

Analysis of the Knowledge Level of University Entrants and Ways to Improve It

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Abstract— The article deals with the influence of the knowledge level of bachelors and masters on the labor productivity and competitiveness of products manufactured by enterprises. It studies the readiness of first-year students to master the program of higher education. It studies the peculiarities of preparation for the Unified State Examination, which is the entrance exam to higher educational institutions. It makes conclusions on the insufficient knowledge level of graduates of secondary schools for mastering the program of higher education. It considers possible ways of increasing the entrants' knowledge level. Special attention is paid to the systems of distance preparation for entrance examinations to higher educational institutions. The article says that the current trends in the development of both the world and the Russian economy lead to a constant reduction of opportunities for low-skilled labor, while the need for highly qualified, competent workers is simultaneously increasing. To ensure the need for skilled workers, it is necessary to raise the level of education, especially secondary-level education, because this is the basis for further education.

Keywords— *Unified State Examination, knowledge level, tutor, supplementary courses, program of higher education, distance learning systems, self-education.*

1. INTRODUCTION

A low level of secondary education is now spoken at all levels. Many publications deal with determining the initial knowledge level of first-year students to differentiate the educational program [4, 6, 14]. The tendencies of changing the initial knowledge level of students and its low level are given in [8, 10, 14, 16], it is said about a drop in the quality of education of secondary school graduates [11]. The reasons for the drop in the knowledge level of school leavers includes: introduction of the Unified State Examination, reduction in the motivation of pupils and a decrease in time spent on studying a number of subjects. I would supplement these reasons with training programs meant for out-of-school extra classes [20]. An insufficient level of secondary education leads to a poor mastering of the university program, and this, in its turn, leads to a low qualification of bachelors, specialists and masters. The consequence of low qualification is a low productivity and quality work, which results in non-competitiveness of products on the world market [20]. Recently, it has become

clear that Russian products can only gain in competition through innovation, the second way - low costs is unacceptable for us, since the cost of production in cold and harsh Russia will always be higher than in other countries. But innovations are new, commercialized knowledge. And new knowledge can be created only by a highly skilled worker. However, the qualification of workers is falling and the reason for this, first of all, is a low level of secondary education.

2. PROBLEM STATEMENT

To analyze the knowledge level of university entrants and ways to improve it, the following tasks were set:

1. Determine how the entrants revise for entrance examinations in the form of the Unified State Examination.
2. Assess the subjective readiness of students to master the university program.
3. Identify possible ways to improve the educational level of entrants

3. RESEARCH METHODS

To analyze the level of secondary education, we tested 90 first-year students of the Economics specialization. Only Russian citizens who passed the Unified State Examination were taken in the sampling. It should be noted that foreign citizens and college graduates are enrolled without passing the Unified State Examination, but based on the internal university examination. The respondents were asked questions about the points received by the results of the Unified State Examination, the availability of tutors and other supplementary classes in the subjects to be passed, as well as the subjective readiness to master the program of higher education. It should be noted that the survey was conducted before passing the first session, when the students were already sufficiently adapted to studying in the university.

4. RESEARCH FINDINGS

After processing the collected data, the following results were obtained. Only 39% of the students had no tutors in any of the subjects and they did not take pre-entry courses. The rest had a tutor and (or) they took courses to prepare for the entrance exams. 63% of the students had a mathematics tutor, 20% had a Russian language tutor, and 36% had a tutor in

social studies. About 30% of the students took supplementary courses in mathematics, Russian language and social studies. If we talk about the correlation coefficient, which shows the effect of having a tutor on the received grade, there is a weak correlation between the presence of a tutor in the Russian language and social studies on the received grade (correlation coefficient 0.3). No correlation is observed with regard to mathematics, but it should be noted that non-specialized schools often do not prepare graduates for the principle exam in mathematics, accordingly, almost all the pupils studied either with tutors or took supplementary courses.

The average grade in mathematics among the respondents is 48 points, which corresponds to the lower limit of Four by the five-point scale, in social studies - 57 points (four), in the Russian language - 66 points (the upper limit of Four) (Fig. 1, 2, 3). Thus, the students passed the state exam well enough.

If we talk about the subjective readiness of first-year students to master the program of higher education, the following data were obtained: 54% of the students say that they lack knowledge of mathematics (or they find it difficult to answer this question) for mastering the university program, 42% of the students note that they lack knowledge of social studies (or they find it difficult to answer) for mastering the university program.

The situation is much better with the Russian language, but it should be noted that the sampling consisted of only students who passed the Unified State Examination, being the citizens of Russia. If you take foreigners into consideration, the picture will change to some extent. The results of the first session indicate that the students correctly assessed their preparedness for studying in the university, since only 59% of the students passed all the exams and tests on the first try. This indicator is very low, especially given that the entrance exams in the form of the Unified State Examination were passed very well (the average grade is four).

5. WAYS TO IMPROVE THE EDUCATIONAL LEVEL OF ENTRANTS

The obtained data confirm the ineffectiveness of the secondary education system. What are the ways to increase the knowledge level of university entrants? In recent years, distance education has been increasingly developing. The main advantages of e-learning are: freedom of access to learning resources, flexibility of learning, realization of the need for self-learning and constant professional self-improvement [1, 2, 3, 5].

It is necessary to note one more advantage of distance education - its relative cheapness, which makes this method of obtaining knowledge much more attractive in comparison with the services of a tutor and, therefore, as accessible as possible. According to Cedar Group consulting company, the cost of the distance learning service is 32-45% cheaper than other forms of education, the learning time takes 35-45% less, and the speed of memorizing the educational material is 15-25% higher.

In addition, the form of distance learning makes the learning process more individual - everyone can learn at

his/her own pace, taking into account the opportunities, the level of knowledge and personal circumstances [15, 17].

An additional and pleasant bonus of distance education is its adaptability, ability to use multimedia technologies, sound, video, which makes distance learning courses more vivid and interesting, and the learning process - lively and dynamic [13].

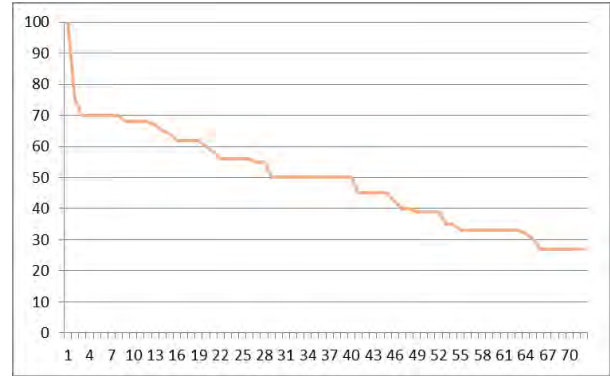


Fig. 1. Results of passing the Unified State Examination in principle mathematics

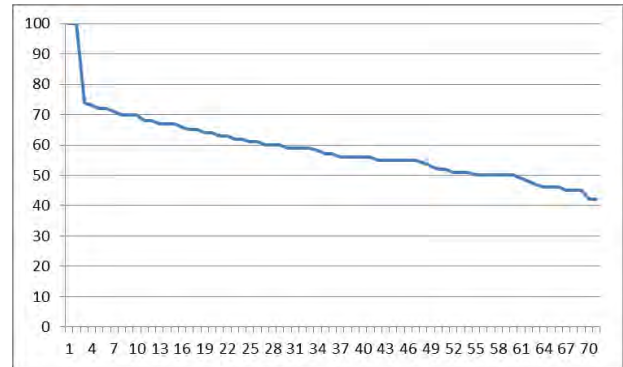


Fig. 2. Results of passing the Unified State Examination in social studies

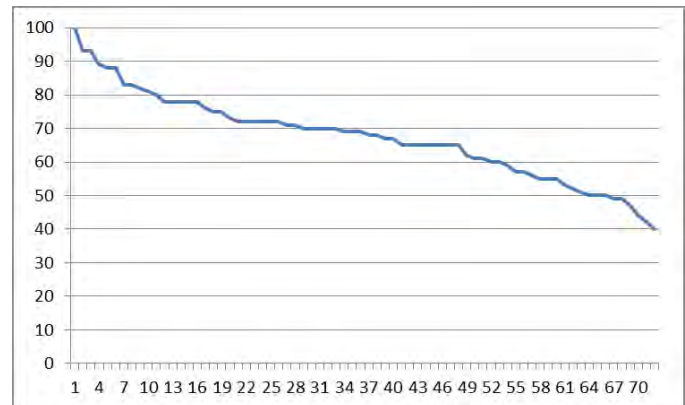


Fig. 3. 1. Results of passing the Unified State Examination in the Russian language

Of course, distance education, as a form of education, has a number of problems, including the dependence on the technical infrastructure and quality of the Internet, labor intensity and complexity of developing distance courses, the need to have good computer and Internet skills.

Currently, most widespread are the following schemes for building an educational process using e-learning environments [5]:

1. Distance learning: the educational process takes place mainly in the environment of distance learning (full-time and part-time education), face-to-face consultations, intramural certification are possible.

2. Distance support for full-time education: the predominant form of education is full-time; in the distance learning environment, students can find additional materials, complete assignments, pass tests, etc. The work in the learning environment is generally performed outside the classroom.

To increase the knowledge level of entrants, the second scheme of training is most suitable, when students can find additional materials, perform assignments, verify the correctness of their implementation, in case of misunderstanding, get an explanation on the correct decision.

The main problem of distance education is the complexity of monitoring the knowledge gained. It is rather difficult to determine remotely how well a learner learned a given material. In the solution of this problem, as shown by a number of authors, in particular [21, 22], distance courses developed on the basis of expert systems can be helpful.

Expert systems are complex software suites that accumulate and retain knowledge of specialists in specific subject fields and replicate this practical experience for consultations of less qualified users.

One of the features of expert systems is their "transparency", i.e., the ability not only to answer the question raised, but also to explain the sequence, algorithm, of this solution.

As a rule, any expert system, in addition to the knowledge base containing a set of rules and a block of logical inference that allows us to find answers to questions, also contains a block of explanations, using which you can adapt the educational material for each learner, organize additional hints or clarifications to those issues that were not understood by a particular learner. This block of explanations can be also used to organize a qualitative and detailed testing of the student's knowledge.

According to several authors, in particular [9, 18, 19, 22, 23], expert systems in the field of distance education are a new and very promising direction in science that will help to solve the problem of monitoring the knowledge of learners, increase confidence of schoolchildren and their parents in this type of education. An active use of the methodology of expert systems will significantly increase the quality of distance courses. Examples of distance courses built on the use of expert systems are given in [22,23], although it should be recognized that so far this methodology is not fully used.

Nevertheless, much is already being done towards the development of distance learning courses. Such sites as I will make the final test work, I will handle the Main State Examination, I will handle the Unified State Examination are created to increase the pupils' knowledge level. They contain all the theoretical materials on the exams to be passed and

training aids for passing the exam. The sites are very convenient for self-study and self-improvement, and, what is extremely important, are free. With a high motivation for learning and the ability of self-learning, these sites will allow you to prepare well for university entrance examinations [7, 21, 24]. However, most schoolchildren are most frequently not ready for self-study, which is a reason of the use of tutors by most entrants [12, 22].

6. CONCLUSIONS

As a result of the studies, the following conclusions were obtained:

1. In most cases, tutors or pre-entry courses prepare the entrants for university entrance examinations. School education is clearly not enough.

2. Half of the first-year students believe that they do not have enough secondary school knowledge to assimilate the program of higher education, despite the fact that they successfully passed the entrance exams.

3. There are systems of distance education, which allow to prepare the entrants for university entrance examinations. Distance education systems are constantly being improved, a promising direction of development is the application of expert systems in the field of distance education.

Summing up the aforesaid, it should be emphasized once again that the current trends in the development of both the world and the Russian economy lead to a constant reduction of opportunities for low-skilled labor, while the need for highly skilled, competent workers is simultaneously increasing. However, the competences and knowledge gained by bachelors, specialists, masters in the university will be competitive only if they are based on a solid foundation of knowledge obtained at secondary school. Therefore, in order not to be in the role of "lagging behind" in the world economy system in the near future, we should now make maximum use of all the available opportunities to ensure a due level of secondary education. Distance courses built on the use of expert systems will allow us to raise the level of secondary education and prepare the entrants for passing the state examination.

References

- [1] Volzhenina, N.V. Organization of students' self-directed learning in the process of distance learning: textbook / N.V. Volzhenina. - Barnaul: Publishing house of Altai University, 2008.
- [2] Glaisner, O.Yu. Distance Education in Russia and in the World [Text] / O.Yu. Glaisner // AlmaMater, 2009. №7. Pp. 26-34
- [3] Gromova, T. Teacher Training for Distance Learning / T. Gromova // Narodnoe obrazovanie (Public Education), 2006. No. 5, Pp.153-156
- [4] Kalko, O.A. Organization of the entrance knowledge monitoring to evaluate the initial level of preparation of university students [Text] / O.A. Kalko, S.N. Balitsky, Yu.S. Kuznetsova, O.V. Ulyanova // Cherepovets scientific readings - 2012: materials of the All-Russian Scientific and Practical Conference, 2013, pp. 86-88.
- [5] Kozlova, D.A. Distance learning as an innovative approach in the implementation of continuing education [Electronic resource] – URL: <https://cyberleninka.ru>
- [6] Konstantinova, N.V. Determination of the initial knowledge level of students as a premise for the optimal management of the teaching a foreign language in an agricultural institution [Text] / N.V.

- Konstantinova // Bulletin of Novosibirsk State Agrarian University, 2006, No. 4, Pp. 13-15.
- [7] Korneva, A.V. Application of infocommunication and distance technologies in the preparation of schoolchildren for the Unified State Examination [Text] / A.V. Korneva, Yu.A. Solovyov // Collections of conferences of SIC Sociosphere, 2015, # 24, pp. 62-64.
- [8] Krasnopolskaya, N.S. To the problem of studying the academic success of students [Text]/N.S. Krasnopolskaya, R.K. Karneev // Science and Education: Problems and Development Tendencies: materials of the international scientific and practical conference: in 3 parts, 2013, pp. 20-23.
- [9] Levina, E.Yu. Intra-university diagnostics of the training quality based on the automated expert system: abstract of a thesis of the cand. of ped. sciences. Kazan, 2008.
- [10] Lyubitsky, Yu.V. Evaluation of the pre-university level of knowledge in information science and information and communication technologies of students of Khabarovsk State University of Economics and Law [Text]/Yu.V. Lyubitsky // Problems of Higher Education, 2008, No. 1, pp. 29-32.
- [11] Lyubitsky, Yu.V. Trends of the changes in the pre-university level of knowledge of students of Khabarovsk State University of Economics and Law in the field of information science [Text] / Yu. V. Lyubitsky., OS. Komova // Problems of Higher Education, 2013, No. 1, Pp. 203-207
- [12] Manintseva, Yu.S. Pros and cons of modern Russian education [Text]/ Yu.S. Manintseva, A.N. Lakhova // Bulletin of medical Internet conferences, 2015, Vol. 5, No. 12., P. 1547.
- [13] Melikhova, N.V. Distance Education: Problems and Prospects [Text] / N.V. Melikhova // Science of SUSU [Electronic resource]: materials of the 69th scientific conference. Section of Economics, Management and Law. - Electron. Text data (7.73 MB), Chelyabinsk: Publishing Center of the SUSU, 2017, Pp. 39-43
- [14] Muratov, V.S. Assessment of the initial level of knowledge of students in the implementation of educational programs [Text] / V.S. Muratov, E.A. Morozova // International Journal of Experimental Education, 2015, No. 12-4, P. 52
- [15] Novgorodova, N.G. Electronic and distance education [Electronic resource] – URL: <https://research-journal.org/technical/elektronnoe-i-distancionnoe-obrazovanie/>
- [16] Ostapenko, I.N. Fuzzy sets in modeling the indicator of the level of knowledge mastering by university students [Text] / I.N. Ostapenko, R.S. Usenko // Actual Problems of Economics, Sociology and Law, 2015, No. 2, Pp. 180-184.
- [17] Pikhota, A. E-learning. Change of trends [Electronic resource] – URL: <https://research-journal.org/technical/elektronnoe-i-distancionnoe-obrazovanie/>
- [18] Samigulina, G.A. Intellectual expert system of distance learning on the basis of artificial immune systems // Information Technologies of Modeling and Management. 2007. Issue. 9 (43), pp. 1019-1024
- [19] Samoylo, I.V., Zhukov, D.O. Information technologies in providing a new quality of higher education // Collection of scientific articles. Book. 2. Proceedings of the All-Russian Scientific and Practical Conference with International Participation "Information Technologies in Ensuring a New Quality of Higher Education (14-15 April 2010, Moscow, MISiS National University of Science and Technology). M.: Research Center for Quality Problems in the Training of Specialists of MISiS National University of Science and Technology, 2010, P.89-95
- [20] Spiridonova, E.V. Factors to increase labor productivity [Text] / E.V. Spiridonova // Science of the SUSU: materials of the 68th scientific conference. Ministry of Education and Science of the Russian Federation; South Ural State University, 2016, pp. 617-623
- [21] Sulimova, E.N. Innovative approaches to preparing students for the USE [Text]/ E.N. Sulimova// In the collection: Language and literature in the scientific dialogue Special issue: collection of scientific articles, 2016, Pp. 121-127.
- [22] Khodak, E.A. Distance learning: opportunities and limitations. The ideal LMS (Learning Management System): what is it? Part 3 [Electronic resource] – URL: <https://ubo.ru/articles/?cat=120&pub=3472>
- [23] Chvanova, M.S., Kiseleva, I.A. The use of the fuzzy set theory tool in the design of modern technologies of distance learning [Electronic resource] – URL: http://ifets.ieee.org/russian/depositary/v16_i2/pdf/9.pdf
- [24] Shchupanovskaya, L.A. Distance learning of schoolchildren. Principles and means of distance learning. Development of distance learning in school education [Electronic resource] – URL: <https://nsportal.ru/shkola/raznoe/library/2013/05/16/distantsionnoe-obuchenie-shkolnikov-printsipy-i-sredstva>