

The cover features a central image of a person standing on a dark rock, looking up at a vibrant green aurora borealis in a starry night sky. The background is a dark blue-green gradient with diagonal stripes in shades of teal and brown. The title 'REVISTA INCLUSIONES' is prominently displayed in white, bold, sans-serif font in the upper center.

# REVISTA INCLUSIONES

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**USING E-TEXBOOK IN A DIGITAL LEARNING ENVIRONMENT**

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**Abstract**

The rapid development of e-learning (electronic learning) in modern Russia is caused by the high rate of informatization, digitalization, upgrading of information and communication technologies (ICT), and the necessity for open and accessible life-long education, which underlies the post-industrial knowledge society. All these processes stimulate the active search for creative educational technologies that meet the requirements of the knowledge society. A modern specialist must constantly learn and improve skills and capabilities in order to keep up with the times. In the framework of the up-to-date educational paradigm, a student is considered as a subject of knowledge, and not an object of pedagogical influence. In the early 2010s, e-learning actively contributed to this process. E-learning allows students and teachers to integrate into the global scientific community and take an active part in the interaction of cultures, including the exchange of moral and spiritual values. Implementation of e-learning is one of the key tasks in the context of the modernization of Russian education. The term “electronic learning” is translated into Russian in different ways. The most popular options are: “distance learning/education”, “mobile learning”, “virtual training”. The European Commission interprets e-learning as the use of new multimedia and Internet technologies to improve the quality of training and education, the availability of support services and educational resources, as well as remote knowledge sharing and collaboration. This is a learning process based on interactive electronic means of storage, delivery, and presentation of information: the Internet, local networks, CDs, and other storage devices

### Keywords

E-learning – E-textbook – Learning environment – Didactic features of e-textbook

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## Introduction

The competitiveness of the country in the modern globalized world is the most important driver for the sustainable economic and social development and ensuring national security. Russia is actively introducing ICT technologies in all spheres of society through the national projects. The national project “Education” is aimed at increasing the competitiveness of Russian education. Russia is strongly committed to enter the top ten countries of the world by the quality of education by 2024. One of the main tasks is the development by 2024 of a secure digital learning environment that ensures high quality and accessibility of education of all types and levels<sup>1</sup>.

Modern school and university education is carried out in a digital learning environment, which includes electronic libraries, video and online courses, e-textbooks.

An electronic textbook (e-textbook) is a digital learning tool that provides a systematic and complete presentation of the subject or part of the subject, ensuring the completeness of the didactic cycle, creating an individualized interactive learning environment<sup>2</sup>.

Since 2017, an information portal has been created that ensures the practical implementation of the State Project “Modern Digital Learning Environment in the Russian Federation”. The portal aggregates more than 30 educational online platforms, more than 120 universities, and offers more than 1000 registered online courses.

The review of the information portals (official web-sites) of leading Russian universities allowed to reveal the insufficient availability of e-textbooks, which include tools for automating the assessment of students’ knowledge, and providing teacher-student feedback<sup>3</sup>.

## Literature review

In accordance with the Federal Law “On Amendments to the Law of the Russian Federation “On Education in the Russian Federation ” regarding the use of e-learning and distance learning technologies” (February 28, 2012. No. 11-FZ), e-learning should meet certain requirements (Figure 1).

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<sup>1</sup> M. G. Sergeeva; S. V. Gubarkov; K. Yu. Zhigalov; I. I. Kurmaeva y A. V. Tolmachev, “Quality management of services of the higher education”, *Ponte*, Vol: 74 num 1 (2018): 34-47.

<sup>2</sup> J. Bírová; P. Kružík; A. Kalimullin; N. Sokolova; Z. Haroun; R. Králik y D. Vasbieva, “Mathematical and Statistical Bibliometric Indicators for Scholars in the Field of Romance Languages and Linguistics”, *EURASIA: Journal of Mathematics, Science and Technology Education*, Vol: 14 num 12 (2018).

<sup>3</sup> E. Dolzhich y S. Dmitrichenkova, *Computer science terminology (a case study of the Spanish language)* (Valencia, Spain: INTED2018: Proceedings of the 12th International Technology, Education and Development Conference, 2018).

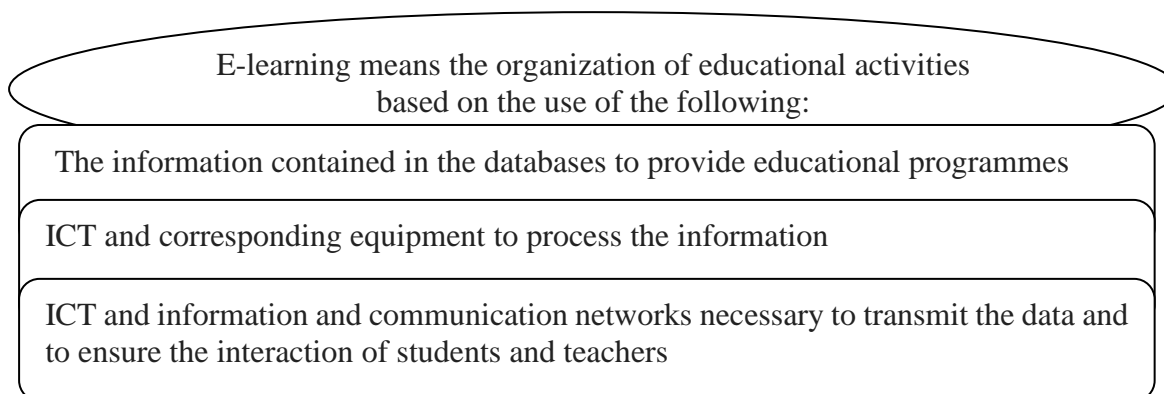


Fig.1  
The requirement to e-learning

The development of e-learning in Russia is presented in Table 1<sup>4</sup>.

Nº	Stages	Contents
1.	Distance learning	Distance learning in Russia in the modern sense began in 1992. Many Russian universities, following the requirements of the time, began to introduce distance learning. But the quality of computerization did not meet international standards for real e-learning and was reduced in Russia to correspondence courses.
2.	Last decade of the 20 <sup>th</sup> century	Active development of the software for testing, presentations and e-textbooks. Development of the first software products for distance interaction between teachers and students.
3.	The 2000s	E-learning has become actively integrated into traditional learning in a wide variety of formats: in support of traditional studies (full-time and part-time), or as an advanced level of distance education in accordance with the educational programs of higher education (bachelor and master level), pre-university training and post-graduate education.
4.	From 2010 to the present	Development of the draft “Concepts of the Federal Law “On the e-Learning Industry”. Its main tasks were planning and improving the e-learning sector in the Russian Federation, the main goal is to ensure the legal framework, leading to the improvement of the national economy and education system.

Table 1  
Stages of e-learning

<sup>4</sup> G. E. Koroleva y M. G. Sergeeva, Electronic textbook of economics: modern approaches to the formation of content: Monograph (Moscow: RUDN, 2019).

Educational programs and corresponding software are being developed to support e-learning in more than 30 countries. In developed countries, even major universities consider the online courses in their educational programs as a prerequisite for efficiency<sup>5</sup>. Compare e-learning development in the USA and Russia (Table 2).

No	Country	Characteristics
1.	The USA	Distance education methods are offered in 200 universities and thousands of colleges, in which more than 3 million people study. Many major universities of the world provide online courses for free, for example the University of California, Massachusetts Institute of Technology
2.	The Russian Federation	A list of institutes, academies and universities offering distance learning is available at <a href="http://edu.rin.ru/">http://edu.rin.ru/</a> . In the Russian Federation, e-learning is becoming relevant in the context of the new generation of state educational standards, a tiered education system and the resulting reduction in the classroom load, the creation of favorable conditions for students to work independently (for which the e-learning seems optimal).

Table 2  
Application of e-learning in the USA and Russia

However, the analysis of the informatization in the sphere of economic education in high school showed that the applied model does not solve the problems that accumulated in this field, and in some cases exacerbates them and causes new problems<sup>6</sup>. In the public domain, dozens of authors post numerous fragments of lessons of various quality. Some teachers are not good at ICT. The shortage of training time allocated for studying the economic sphere is compounded by the loss of time when using ICT without appropriate methodological recommendations and support. Common risks and problems of informatization often reduce the quality of available educational resources, incorrect understanding of the role of teachers in the educational process, etc.<sup>7</sup>

<sup>5</sup> G. E. Koroleva, "Economic education at school: which format is better?", Teaching history and social studies at school, num 1 (2015): 74-80.

<sup>6</sup> S. Sharonova; N. Trubnikova y N. Sokolova, "Interpreting religious symbols as basic component of social value formation", European Journal of Science and Theology, Vol: 14 num 3 (2018): 117-129; S. Blinova; T. Dugina y A. Zabolotskikh, Teaching mixed nationality groups (on the example of students from the Northern Caucasus region) (Valencia, Spain: INTED2018: Proceedings of the 12th International Technology, Education and Development Conference (pp. 7977-7982), 2018) y <sup>6</sup> M. G. Sergeeva; N. G. Bondarenko; T. A. Shebzuhova; B. A. Solovyov; D. V. Parinov; L. A. Shvedov y A. P. Ovchinnikov, "Verification of management-support of professional and educational trajectory of students in the socio-cultural educational environment of the university", Amazonia Investiga, num 8 Vol: 18 (2019): 5-14.

<sup>7</sup> S. Wang; N. Gorbunova; A. Masalimova; J. Bírová y M. Sergeeva, "Formation of academic mobility of future foreign language teachers by means of media education technologies", Eurasia Journal of Mathematics, Science and Technology Education, Vol: 14 num 3 (2018): 959-976; V. Utemov; R. Khusainova; M. Sergeeva y V. Shestak, "Full Packaged Learning Solutions for Studying Mathematics at School", Eurasia Journal of Mathematics, Science and Technology Education, Vol: 14 num 12 (2018) y M. Sergeeva; A. Shumeyko; A. Serebrennikova; A. Denisov; N. Bondarenko y E. Getmanova, "Innovative pedagogical experience in practice of modern education modernization", Modern Journal of Language Teaching Methods, num 8 Vol: 11 (2018): 814-823.

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## Proposed Methodology

Recent studies presented the didactic features of e-textbook as a source of educational content<sup>8</sup>. The main advantage of e-textbook is that it includes not only the subject content, but also the chosen learning technology. E-textbook is an automated educational system that involves didactic, methodological, informational and reference materials, as well as software that allows using them comprehensively for independent acquisition and control of knowledge. E-textbook could have search and cross reference functions, reference materials, glossary, hypertext links, bookmarks, interactive dictionaries, highlights, multimedia objects and note taking.

Table 3 shows the peculiarities of e-textbook structure<sup>9</sup>.

No	Peculiarities	Characteristics
1.	Organization of educational information in the form of hypertext	Hypertext as an opportunity to create interactive educational material provided with reciprocal links. Hypertext allows dividing the material into a large number of fragments, connecting them with hyperlinks in logical chains. The presence of multimedia to illustrate the phenomena under study. Multimedia products use many types of information: digital/graph data, video and audio. Multimedia improve the quality of learning and allow keeping students engaged in their learning.
2.	Modeling of the studied processes and phenomena	The ability to conduct virtual computer experiments in those areas of knowledge where real experiments are very time-consuming or elusive. The presence of a system of self-assessment, the final control, compatibility with the electronic examination system. The ability to evaluate acquired knowledge.

Table 3  
Peculiar features of e-textbook

<sup>8</sup> S. Neverkovich; I. Bubnova; N. Kosarenko; R. Sakhieva; Zh. Sizova; V. Zakharova y M. Sergeeva, "Students' internet addiction: study and prevention", *Eurasia Journal of Mathematics, Science and Technology Education*, Vol: 14 num 4 (2018): 1483-1495; P. Gorev; N. Telegina; L. Karavanova y S. Feshina, "Puzzles as a didactic tool for development of mathematical abilities of junior schoolchildren in basic and additional mathematical education", *EURASIA: Journal of Mathematics, Science and Technology Education*, Vol: 14 num 10 (2018): 178-185; Y. Volkova y N. Panchenko, "Discourse variation of the concepts of destructive emotions. Vestnik Rossiiskogo Universiteta Druzhby Narodov", *Russian journal of linguistics*, Vol: 22 num 1 (2018): 175-194; M. G. Sergeeva; V. Yu. Flyagina; I. V. Taranenko; E. V. Krasnova y A. V. Vilkova, "The interaction of labor market and educational services market considering social partnership mechanism and specificity of the regional educational policy", *Ponte*, Vol: 73 num 12 (2017); M. G. Sergeeva; T. M. Stepanyan; A. A. Spector; M. S. Komov; N. A. Latysheva; I. V. Okhotnikov y L. A. Shvedov, "Formation of economic competence of the head of the educational organization in terms of professional development", *Revista San Gregorio*, num 30 (2019). Available at: <http://revista.sangregorio.edu.ec/index.php/REVISTASANGREGORIO/article/view/888/1-Sergueeva> y G. E. Koroleva y M. G. Sergeeva, *Electronic textbook of economics: modern approaches to the formation of content*: Monograph (Moscow: RUDN, 2019).

<sup>9</sup> G. E. Koroleva y M. G. Sergeeva, *Electronic textbook of economics...*

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Table 4 presents the differences between e-textbook and traditional textbook<sup>10</sup>.

Nº	Demands to the contents and structuring	Characteristics
1.	Established scope of presentation	Shortening of the text to make it easier to read on screen
2.	Structuring	The division of the material into several levels (for example, obligatory for reading, additional, auxiliary, definitions, etc.)
3.	Module contents	Subdivision of the educational material into modules, in accordance with the requirements of psychology
4.	Material Presentation Capacity	Compression and streamlining of the material with maximum information content
5.	Graphical support	The inclusion of graphic supporting illustrations, which allow transferring the necessary amount of information and the concise presentation

Table 4  
Comparison between e-textbook and traditional textbook

We analyzed the role and place of ICT in economic lessons through the questionnaire. It allowed us to conclude that the use of ICT in economic education increased the number of available sources of economic information and the range of pedagogical tasks to be solved: the visibility of complex economic ties, expanding the channels for perceiving educational information, the diversity of activities, the relevance of educational content, the motivation for studying Economics.

Guided by the need to implement various scenarios for using e-textbook, Ya.G. Martyushova<sup>11</sup> identified the following structural units of e-textbook (Table 5).

Nº	Structural units	Characteristics
1.	Basic	The main material including explanatory texts, interactive illustrations, theoretical provisions and a set of standard tasks
2.	Additional	Additional materials in the form of audio and video fragments, informative materials that reveal the history of scientific thought, methods of scientific knowledge, etc.
3.	Practical	Practical part, consisting of blocks of testing, training and monitoring tasks, creative tasks
4.	Statistics	Block of statistical information on the results of students using e-textbook
5.	Evaluation	A block of tools for evaluation the complexity of tasks, the level of mastering the subject by students

Table 5  
Structural units of e-textbook

<sup>10</sup> G. E. Koroleva y M. G. Sergeeva, Electronic textbook of economics: modern approaches to the formation of content: Monograph. (Moscow: RUDN, 2019).

<sup>11</sup> Ya. G. Martyushova, "Harmonization of requirements for a printed publication and an electronic textbook based on it as an integral part of modern teaching materials", Innovations in Education, num 7 (2017): 10-20.

To build individual learning paths and ensure the variability of personal tasks, users are offered a graph-oriented approach, which allows formulating two main didactic principles for designing e-textbook (Table 6).

№	Didactic principle	Characteristics
1.	The principle of building the individual learning paths by means of a graph-oriented approach	The essence of the graph-oriented approach is to structure the content into various sections, ranked according to the logic of studying the course, and to provide each element of the content with a numerical indicator of the complexity of its implementation
2.	The principle of adaptability	It is implemented on the basis of feedback and statistical processing of user results.

Table 6  
Didactic principles of designing e-textbook

## Result Analysis

The empirical study was conducted in the specialized economic classes of Moscow universities, which had the agreements with schools for school-leavers to enter particular universities<sup>12</sup>. We examined several textbooks that seemed suitable for integration with ICT and could be taken as the basis model of economic education. The authors of most textbooks avoid analytical (mathematical) and graphical forms of presentation. This makes it difficult to consider macro- and microeconomic models, since key economic concepts are given fragmentarily, isolated from functional, logical, hierarchical, and other relationships. These textbooks are not sufficiently illustrated by schemes, poorly structured, which actually does not correspond to modern economic theory. Reproductive tasks prevail. Students received insufficient understanding of the objective economic relationships, concepts and dependencies expressed by formulas, for independent productive activities. From the point of view of our research, we can conclude that the imposition of ICT on such textbooks seems to be ineffective, since it would require a lot of additional refinement. Textbooks on Economics written by economists, not educators, are difficult for high school students to perceive. Such textbooks are mainly translated from foreign languages and poorly take into account the peculiarities of the Russian economy. At the same time, they are well-structured, which allows illustrating macro- and microeconomic models, their elements and basic connections using modern multimedia, present material in both analytical and graphical form. Such structuring of economic topics is aimed at activity-oriented approach, but does not implement it sufficiently. The structure and the content of such textbooks, in our opinion, is more consistent with the e-textbook, which involves the use of multimedia and hypertext.

We examined the teaching methods used in the lessons of Economics. We studied the experience of Economics teachers who widely applied innovative methods and highly appreciated their effectiveness. The following technologies and methods of teaching were recognized as effective: business game, computer modeling, problem discussion, essays, organization of school companies. However, most teachers, as the analysis of the review results proved, do not have a sufficient idea of innovative methods of teaching Economics. Moreover, in the practice of economic education of high school students, a certain imbalance has developed between the demand for, relevance of economic knowledge and the level of

<sup>12</sup> G. E. Koroleva y M. G. Sergeeva, Electronic textbook of economics: modern approaches to the formation of content: Monograph (Moscow: RUDN, 2019).

economic training of Social Science teachers, a section of which is Economics. Highly appreciating the importance of the economic sphere, teachers assess the level of their own training in Economics, the level of knowledge of modern teaching methods as extremely low. The data obtained indicate that 90% of respondents recognized the importance of studying Economics in high school. At the same time, only 38% of Social Science teachers considered themselves well-trained in economic issues. In Table 7, the topics of Social Studies are ranked according to the number of teachers who consider themselves well-prepared for their teaching (Figure 2).

<b>The topics of Social Studies</b>	<b>% of teachers consider themselves well prepared for their teaching</b>
Political science	73
Law	69,5
Sociology	67,5
Cultural studies	61
Global world	55
Information society	53
Philosophy	45
Economics	38,5
Religious studies	38,5
Social psychology	37

Table 7  
The level of teachers well-prepared for Social Studies

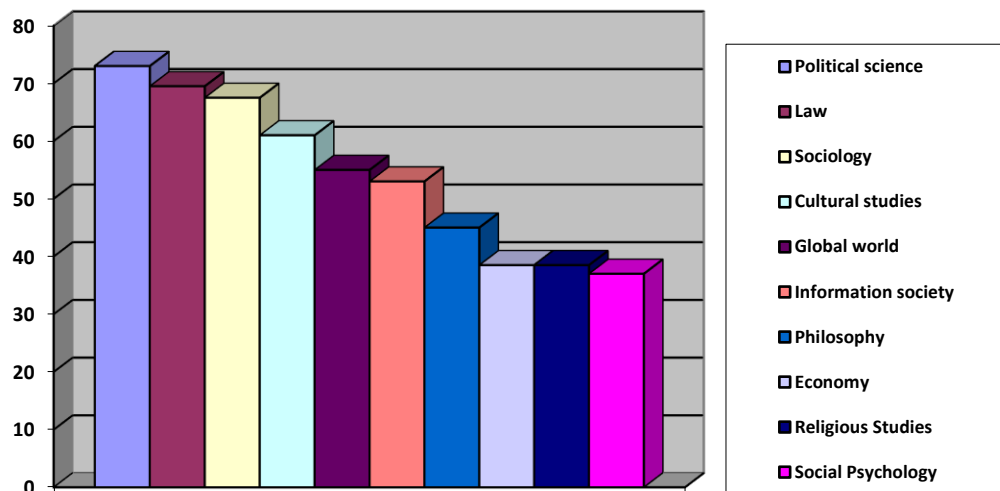


Fig. 2

The level of training of teachers in the content lines of Social Studies

To teach Economics at the modern technologically advanced level, teachers are forced to rely mainly on the lecture-based model. Teachers unanimously speak out about the need for changes in the continuing professional development system.

We turned to the opinion of teachers about what an ideal textbook on Economics (Social Studies) should be. In 2010-2015 the research team of the Institute for Education Development Strategy of the Russian Academy of Education conducted a survey of teachers. More than 300 teachers from Moscow, St. Petersburg, Arkhangelsk, Bryansk, Chelyabinsk, Nizhny Novgorod were interviewed. Various characteristics of the textbook were proposed for evaluation: the scope and level of detail, the prevailing style of presentation, illustrations, and methodological support of the textbook.

Below are the results of a survey of teachers of Economics and Social Studies in basic (grades 5-9) and high (grades 10-11) school. Teachers were invited to comment on the following issues:

- the place of economic education in the curriculum: independent subject (basic level); independent subject (advanced level); section of Social Studies; elective course; lessons with an invited teacher (consultant);

- the content of economic education, the selection of priority topics: the basics of economic theory, the basics of entrepreneurship, the basics of financial literacy, etc. ;

- diversity of teaching methods, a combination of traditional and innovative teaching technologies;

- a high-quality textbook on economics: the prevailing style of presentation, illustrations and methodological support of the textbook;

- the use of electronic educational resources for various purposes, including their own experience.



As a result of the review analysis, we received the following information on economic education in Moscow schools.

Economic education is represented in the following forms:

- the section “Economics” of Social Studies (in basic school 44% respondents and in high school 37%);
- an independent subject (in 24% at the basic level and in 20% at an advanced level in high school);
- Elective courses on selected economic issues: Entrepreneurship, Financial Literacy, Consumer Protection, Family Economy (10% in basic school and 14% in high school).

Elective courses, as a rule, are presented in those schools where the teaching of Economics is conducted as an independent subject at the basic level. This form can be considered as an intermediate step between the basic and advanced level.

Choosing the most promising form of organizing economic education in a basic school, teachers give preference to the Social Studies with the economic section. As an independent subject, Economics in basic school is recognized as inappropriate. 10% of teachers offer to study Economics in grades 5-7, 20% in grade 8 and 30% in grade 9.

For high school, most teachers believe that the Social Studies should be supplemented by Economics as an independent subject, and only 16% of teachers believe that high school students will have enough of the economic section in Social Studies. Note that all teachers in those schools where the Economics is already organized as a separate subject approve this choice.

At an advanced level, 34% of teachers are ready to teach Economics in grades 10-11, and 19% of teachers believe that an invited teacher (consultant) should conduct economic lessons. In addition, teachers consider it necessary to conduct additional elective courses on economic issues: in grade 8 17% of respondents, in grade 9 31%, in grades 10-11 20%.

Choosing priority topics, teachers evaluated the feasibility of studying the following issues: the basics of economic theory, the basics of entrepreneurship, the basics of financial literacy, the basics of consumer culture, the history of economic studies, management, marketing, environmental issues and the family economy. At the same time, teachers were asked to evaluate their own level of training on each economic topic. Among the issues that should be covered in the content of economic education, applied topics received more than 50% of the vote: management, marketing, the basics of entrepreneurship, the basics of financial literacy. The basics of economic theory were highlighted by 49% of participants. Choosing which course should include economic issues, Economics or Social Studies, the teachers answered that in Social Studies it is more logical to consider three topics: basics of consumer culture (49%), Economics and environmental issues (44%), Family economy (52%). Other topics should be studied in the framework of Economics.

The data obtained showed that only 35% of teachers considered themselves well-prepared on the issues of economic theory. This is slightly lower than five years ago (38%). Let us clarify that only 20% of respondents knew all economic topics, and 17% did not know a single topic. According to their own assessment only a third of teachers are familiar with the economic theory and applied economic topics. Such a situation, in our opinion, cannot be considered satisfactory. Federal State Educational Standard for secondary education provides for a massive transition to an in-depth study of Economics in high school. Though the results of the questionnaire allow us to consider that the study of Economics at advanced level today is not ensured by the readiness of teachers.

Teachers were invited to speak out about the need to combine traditional and innovative teaching technologies. The questionnaire provided options for using various forms and methods of teaching (regularly or occasionally).

According to teachers, students should regularly work with didactic materials and a textbook, and occasionally participate in role-playing games, group work, project and research activities. Less than half of teachers approved the lecture as a preferable form. The advantage was given to active forms of learning and independent work of students. Teachers gave suggestions on the model textbook for economic education regarding the style of presentation, the contents, illustrations, instructor annotations or interactive quizzes and methodological support of the textbook. The following characteristics of the new generation Economics textbook were named:

- 74% of respondents suggested a summary of the material in the basic level textbook, 61% adapted presentation style, 67% representation of different points of view;

- various types of illustrations (about 70%): logical circuits, examples from Russian (to a lesser extent foreign) life, statistical data, schemes, photographs and drawings;

- all types of methodological support (about 70%): glossary, student's workbook, methodological recommendations for the teacher, electronic support.

## Conclusion

The ICT have a high pedagogical potential in expanding learning environment, interdisciplinary communications, a variety of types of work, wide illustrative possibilities, quick and effective control and assessment. Common risks and problems of informatization are the reducing the quality of available educational resources, incorrect understanding of the role of teachers in the educational process, the unclear role of the instructor in adoption of e-textbooks in courses etc. As a result we can conclude that the effectiveness of the ICT in education depends on the choice of a priority model and the principles of constructing the content of education.

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