Using New Forms of Textbooks in the Digital Educational Environment

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Abstract

The quality of education is a fundamental topic for discussion not only among scientists, teachers and officials, but also all citizens who are directly or indirectly connected with education. Among the factors that affect the quality of education are: teaching staff; material and technical base; educational and methodological support. Each of these factors is important for determining the quality of education, and each of them affects the quality of education. The aim of the research is to rethink the traditional means of teaching, to identify the features of the virtual educational space and its didactic possibilities in the digital era. We want to show the variety of tools and technologies that a teacher can use in the process of organizing and controlling the educational activities of students in the digital educational environment. But with the advent of new learning tools, teachers are faced with the question of the place and role of the traditional textbook in the educational space.
Keywords: ddigital society; textbook, digital technology; pedagogical activity.

Introduction

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The quality of education is a fundamental topic for discussion not only among scientists, teachers and officials, but also all citizens who are directly or indirectly related to education. The reason for this is the fact that high-quality education can guarantee the training of competitive and in demand professionals who are capable of continuous self-education. You can name many formal signs of quality education, including: conditions in the educational institution; participation in olympiads or competitions; final marks; rating of an educational organization; high reputation in the market of educational services, etc.

Among the reasons that influence the quality of education are: the teaching staff; the material and technical base; the educational and methodological support; the students themselves, who are carriers of knowledge and skills. Each of these factors is important in definition of the quality education and each of them affects the quality of education.

Purpose and objectives of the study

The purpose of the study is to determine the characteristics of the virtual educational space and its didactic capabilities in the era of advanced digital technologies. We want to show the variety of tools and technologies that a teacher can use in the process of organizing and controlling students' learning activities in a digital educational environment. But with the advent of new learning tools, teachers are faced with the question of the role and place of the traditional textbook in the educational environment. The final task of the study is to present digital didactic tools that should be mastered by a teacher who has the competence to use IT technologies in the teaching process.

Literature review

The problems of digitalization have been considered in many scientific sources in the last decade. Scientists in many countries consider this problem from several points of view. Scientists pay much attention to the positive and negative characteristics of digital learning, principles and functional features. Among the new works that address the problem of the university textbook, it should be noted the research of M. N. Lykov, A.V. Khutorsky, Yu. I. Losev, O. A. Vasilyeva, Z. A. Mendubaeva, I. A. Press, Yu.S. Vasilyev, E.G. Tareva and others. Problems of informational and management information-educational environment are discussed by Yu. G. Korotenkov, O. Ilchenko, J. N. Zaitseva,V. I. Soldatkin, V. V. Gura, B. P. Saikov etc. The phenomenon of digitalization in scientific contexts was considered by such authors as: M. A. Stepanova, V. G. Fedotova, A. L. Nikiforov, M. M. Shulman, D. V. Efremenko, M. N. Kuzmin, O. V. Letov, B. G. Yudin, V. G. Gorokhov, A. O. Karpov, S. A. Lebedev, A. I. Rakitov and others Yu.S. Bortsov, D. L. Konstantinovsky, G. E. Zborovsky and others.V. A. Lukyanenko and V. S. Fedorova proved the necessity of an activity-based approach to digitalization of education. Psychological and pedagogical

foundations of the use of information technologies in education are considered in the works of A. G. Asmolov, V. P. Bespalko, V. M. Monakhova, E. S. Polat. Current research trends in the field of learning in the digital educational environment are based on the works of V. I. Baydenko, V. A. Bolotov, I. A. Zimnyaya, M. G. Minin, Yu. G. Tatur, A. V. Khutorskoy, V. D. Shadrikov (Burlakova, 2015).

The definition of the quality education implies a system, model, organization and procedures that guarantee students the necessary and sufficient level of personal and professional development. From positions of modern didactics, the following characteristics of modern quality education are distinguished:

- conceptual level of content in accordance with the level of scientific and technological progress;

- competence-based and activity-based nature of education;

- taking into account the individual characteristics of students;

- variable, alternative and problem-based learning with extensive use of information technologies;

- creating a cultural space for multicultural education in order to form a willingness to live in a multi-ethnic environment;

- independent evaluation of learning outcomes;

- providing conditions for self-assessment, self-certification and self-management in learning and development (Burlakova, 2015).

The result of high-quality education is such personality traits as self-organization and self-identification. Ultimately, a well-educated person should be competitive, successful and in demand in the labor market. It should be able to adapt easily and freely in changing socio-economic conditions, effectively using the received education.

In the modern world the quality of education is known as a mastering of the latest knowledge in basic sciences; social experience; the basic elements of human culture, as well as the capability to use the content of education to solve practical problems. Of course, the concept of quality education is used in many countries and is found in various formulations in regulatory documents relating to different levels of education (Tosh, D., Werdmuller, B., 2018).

It is necessary to understand that the quality of education becomes an important social aspect in the context of the pandemic, when educational organizations of all levels have switched to a distance format. Many participants of the educational process expressed concern about the decline in the quality of education. The scientific community and practical teachers were faced with the question of quickly finding technologies for optimizing the educational process in an online format and updating the means of transmitting the content of education.

In traditional textbooks for schools, educational publications implement a didactic component. As a rule, they take into account the specific features of the individual perception of educational information by students. The didactic component, unfortunately, is not taken into account in textbooks for universities. Teachers and students believe that taking into account the individual characteristics of the perception of educational information ensures the success of students ' academic work. For the assimilation of information, it is important not only its complexity, but also the volume of the educational text. The main didactic requirement for an educational book should be a verified amount of educational information. This is especially true today, when a student, studying in a shortened period, in a remote form, seeks to find the necessary information in the textbook as soon as possible. It is here that the author's didactic literacy should manifest itself.

One of the most important components of digital educational environment is a e-textbook. The e-textbook is intended for the management of independent educational activities of students in the process of mastering of the course (Volkova, 2017).

Methodology

Digital technologies in education have been studied for many years. Scientists and methodologists have accumulated a large amount of knowledge about variable electronic educational resources and educational platforms. However, the process of knowledge accumulation did not develop rationally because the number of computer tools that teachers use in education was constantly growing. The attention of scientists is drawn to the creation of a digital educational environment, but not to the problem of the influence of this environment on the student. As a result, today in education, a huge bank of computer-based learning resources has been formed, which is not subject to classification, expert analysis and evaluation. The teacher does not consider digital educational practices, but only uses them. Although at first it was assumed that the teacher himself should be able to develop and fill electronic educational content, create a technology for its evaluation and application. The teacher does not consider digital educational practices, but only uses them. Although at first it was assumed that the teacher himself should be able to develop and fill electronic educational content, create a technology for its evaluation and application. There is a paradoxical situation: on the one hand, there is a set of educational digital resources, on the other-teachers

who are poorly oriented in the number of electronic educational resources, do not know the technologies of their content, check its quality and include it in the educational reality (Tareva, 2015).

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Empirical diagnostic methods (surveys, questionnaires, interviews) revealed the following trends in the use of computer technologies in the classroom and the teacher's competence in digital technologies in the period 2018-2020. As a result of a survey of teachers (N = 100) of higher educational institutions, we identified three categories of specialists according to the level of their use of online educational resources and the teacher's competence in digital technologies (see Table 1):

Table 1. Teacher categories (IT experience)

Year	N of participants	Designers	Users	Non-Users
2018	100	9	65	26
2019	100	10	70	20
2020	100	15	76	9

The data obtained indicate that the growth in the number of teachers who use electronic resources for educational purposes is obvious. This indicates the growth of digital literacy of teachers. We also see that the number of teachers who do not have experience with electronic resources and are not ready to develop a product for online learning is decreasing.

Thus, we observe the spread of leading trends that are aimed at optimizing the educational environment through the use of digital technologies but we met with the teacher's unwillingness to use digital technologies and, moreover, to develop electronic learning tools, including electronic textbooks. As a result, teachers still use traditional pedagogical technologies in teaching, which do not work effectively in the student audience.

Results

In the educational context, network (digital) technologies have been studied for decades. A very impressive bulk of knowledge has been accumulated about educational electronic resources and platforms, digital educational items. At the same time, an extensive method was used to accumulate knowledge in the field of teaching with the help of information technologies. The number of computer tools has grown significantly. They were designed to solve a specific pedagogical problem and focused primarily on the digitalization of the educational environment, rather than on the problem of its impact on the student. As a

result, a bank of computer learning resources was formed in education, which were not classified and analyzed (Tareva, 2015).

The use of digital technologies in the professional training of students has both supporters and opponents. Many teachers believe that the computer is a barrier to communication between the teacher and the student. Other educators believe that the computer is a time-saving tool. Therefore, we will consider the advantages and disadvantages of information technology (Tihomirova, 2016).

Digital technologies have the following advantages: there is a personalization of the educational process; educational autonomy is developed; the feeling of anxiety and fear in the case of wrong answer is removed; the student is guided by self-education; constructive and critical thinking is formed; there is a step-by-step management of educational activities; operational feedback is established; self-management, self-control and correction of educational activities are taught. (Koroleva, 2016).

Digital technologies also have a number of disadvantages: there is a decrease (and sometimes complete elimination) of the use of group technologies in teaching; there is a weakening of the creative activity of students; there is a weakening of the intellectual and emotional impact of the teacher on students both in a group and individually; students stop communicating with each other; there is a weakening of the main function of education - the development of the student's personality. (Gianelli, 2018).

However, it should be noted not only the relevance of the development of virtual educational environments for the education system in general and for improving the distance learning system in particular. Also relevant is the question of the conceptual foundations of an electronic textbook. At this stage, we are only seeing the development of new software. A significant role is played by the virtual educational environment in the university, or rather one of its components-the virtual multimedia learning environment. However, it is difficult to imagine the learning process only with the help of multimedia. The development of a new electronic textbook is becoming an urgent problem that will significantly improve the quality of education generally.

T. Fenwick and R. Edwards believe that, the main modules of the virtual environment for teaching foreign languages can be the following:

- virtual media library with multimedia training courses;

- virtual electronic library of textbooks and projects;

- virtual music laboratory with authentic audio files in different languages;

- a virtual video library that contains a collection of feature films and documentaries in different languages;

- satellite TV;

- a virtual encyclopedia or system that includes dictionaries, multimedia encyclopedias, and reference books;

- computer test system (Fenwick, T., & Edwards, R., 2015).

Discussions

One of the most important components of digital educational environment is a e-textbook. The e-textbook is intended for the management of independent educational activity of students in the process of assimilation of the content of the course. Such e-textbook can provide: the organization of independent work of the student, including training and self-control of knowledge, training grant a required educational program material; methodological support of the learning process. The electronic textbook must meet the following requirements: scientific presentation of the material, accuracy and reliability of the facts, taking into account the latest scientific achievements; availability for the assimilation of the theoretical part of the educational material that corresponds to the age and individual characteristics of students; practical orientation and practical significance of the material; problem-solving and relevance of practical tasks; the visibility that requires account of sensory perception of the studied objects; the regularity and consistency that means ensuring the consistent learning by students; methodological orientation that provides cognitive, heuristic, research and prognostic functions in student activities; practical orientation that means the disclosure of practical use of the studied material in real life (Belikov, V. A., 1998).

E-book helps to solve the following pedagogical tasks (Y Huang, G. Huang, 2020):

- support and stimulate students' learning motivation;

- encourage their activity and independence, expand opportunities for learning and self-study;

- develop the skills of reflective and evaluative activity of students;

- develop learning skills – set goals, plan and organize your own learning activities;

- promote individualization (personalization) of education;

- promote successful socialization of students.

But with the emergence of new teaching tools, teachers face the question of correcting the quality control of training. Most distance learning courses conducted on the basis of the Internet telecommunications network include mandatory testing of students as a control of their learning activities .

There is a new concept of knowledge and skills control - teletesting. Teletesting is organized in such a way as to distribute functions between the user's local computer and the central computer (server) of the training center. At the same time, there is a special program on the server that contains a huge number of different tests. A certain number of test tasks are passed to the student depending on the method of connection to the network (Reyna, J., Hanham, J., & Meier, P., 2018). If the student connects the computer to the server, then the tasks are received in synchronous mode and the student's knowledge is monitored in real time. In this case, the test results are issued immediately. Asynchronous connection of the student involves receiving test questions from the server by email. This takes a certain amount of time. In this case, there is a problem of ensuring the reliability of test results and obtaining high-quality information about the real knowledge of students (Esteve-Mon, F. M., Cela-Ranilla, J. M., & Gisbert-Cervera, M., 2016).

In order to protect the test data, the following actions are provided. At the technical level, system administrators configure various ciphers and encodings to protect the tests from unauthorized access. They also strictly run test programs using personal passwords. At the organizational level, system administrators create regional testing centers that have an official license to conduct testing. At the psychological level, a restricted access mode and a response time limit are introduced for testing (David, L., Bruce, D. L., & Chiu, M. M., 2015).

The process of evaluating test results is also a complex issue. The teacher can no longer evaluate the answers of students with the usual grades of "excellent", "good"," satisfactory" and "unsatisfactory", because it is difficult to achieve objectivity and reliability of the results. Different teachers in different universities may evaluate the same answer differently. In this case, it is customary to use the rating method of assessment, in which the final score is formed statistically.

In our opinion, it is difficult to use the so-called communicative method of assessing students ' knowledge and skills in the distance education system. This method gives the teacher the opportunity to get to know the students better, to check their level of training in details. This method is largely subjective, based on

direct personal contact between the participants of distance learning - the teacher and the students. Unfortunately, this form of control cannot be automated due to its subjectivity, which is a big drawback of this method of knowledge control, since one teacher of the study group will not be able to give an adequate assessment of the work of more than 20-30 students (Burlakova, 2015).

Self-control questions are included in the materials of an electronic textbook. Students use these questions to self-assess their level of professional training. This so-called formative assessment method can be applied in addition to any method of quality control of learning in a digital educational environment (Maderick, J. A., Zhang, S., Hartley, K., & Marchand, G., 2015).

Many teachers use questionnaires, which are sent by students by e-mail, for the purpose of conducting operational intermediate control during distance learning. The questionnaire is a very flexible and soft tool for monitoring the quality of knowledge. The teacher can ask questions in different ways. However, this method requires careful development, testing, and troubleshooting before it can be widely used in distance learning environments or implemented as a control tool in an electronic textbook.

Some teachers sometimes replace the traditional exam with other assessment methods, such as writing a final essay or preparing a project. But this method of knowledge control can only be used with a traditional learning system. However, this method can be introduced as self-control tool in electronic learning.

These methods of organizing the control of educational activities can be successfully implemented in the conditions of a telecommunications network.

Conclusion

Thus, modern distance learning technologies, including electronic textbooks, are used at all stages of training: when introducing new material, consolidating, repeating, and controlling knowledge and practical skills. It is the electronic textbook that serves the student as a working interactive tool. In the function of a teacher, an electronic textbook is: a source of information; a visual aid; a simulator; an individual information space; a means of diagnosis and control. In the function of a working tool, an electronic textbook acts as: a means of teaching and controlling knowledge and skills (Mukhaimin, M., Habibi, A., Mukminin, A., Pratama, R., Aer , A., Kharja. Kh., 2019).

Training with the use of an electronic textbook in the system of professional education also performs the functions of organizing and managing the educational process (as a means of implementing the curriculum as a means of diagnosis and final control); organization and management of classroom work through the activation and coordination (coaching); monitoring of individual students, providing individual

consultations; preparation of the components of the information environment (software and systems), their connection with the specific content of the course.

Thus, the development and use of an electronic textbook in the system of professional training of students involves: determining the sequence of operations; developing and selecting the appropriate content; creating practice-oriented tasks to check the quality of the learned material (Poulos, C. N., 2002). The algorithms for working on an electronic textbook are determined by the teacher himself. The preparation of electronic learning tools, including electronic textbooks, will significantly improve the quality of professional training of students and enable students to integrate into the digital educational space, moving from traditional textbooks to electronic learning tools.

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References

Burlakova, I.I. (2015). Quality management of professional training of students-future foreign language teachers. *The science. Pedagogy*. Retrieved from http://nauka-pedagogika.com/pedagogika-13-00-08/

Belikov, V. A. (1998). *Elements of learning technology*. MSPI, Magnitogorsk.

Volkova, N. V. (2017). Technology of designing educational events. *Education and science*. Retrieved from https://elar.rsvpu.ru/bitstream/123456789/29398/1/edscience_2017_4_011.pdf

David, L., Bruce, D. L., & Chiu, M. M. (2015). Composing with new technology: Teacher reflections on learning digital video. *Journal of Teacher Education, 66* (3), 272-287. https://doi.org/10.1177/0022487115574291

Gianelli, M. E. (2018). Learning in theory, practice and research. *Questions of education*. Retrieved from http://vo.hse.ru данные/2018/11/19/1141814058/

Esteve-Mon, F. M., Cela-Ranilla, J. M., & Gisbert-Cervera, M. (2016). ETeach3D: Designing a 3D virtual environment for evaluating the digital competence of preservice teachers. *Journal of Educational Computing Research, 54*(6), 816-839. https://doi.org/10.1177/0735633116637191

Fenwick, T., & Edwards, R. (2015). Exploring the impact of digital technologies on professional responsibilities and education. *European Educational Research Journal, 15*(1), 117-131. https://doi.org/10.1177/1474904115608387

Koroleva, D. O. (2016). Always online: the use of mobile technologies and social networks by modern teenagers at home and at school. *Questions of framing*. Retrieved from http://vo.hse.ru"данные/2016/05/10

Maderick, J. A., Zhang, S., Hartley, K., & Marchand, G. (2015). Preservice teachers and self-assessing digital competence. *Journal of Educational Computing Research, 54* (3), 326-351. https://doi.org/10.1177/0735633115620432

Muhaimin, M, Habibi, A., Mukminin,A, Pratama, R. , Asrial, A. , Harja. H. (2019). Predicting factors affecting intention to use WEB 2.0 in learning: evidence from science education. *Journal of Baltic Science Ed*. http://oaji.net/articles/2019/987-1564686612.pdf

Poulos, C. N. (2002). The death of ordinariness: Living, learning, and relating in the age of anxiety. *Qualitative Inquiry, 8* (3), 288-301. https://doi.org/10.1177/107780040200800306

Principles behind the Agile Manifesto [Agile manifesto] (2018). *Agile manifesto.* Retrieved from http://agilemanifesto.org/principles.html?source=post_pag-, accessed 10.12.2020.

Reyna, J., Hanham, J., & Meier, P. (2018). The Internet explosion, digital media principles and implications to communicate effectively in the digital space. *E-Learning and Digital Media, 15*(1), 36-52. https://doi.org/10.1177/2042753018754361

Tareva, E. G. (2015). Razvitie lingvoobrazovatel'nyh praktik: optimistichnaya proekciya [Evolution of Foreign Language Teaching Practices: Optimistic Projection]. *Vestnik Moskovskogo gorodskogo pedagogicheskogo universiteta. Seriya: filologiya. Teoriya yazyka. Yazykovoe obrazovanie* [Bulletin of the Moscow City Pedagogical University. Series: Philology. Language theory. Language education], 2 (18), 75-85.

Tikhomirova, E. (2016). *Live learning: What is e_learning and how to make it work* / E. Tikhomirova. - Moscow: Alpina Publisher, 2016. - 236 p.

Tosh, D., Werdmuller, B. (2018). Creation of a learning landscape: weblogging and social networking in the context of e-portfolios. *Docplayer*. Retrieved from https://docplayer.net/7520363-Creation-of-a-learning-landscape-weblogging-and-social-networking-in-the-context-of-e-portfolios.html

Huang, Y., Huang, G. (2020) Design and implementation of web-based teacher remote training platform. *Journal Materials Science and Engineering, 750*(1), 609-615. https://www.journals.elsevier.com/international-journal-of-engineering-science

Wang, Z. (2020), Application of the Mobile Terminals in the Long-Distance Continuing Education for Preschool Teachers. *Journal Advances in Intelligent Systems and Computing*, 1027-1033. https://www.researchgate.net/publication/334819720