doi: 10.1109/ICISCT47635.2019.9011980.
20. Adinaev Sh, and A. A. Temrov. "Java dasturlash tilini o'rgatishda talabalarga mustaqil ish topshiriqlarini berishning namunaviy tuzilmasi." *Fizika, matematika va informatika//2021.–2.–B*: 16-23.
21. Siddikov, I.K., Khujamatov, K.E. and Temirov, A.A., 2022. Models for Determination of Maximum Power in Compatible Management of Hybrid Energy Sources. *Journal of Ethics and Diversity in International Communication*, *2*(3), pp.105-121.