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**Modernisation of Higher Education in
Central Asia through New Technologies
(HiEdTec)**



RECOMMENDATIONS FOR ADAPTING THE CENTRAL ASIAN HE SYSTEM TO THE NEEDS OF THE DIGITAL GENERATION (KAZAKHSTAN)

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Technologies (HiEdTec)**

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LIST OF ABBREVIATIONS

HiEdTec	– <i>Modernisation of Higher Education in Central Asia through New Technologies</i>
HE	– <i>Higher Education</i>
LMS	– <i>Learning Management System</i>
LLL	– <i>Lifelong learning</i>
VLE	– <i>Virtual learning environment</i>
MOOC	– <i>Massive Open Online Course</i>
OER	– <i>Open education resource</i>
DER	– <i>Digital educational resources</i>



1. INTRODUCTION

The current report contains an analysis of the results of the Google forms survey focused on establishing the level of introduction of digital tools in higher educational institutions in the Republic of Kazakhstan.

The Almaty Technological University conducted a survey of students and faculties of universities to get feedback about the level of implementation of digital tools in higher educational institutions of the Republic of Kazakhstan.

The survey has been completed by representatives of 23 universities with different areas of study. Among them are state regional multi-purpose universities, technical, medical, economic, and pedagogical universities.

The total number of respondents for this survey is 1159. 33.3% of them are teachers and researchers, 66.7% students. The structure of responses can be viewed in more detail in Figure 1. Thus, it was possible to find out the opinion of both teachers and students, which makes the survey results more reasonable.

2. HiEdTEC QUESTIONNAIRE RESULTS

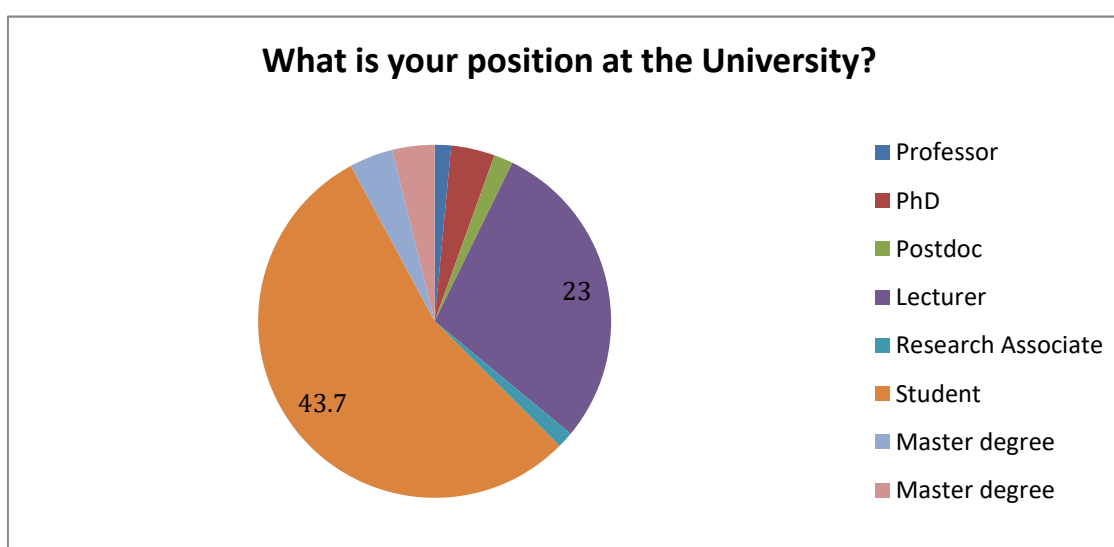


Figure 1. Structure of the respondents

The survey includes 19 questions and consists of 6 parts:



- A. Teaching methods, approaches and techniques;
- B. educational technologies;
- C. quality of the teacher;
- D. the state of innovative learning in higher education classes;
- E. quality assurance of the teaching and learning process;
- F. continuous professional development of teachers.

The next section presents a description of the survey results.

2.1. Methods, Approaches and Methods of Training

Question 1. How important is it for you to use teaching methods and/or approaches to achieve better learning outcomes?

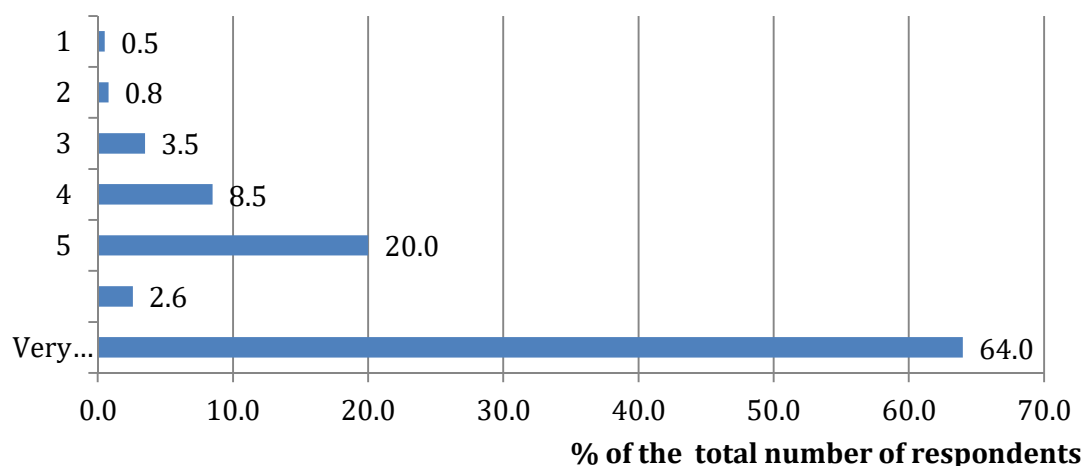


Figure 2. Importance of using teaching methods to achieve better results

The results of the responses (Figure 2) show that most teachers and students are aware of the importance of using certain approaches and methods to improve learning outcomes.

Thus, they believe that to use certain approaches and methods to improve the effectiveness of training is:

- very important – 64 %;
- important to a high degree – 28.5% (4 and 5);
- important – 4.3% (2 and 3);



- only 2.6% of the respondents are not important.

Question 2. What innovative teaching methods do you know?

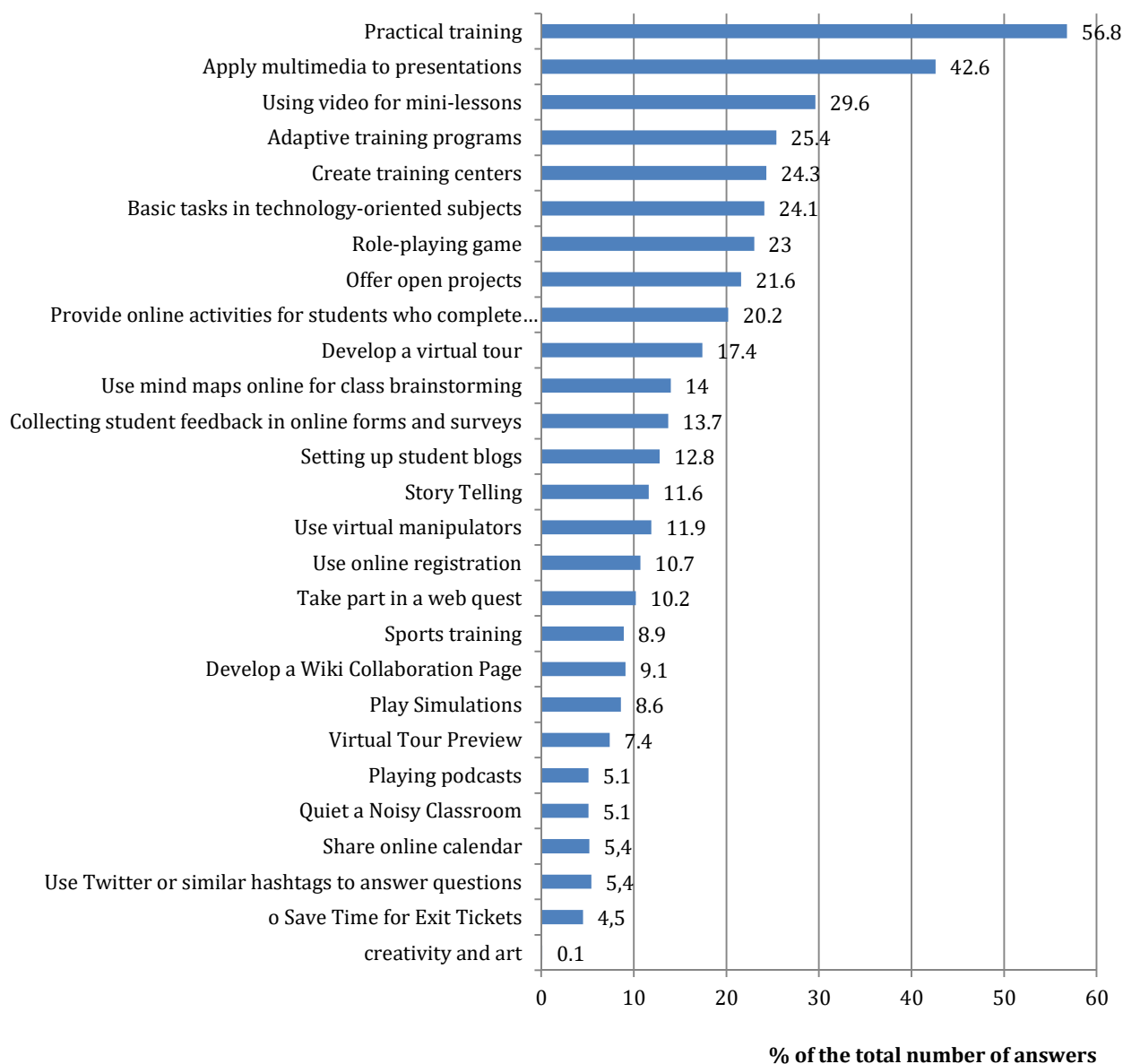


Figure 3. Innovative teaching methods used

Analysis of the results of the answers to this question showed that the respondents indicated about 4 dozen different, in their opinion, innovative methods of training (Figure 3). The most frequently noted answer is practical training 56.8%. Also, among the most common answers (there are 10 of them):



multimedia elements in the presentation (42.6%), the use of video in mini-lessons (29.6%), adaptive training programs, training centers, role-playing games, open projects, online activities, etc. Little familiar, virtual patient and manipulators and some others.

Question 3. What innovative teaching methods do you use at your university?

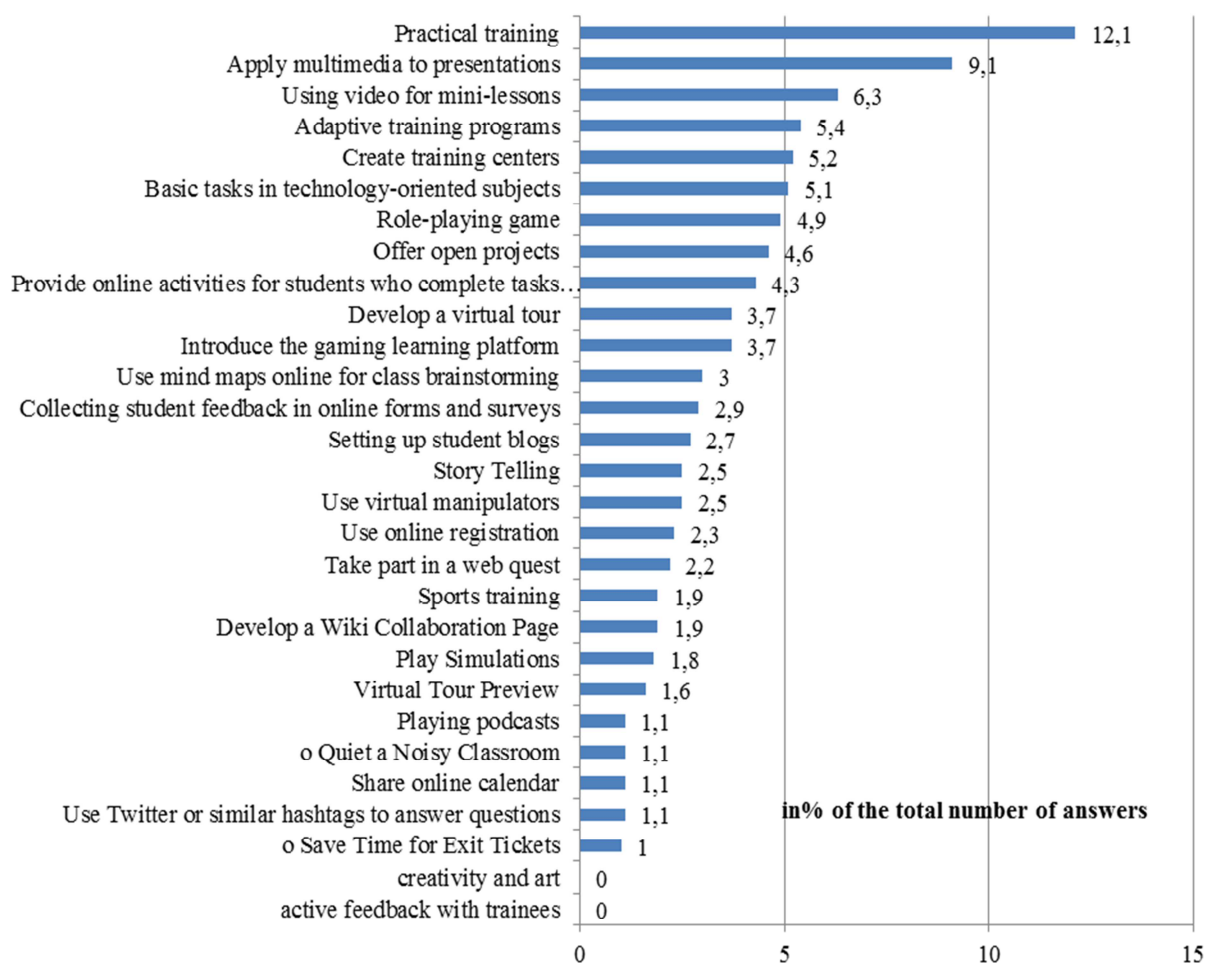


Figure 4. Innovative teaching methods used at the home university of the respondents

Respondents' answers showed that the largest number of them use practical training as innovative method (12.1% of all answers). The use of multimedia elements in the presentation (9.1%), the use of video for mini-lessons (6.3%), adaptive training programs (5.4%), as well as role-playing games, open projects, collecting the results of students' survey in online forms and surveys, mind maps, student blogs, web quests and some others (Figure 4). Oddly enough,



few respondents noted active feedback, although by the experience it is used by almost all teachers. The results of the answers to this and previous questions allow us to conclude that the known methods of teaching are also used by teachers in the educational process.

Question 4. What teaching methods by your experience are the most useful and achievable for teaching students (including those that do not exist at your University)? Why?

One of the most common answers is "project-oriented learning", which is based on the experience of practical research, while the student needs to update all their scientific and educational information, remember and get practical skills, as well as to analyze the information. Active teaching methods – TBL, PBL, RBL, CBL, promote active thinking, develop creative thinking, learn to work in a team, develop students' self-education skills. Interactive presentations and videos contribute to better assimilation of information. Also web quests, which, firstly, teach students to think in an original way, without limiting it to a template; secondly, to think quickly; thirdly, unite the group and allow each student to strive to prove their usefulness to the team are thought to be very useful methods.

Question 5. What teaching methods by your experience are the most useful and purposeful for teaching students (including those that do not exist at your University)? And why?

The importance of techniques related to the Internet and the adaptability of the learning system is widely noted. It is indicated that interactivity and simulators are very useful for developing skills of laboratory research and other professional skills. The use of information and computer technologies, the advantages of which are: high-quality demonstration of educational material, accessibility, visibility, higher level and volume of information

It is also noted that all methods are important for the best result for each student (University). It is necessary to choose more convenient and useful options. In this case, the greatest effect is achieved for instilling the necessary competencies (knowledge).



In general, it should be noted that most teachers understand the advantages of innovative, and especially digital, technologies in training, correctly justify the results of their application. At the same time, both teachers and students have a desire to use such technologies in the educational process, which will help to improve its effectiveness.

2.2. Educational Technologies

Question 6. What educational technologies do you know?

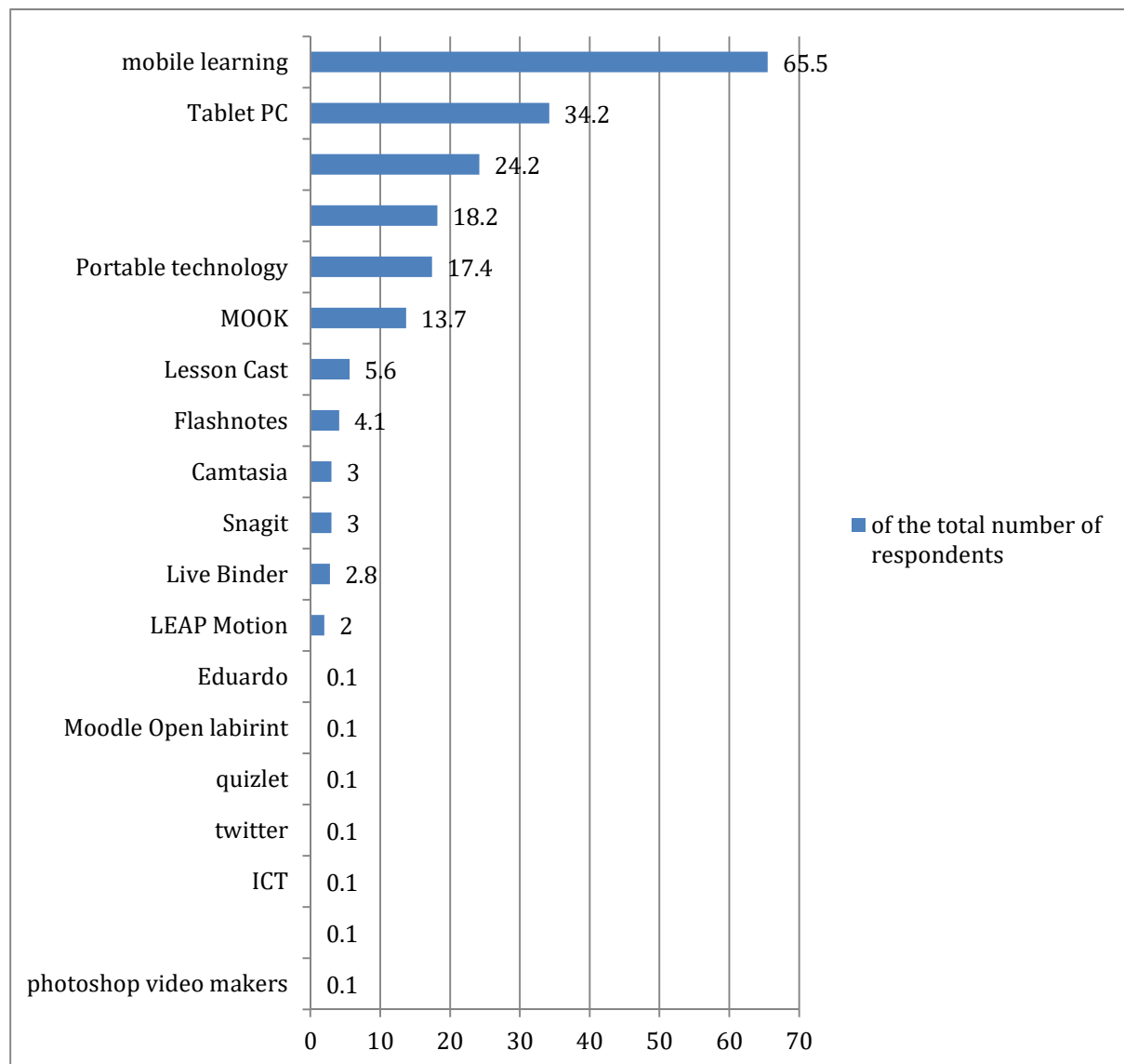


Figure 5. Familiarity with educational technologies



The analysis of the results of the answers to this question showed that the respondents indicated about 4 dozen different, in their opinion, innovative learning technologies (Figure 5). The most frequently noted answer is mobile learning 65.5%. Among the most common answers (there are 10 of them): knowledge (35.4%), tablet computer (34.2%), virtual and remote laboratory, open content and training Analytics, games and gamification, cloud computing, MOOC, etc.

Respondents are not familiar with problem and team training, virtual patient, project methods and some others.

Question 7. What educational technologies are used in your university for education?

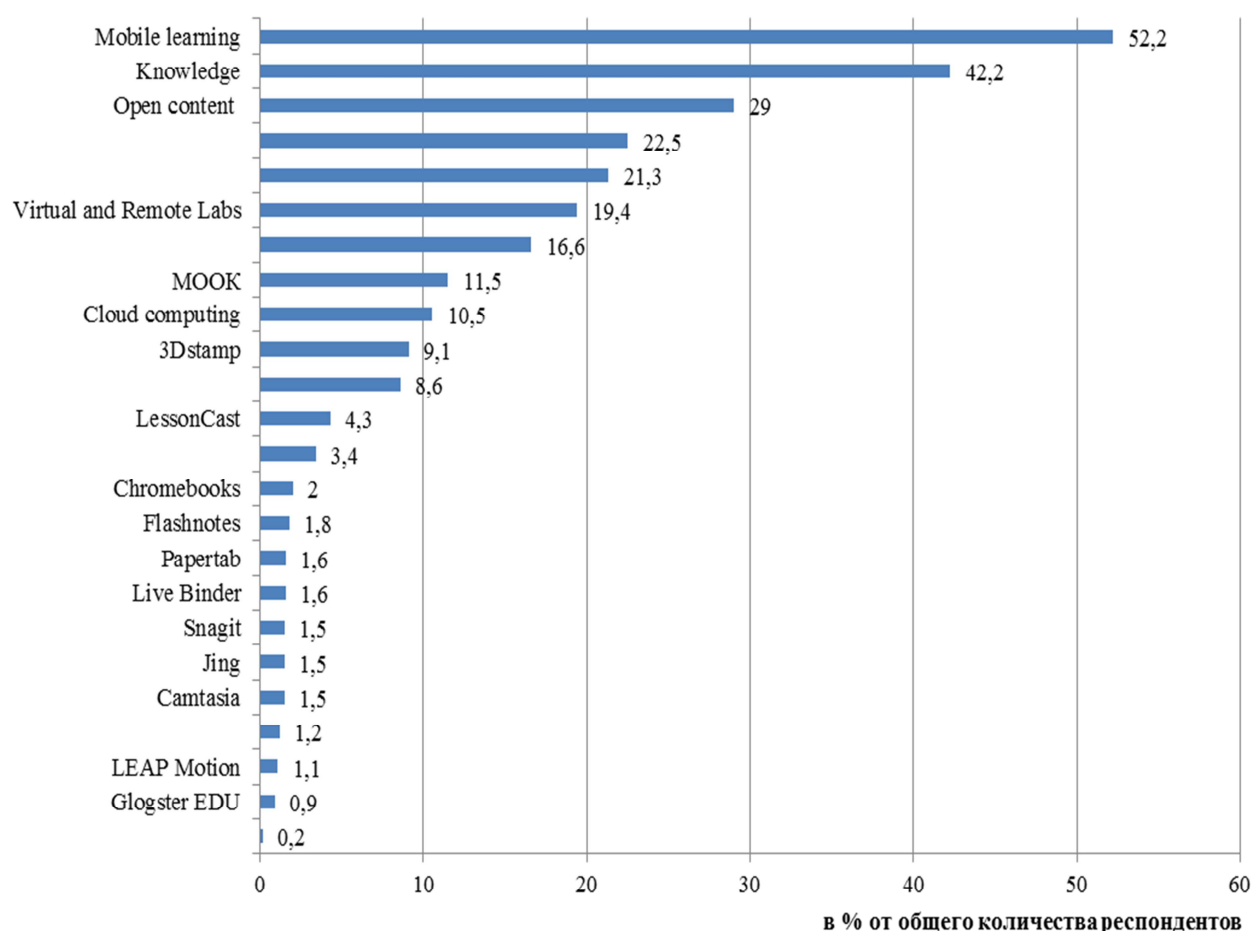


Figure 6. Educational technologies used for education at the home university of the respondents



The most frequently noted, as in the previous question, the answer is mobile learning 52.2%, among the most common answers, (there are 10 of them): knowledge (42.2%), open content (29.0%), a tablet computer (22.5 %), virtual and remote laboratory, open content and educational analytics, games and gamification, portable technologies, cloud computing, MOOK, etc. (fig. 6). Problem and team training, a virtual patient, project methods and some others are used a little by the respondents (Figure 6).

An analysis of the two questions shows that the answers to the frequency coincide, i.e. teachers use familiar technologies, the number of which is significant but well known and only a few of them are used.

Question 8. Which of these technologies proved to be the best in your opinion? Why?

The answers to this question show that teachers and students are well versed in the advantages of a particular educational technology. As already noted, preference is given to mobile learning. It allows students to think independently, look for the necessary information, process it, identify the problem, analyze the experience and knowledge, gives the opportunity to study in other universities and gain new experience. According to students it is open content, because even if they missed classes, they will be able to independently study the material. Virtual and remote laboratories help to work in real time with the studied process, save resources. 3D printing allows you to demonstrate the creation of models. Portable technologies provide quick and easy access to information.

In general, the questionnaire covers all the technologies offered in the list. Each of them has its own admirers who use them in the learning process, and usually not one, but several technologies.



Question 9. Are students involved in the process of finding new teaching methods and introducing new technologies at your University?

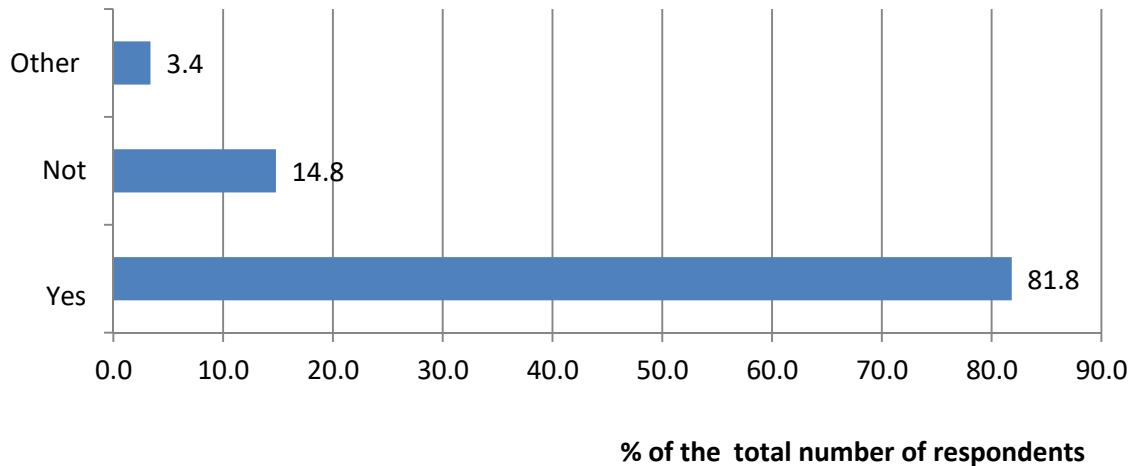


Figure 7. Involvement of students in the process of finding new teaching methods and introducing new technologies at university level

The answers to this question show that teachers involve students in the process of finding and implementing new teaching methods in the educational process in their disciplines. This is noted by 81.8 % of the respondents. Based on this figure, we can conclude that the opinions of teachers and students on this issue are the same. Only 14.8 % of the respondents do not participate in this process (Figure 7). In the category of other answers were: "I do not know", "I can not answer", "all" and even "through Advisory bodies", as well as missing lines.

2.3. Quality of the Teacher

The results are shown in (Figure 8).

In response to the question "What do You think makes the lecturer innovative?" 72,5% of the respondents said that creativity, 54,5% of the ability of the teacher to encourage students, 49,4 % providing students the opportunity that are relevant to their lives and future, 42,9 % - to provide students an innovative and stimulating environment, 41,9% of the determination.



Despite the fact that the first lines in the survey occupy quality, they do not express explicitly innovative lecturer without whom the use of new technologies is not possible. However, this explicit answer is presented in the leaders – 42.9%.

Question 10. What do you think makes the lecturer innovative?

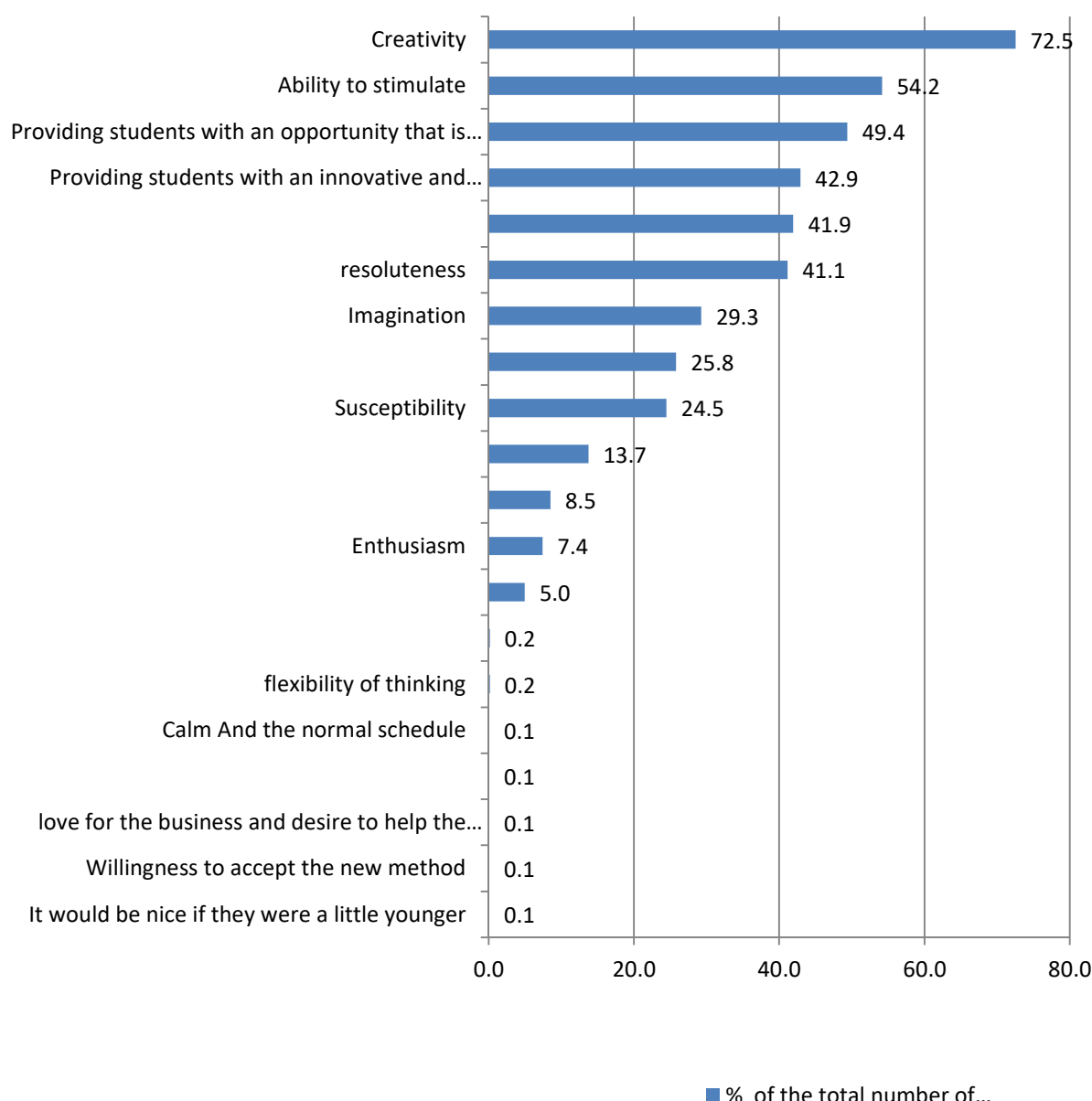


Figure 8. Characteristics of the innovative teacher



Question 11. What qualities do lecturers / teachers need to teach 21st century students?

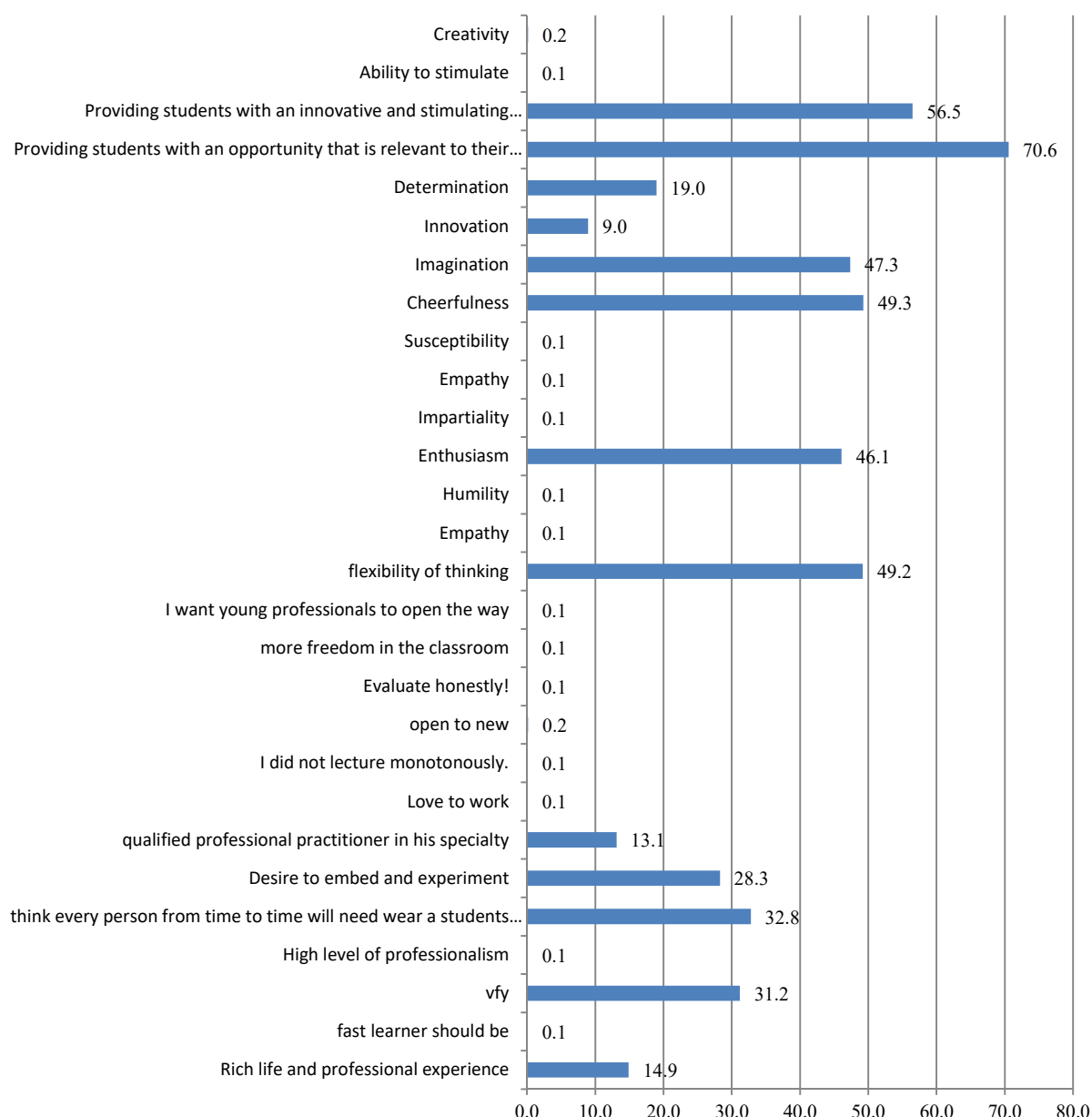


Figure 9. Qualities of 21st century leaders

The necessary qualities required for lecturers/teachers to teach students in the 21st century is marked by decreasing qualities such as: providing students with an opportunity that is relevant to their life and future (70.6 %), providing students with an innovative stimulating environment (56.5 %), vivacity (49.3 %), flexibility of thinking (49.2 %), imagination (47.3 %), enthusiasm (46.1 %).



About 30 % (fig. 9) of respondents consider it necessary to have professional and life experience, 32.8 % need to periodically improve their skills.

2.4. Status of Innovative Learning in Higher Education Classes

Question 12. How do you think the current level of education today? Is it innovative enough?

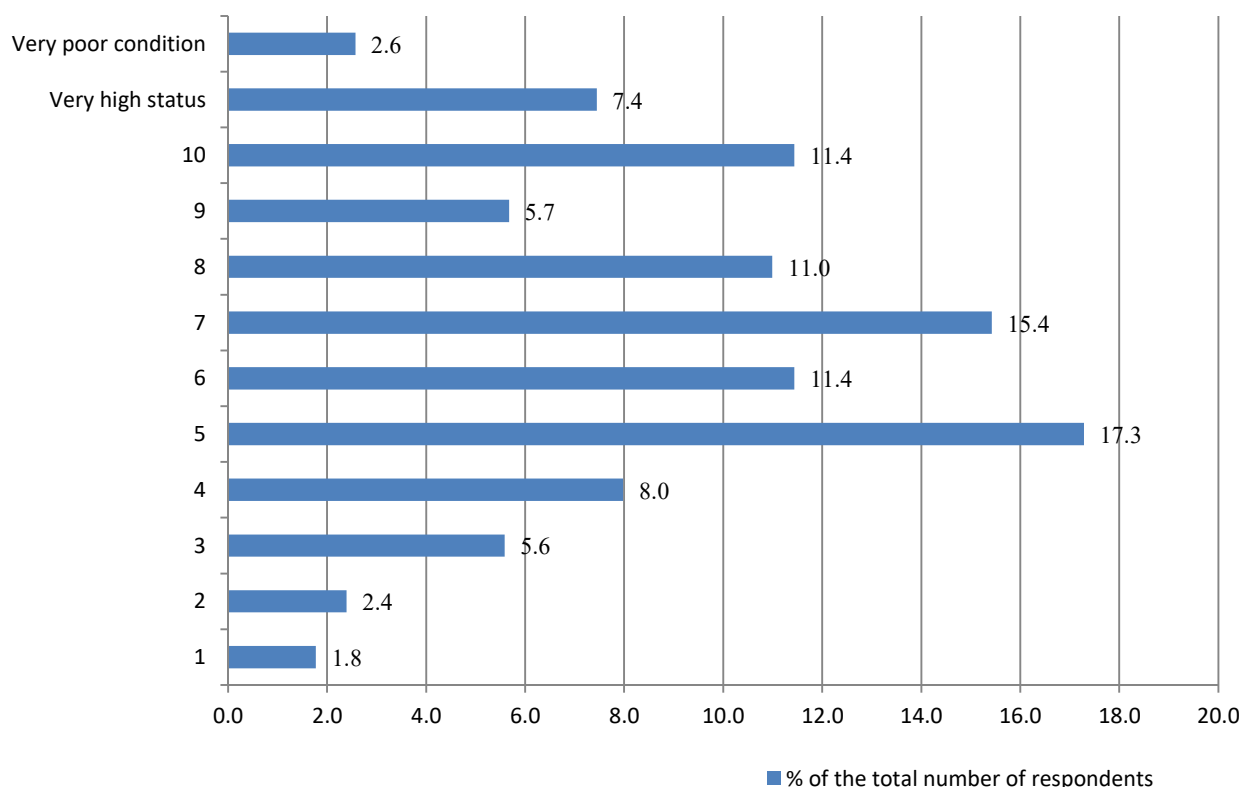


Figure 10. Level of innovativeness of HE nowadays

Analysis of the survey results (fig. 8) shows that most of the people asked think that there is a high standard – 35.5 % of respondents, the average – 52.1 % of respondents, low – 12.4 %, and 2.6 % of respondents estimate the current level of education is very poor.

Question 13. Do you allow your students to rate your lectures?

The survey shows that the majority of teachers (60.6 % of the total number of respondents) allow their students to evaluate lectures (Figure 11).

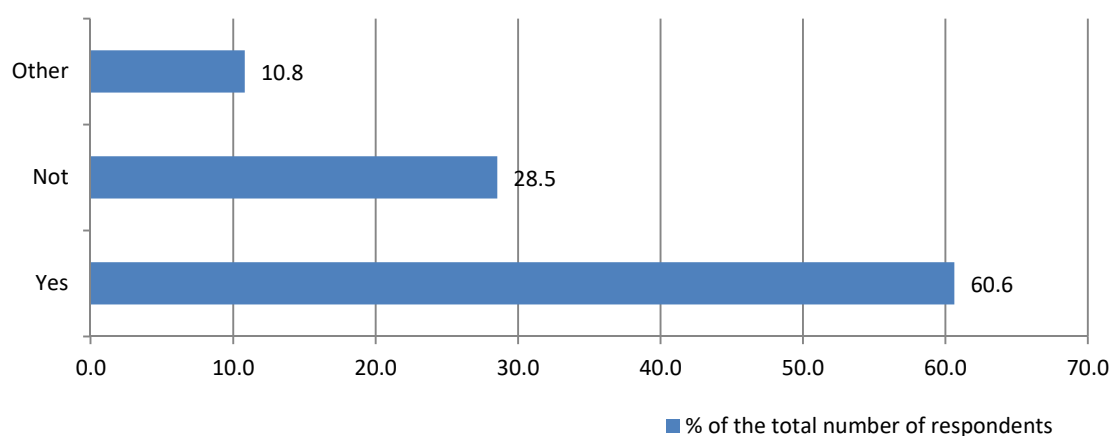


Figure 11. Student involvement in the rating of lectures

Question 14. What tools / methods do you use to do this if the answer to question 13 is yes?

To obtain feedback and improve the educational process, parts of the respondents-lecturers, evaluates their classes by talking, questioning, reflecting and be the expert evaluation method. More often, the assessment of classes of teachers by students is carried out in the course of a survey conducted at the University level.

Question 15. What teaching methods do students complain about the most, which are used in your University?

Most respondents found it difficult to answer. Students note that lectures held in the format of "monologue" are ineffective; rewriting the material takes a long time.

Question 16. What are the criteria for evaluating teachers at your University?

The majority of students answered to this question that a hundred - or ten-point scale is used to evaluate teachers, but not everyone remembered what criteria are considered. Teachers generally remembered KPI and questioning. Those and others mentioned the survey "a Teacher by eyes of students". The following criteria were mentioned: quality of knowledge presentation, punctuality, public speaking and professionalism, innovation, ability to provide



online events, academic honesty, ability to stimulate. Oddly enough, the use of active teaching methods and digital educational resource was not marked at all, although in all questionnaires, these items are present and are one of the main criteria for evaluation.

Question 17. Do you use any innovative methods of feedback (survey, Google forms, etc.)? If yes, please specify.

Among the answers, directly or indirectly, is the Internet. This includes online surveys, social networks, an educational portal, the capabilities of the MOOC platforms. Absolute leader in use are google-forms for surveys, which are really widely used by teachers.

To the question “why you think so”, the respondents did not give an answer, which does not allow to reveal any patterns.

It should also be noted that the overwhelming majority of respondents answered positively to this question (89%). This allows us to conclude that teachers strive to improve the quality of their classes.

Question 18. Do you think that the current training program for lecturers in your country meets the needs of modern schools and universities?

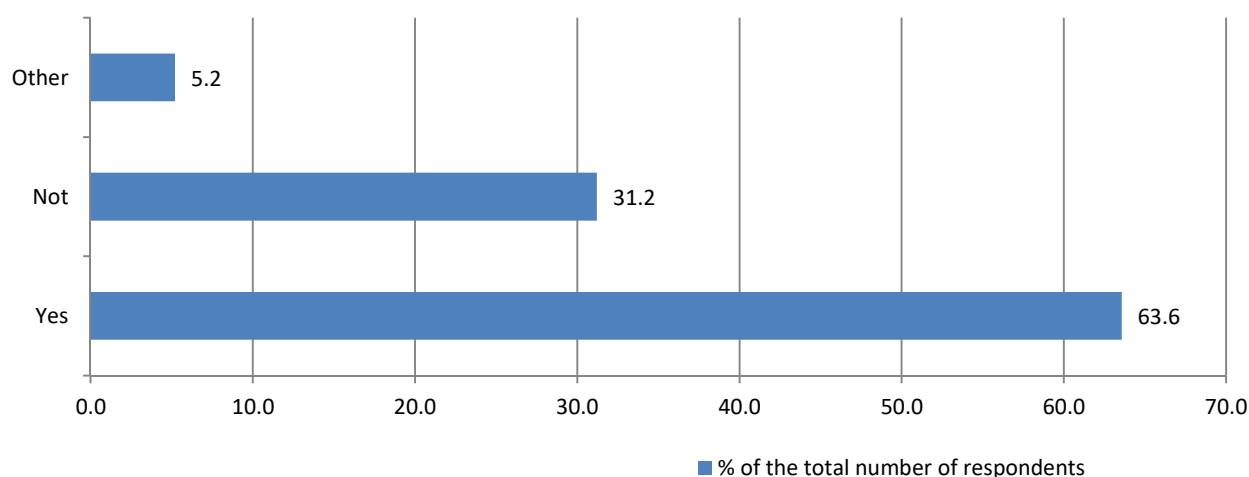


Figure 12. Level of compliance of training programmes to the needs of modern schools and universities



The majority of respondents (63.6%) believe that the current training program for lecturers in Kazakhstan meets the needs of modern schools and universities (Figure 12).

2.5. Continuous Professional Development of Teachers

Question 19. What are you doing to improve your skills in teaching methods?

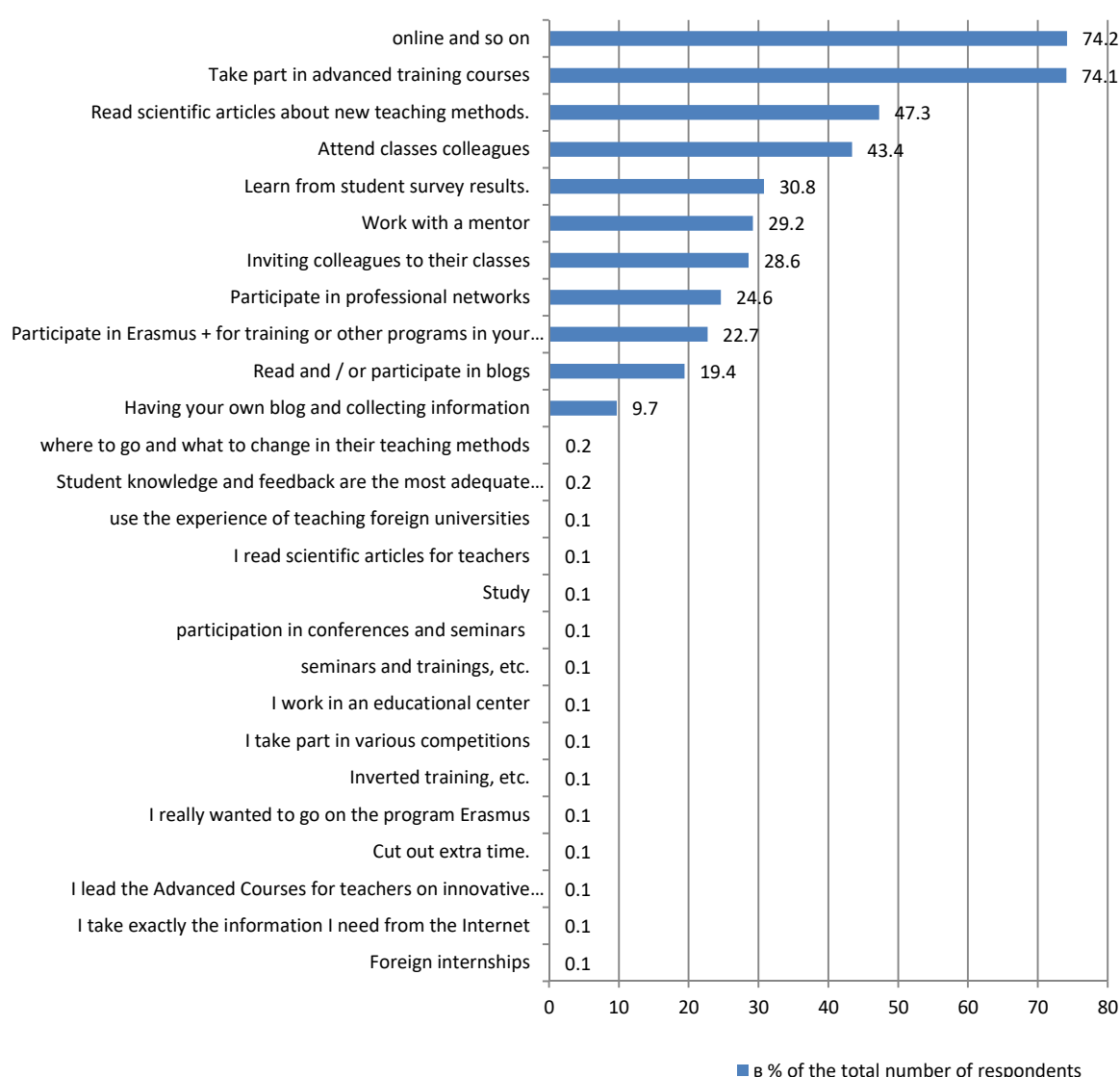


Figure 13. Involvement of teachers in activities related to the improvement of their teaching skills



Teachers mainly improve their skills in teaching methods through advanced training courses, online training (74.2% of respondents), reading scientific articles about new teaching methods (47.3%), attending classes of colleagues (43.4%) and inviting colleagues to their classes (28.6%), analyzing the results of a student survey (30.8%) (Figure 13). Great importance was also noted in improving the skills of teaching the role of mentoring (29.2%). Improve the skills and participation of teachers in professional networks (24.6%), in Erasmus+ programs (22.7%).

The analysis of the survey data shows that participation in the blogs of the professional community (19.4%) and the presence of your own blog (9.7%) allow teaching staff to collectively or alone reflect, accumulate experience, summarize the results of self-education, self-development, etc. and not just to reflect, but to share the results with fellow bloggers.

3. SUMMARY

As already noted, the survey covers a fairly large sample of universities in Kazakhstan, which have different forms of ownership and provide training to students in various areas. The number of respondents was 1159 people. Among them there are professors and teachers, researchers, students of different levels of training. All this indicates a sufficient degree of reliability of the results.

Analysis of the results showed that teachers, as well as students, are familiar with modern teaching methods and technologies, including digital, mobile, and distance, electronic courses. It can also be concluded that in the learning process Internet technologies are used, higher education institutions have educational portals and platforms for e-courses, including the Massive Open Online Course (MOOC).

Most teachers understand the advantages of innovative, and first of all digital, technologies in education, to properly assess the results of their use. At the same time, both teachers and students have a desire that such technologies be used in the educational process, which will contribute to increasing its effectiveness. Individual teachers practice the use of digital educational resources and technologies, strive to improve them and attract students to



search for and introduce new teaching methods in the educational process, try to change their approach to teaching methods, based on the opinions and characteristics of students' worldview.

However, the survey results also allow us to conclude that not all teachers use innovative technologies widely and do not have sufficient skills to create digital educational resources.

Given the above, it is necessary to adapt educational activities to the needs of the digital generation.

4. RECOMMENDATIONS

Based on the survey, we consider it necessary to provide some recommendations for managers and subjects of education of the Republic of Kazakhstan.

For the Ministry of Education and Science of the Republic of Kazakhstan:

1. Carry out work by improving the regulatory framework in higher education, aimed at:
 - implementation of the adaptation of the regulatory framework to the using of interactive technologies and distance learning, ensuring proper quality, credit recognition mechanism and regulation of intellectual property rights;
 - training and retraining of teachers in the development and application of digital educational technologies;
 - stimulating the development of electronic, mobile and distance learning;
 - further development of international educational programs, academic mobility;
 - creation of a single republican base of scientific and educational materials, an inter-university network;
2. Promotion of the creation of a national network of innovative educational technology centers, digital educational resources.



Heads of higher education institutions need to:

- Consider the possibility of encouraging and encouraging university staff for the development and implementation of digital educational resources and technologies in the educational process;
- Improve the qualifications of pedagogical staff at the republican and international level in the field of innovative teaching methods and technologies, developing the digital educational resources, distance learning, using cloud technologies.
- Ensure the availability of high-speed Internet in educational buildings, to create a broadband infrastructure of wireless Internet.
- Equip classrooms with interactive equipment, feedback system "feedback" during training sessions.
- Acquire or develop independently DER and software.
- Continuously improve e-learning platforms.
- Create a publicly accessible virtual inter-university and regional library, providing access to libraries in other countries.
- Continue the development and implementation of innovative educational technologies and didactic models, including augmented reality (AR), virtual reality (VR), big data (Big Data), Internet of things, Internet of everything, artificial intelligence and machine learning, security, personalized training.
- Promote the introduction of a research approach to education.
- Develop blended learning (traditional + e-learning) as the main way of training specialists with the appropriate skills necessary for successful functioning in a digital society.
- Use innovative educational technologies and methods to attract foreign students.
- Monitor the implementation of innovative educational technologies and didactic models in order to improve educational activities;
- Promote and replicate the results of the implementation of innovative educational technologies and didactic models through mass media, regional and national seminars and conferences, social networks and others.