Assessment of Students’ Supra-Professional Competencies in an Online Format

Nikolaeva M.A.1,*, Pesha A.V.2, Shramko N.V.1

1Ural State Pedagogical University, Yekaterinburg, Russia
2Ural State University of Economics, Yekaterinburg, Russia
*Corresponding author, Email: nikolaeva250381@list.ru

ABSTRACT
Technologization of the educational process leads to the need to search for methods and technologies for evaluating students’ competencies in an online format. Content analysis of publications on the assessment of students’ competencies showed the relevance of studying the possibilities of using online assessment in higher education. The article reveals the content of online assessment of not only professional, but also supra-professional competencies of students. The authors present the results of the all-Russian competition of supra-professional competencies “Assessment “Teachers of the 21st century” in an online format. The assessment centre is based on supra-professional competencies, the profile of which was determined in advance. The approach used by the authors makes it possible to assess students’ supra-professional competencies simultaneously in different areas of training. The article shows that the students demonstrated an average and above average level of development of supra-professional competencies. The feedback from the participants presented in the discussion confirms the relevance and timeliness of its organization in an online format. Summing up the results of the online assessment made it possible to formulate a number of advantages of this assessment format: accuracy, budget, objectivity, and convenience of the organization. The results of the study may be of interest to university teachers, organizers of competitions for students, and researchers studying the assessment of competencies.

Keywords: assessment, competence, higher education, online assessment, pedagogical education, supra-professional competencies

1. INTRODUCTION
Assessment of the formation of students’ competencies is one of the important organizational and content elements of the educational process in higher education. Scientists all over the world devote their research to this issue [e. g. 7; 13; 16; 18; 21]. Digital opportunities for assessing the competencies of students and university graduates of various forms of education and training areas have been relevant over the past two decades, which is explained by significant technological transformations of the educational process that began at the end of the 20th century [12; 14; 16]. The transformation of the didactic triangle into a didactic tetrahedron, where one of the sides is firmly occupied by technology, leads to the need to review the tools and methods for assessing students’ competencies using the capabilities of the digital environment. Scientists and university teachers conduct research, testing various methods and online approaches for assessing competencies that have replaced the traditional ones [e.g. 1; 4; 6]. In their studies, researchers are testing various methods and online approaches for assessing competencies. At the same time, much attention is paid to the comparative analysis of studying the advantages and disadvantages of the competence assessment process.

The ongoing research on assessment technologies concerns not only professional, but also supra-professional competencies, which are beginning to play an increasing role in the labor market of various countries [e.g. 5; 15]. By supra-professional competencies, we understand a wide range of skills and behaviors, interpersonal relationships and personality traits that allow a person to navigate and adapt to the tasks and challenges of the environment quickly, establish relationships and establish contacts, show high labor efficiency and achieve goals and objectives [14]. Supra-professional competencies, such as socio-emotional (interaction with people, customer orientation, self-control, etc.), cognitive (project thinking, computational thinking, systems thinking, etc.), communicative and digital, are not easy to assess using standard testing or interviews [Pesha et al., 2020].

To assess supra-professional competencies that manifest themselves in behavior in various contexts, it is necessary to use tools that guarantee the consistency, objectivity and significance of the results obtained. Such an assessment is best carried out using the tools of the assessment centre, involving expert appraisers who must meet certain requirements and undergo preliminary training [10; 14; 17].

In this paper, the authors present the results of evaluation of the supra-professional competencies of students in
pedagogical areas of training, which was conducted in the framework of the all-Russian competition “Teachers of the 21st century” (hereinafter referred to as the Competition) in the assessment format. The Competition was attended by students and undergraduates in the direction of training “Pedagogical education” (31 people) from four universities of the Russian Federation. To achieve this goal, the paper reflects the results of content analysis of the literature on competence assessment, including using online tools; reveals the methodology for conducting the Competition in an online format; presents an analysis of the results of the Competition, on the basis of which recommendations for the development of supra-professional competencies of future teachers are developed.

2. METHODOLOGY

The content concept of the all-Russian competition “Assessment “Teachers of the 21st century” was formed on the basis of the all-Russian competition of students and young specialists in personnel management “Open Assessment “HR: talent pool”, which has been held since 2013 [14]. The key features of the competition in 2020 are involving students and undergraduates in the directions of training “Pedagogical education” and “Personnel Management”, as well as holding events in an online format. One can learn more about the concept on the website of the Competition “Talents of the 21st century”: http://assessment2020.tilda.ws.

Within the framework of the Competition, the main method for assessing supra-professional competencies was the assessment centre, which included several stages:

Stage 1 - online registration, where data on the motivation of students to participate in the Competition and their opinions on key competencies for a modern teacher were collected using Google Forms.

Stage 2 - selection (online, asynchronous format). The selection stage included two steps: the first - testing of abilities (numerical, verbal and logical), which was conducted using the OnlineTestPad resource; the second - solving cases on professional topics using Google Forms.

Stage 3 - final (online, synchronous format). Participants who successfully completed the selection tasks and scored more points were invited to the final. The final was held in the format of an assessment centre. The matrix of exercise competencies is presented in Table 1. Assessment of competencies at all stages and for all exercises was conducted on a nine-point scale (fig. 1). The event was held on the Zoom platform using collaboration tools that enable interaction in mini-groups, in pairs “expert-participant” and communication in a general conference.

Table 1 Matrix of competencies-exercises (tasks) of the competition “Assessment “Teachers of the 21st century»

<table>
<thead>
<tr>
<th>Competencies</th>
<th>Tool/Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Selection</td>
</tr>
<tr>
<td></td>
<td>Numerical test</td>
</tr>
<tr>
<td>Socio-emotional</td>
<td></td>
</tr>
<tr>
<td>Cognitve</td>
<td>computational thinking</td>
</tr>
<tr>
<td></td>
<td>creative thinking and innovation</td>
</tr>
<tr>
<td></td>
<td>design thinking and project management</td>
</tr>
</tbody>
</table>
continuation of Table 1

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>systems thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>information management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>understanding the meanings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communciative</td>
<td>negotiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital</td>
<td>general technical literacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where</td>
<td>is the competency assessed in the task</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 Competence assessment scale

Test results were processed automatically. The solutions of the cases were evaluated according to a number of criteria related to the disclosure of the situation, the relevance of the proposal, and the possibility of applying the solution in similar situations in future real pedagogical practice. During the final events, competence assessment was carried out by experienced and trained experts (assessors) that are representatives of the professional HR community, and the teaching staff of partner universities. The assessment was synchronous; the results of each participant were marked in an electronic form for all exercises. Summary data was generated automatically in the final report. As a result, average scores were formed for each competence. The requirements of objectivity and unbiased assessments were met, and the results obtained can be considered reliable.

3. RESULTS

In total, 82 students from 14 Russian universities took part in the all-Russian competition “Assessment “Talents of the 21st century”. In the competitive direction “Teachers of the 21st century”, the number was 31 people from universities in Yekaterinburg, Chelyabinsk and Ulyanovsk. 22 of them were tested in the selection stage, 16 - coped with the solution of case tasks, 10 - reached the final. All the teachers who reached the final of the Competition took part in online events of the assessment centre. At the first stage, the participants were asked to fill in the registration form. In addition, the future teachers briefly presented the goals of their participation and outlined the key competencies of the future teacher. Bachelors and masters of pedagogical training were registered in the Competition. The main goals of participation in the competition were defined by the participants as “to get maximum feedback from experts” (42%); “to add to the competencies portfolio” (41%); “to be able to assess their readiness for new challenges” (36%); “to try to apply the knowledge gained in higher education in practice” (34%); “to get practical advice” (32%); “to communicate with like-minded people” (27%); “to try something new” (15%); “to get an additional internal incentive for personal growth” (8%); “to find out the trajectory of their development” (8%); “the opportunity to see growth points” (8%). Most students see the content of the key goal in opening up new opportunities for professional development and personal growth, as well as the opportunity to try to put into practice the knowledge, skills and abilities acquired at the university.

As key competencies that will be useful in future teaching activities, participants identified the following: “responsibility”, “ability to build communication”, “stress resilience”, “ability to plan and set goals”, “organizational skills”, “patience”, “knowledge of computer technologies”, “communication skills”, “ability to work with documents”, “general erudition”, “knowing their subject”, “knowledge of child’s psychology”, “mobility”, “quick learning”, “ability to find an individual approach and motivate students”, “creativity”, “self-organization”, “initiative”. It must be noted that competencies determinations were made by the students themselves, since the question was open.

At the second stage, participants had to solve a number of test tasks and cases. The results of the assessment of
logical, verbal, and computational abilities are shown in figure 2.

![Figure 2](image)

**Figure 2** Results of the first part of the selection stage of the Competition (tests of abilities)

The boxplot (fig. 2) shows that participants showed the lowest scores in solving problems related to computational abilities. At the same time, in their final comments, they noted that they were afraid of not meeting the time terms given for completing the tasks (10 minutes). However, almost everyone managed to solve the problems in time. The average time to pass the numerical test was 8.96 minutes. Consequently, there was still time for most of the students to pass the test. The average score on the test was 2.9 points. Two out of three outliers correspond to the minimum (0 points) and maximum score, 5 points with a standard deviation of 0.36 points. The interquartile range (IQR) on the numerical test was 2.5 points. None of the participants solved all the tasks correctly. We can state a very average level of development of computational abilities of future teachers. Participants received higher scores when completing tasks on the verbal test. The average score was 5.09, which shows an above-average level of development of the “understanding of meanings” competency. The range of ratings in this test is from 2 to 9 points, 1 person gave correct answers in all the proposed tasks. The IQR was 3 points. The lowest IQR was diagnosed with participants who passed the test of logical abilities (1.5 points), while the highest number of correct answers was received to the questions of this test. The average score was 6.19. Summing up the analysis of the first selection task of the Competition, it can be noted that future teachers have a higher than average level of development of logical thinking, an average level of the competency “understanding the meanings”. At the same time, it is necessary to pay additional attention to the development of computational competencies of future teachers, which, according to a large number of international frameworks and research, are among the most popular basic competencies with modern specialists [8; 9; 11; 19]. These studies focus on data on literacy skills, computational literacy, problem-solving skills, and digital literacy.

Analyzing the results of the second selection task “solving cases”, we can say that participants successfully coped with it. The average score was 8 for solving two cases. At the same time, the most common score is 9. Participants took a fairly systematic approach to solving the situation, described its possible causes, initiated several possible options within the framework of the work, and described specific steps using “I-statements”.

The results of the final stage tests are shown in figures 3-5. The level of development of the cluster of socio-emotional competencies of students was assessed by experts as high and above average. The average scores were 5.46-6.33 points. The IQR in cluster competencies assessments is quite high 2.63-3.06 points, which indicates that the students showed significantly different levels of competence development.

![Figure 3](image)

**Figure 3** Final assessments of participants for the social and emotional competencies cluster

Figure 4 shows a boxplot of the scope of the final scores of the finalists for the cluster of cognitive competencies. The boxplot shows that the competencies of the participants in this cluster received different expert ratings. Participants received the highest marks for the competency “system thinking” and “creativity and innovation” (from 5 to 7 points). The lowest ratings were given to the participants’ competency “design thinking and project management”. It is difficult for participants to work on a task as a separate project. The highest IQR is given for the competencies “information management” (2.29 points) and “project management” (2.06 points). Participants showed different levels of cognitive competence development.

![Figure 4](image)

**Figure 4** Final assessments of participants for the cognitive competencies cluster

Students’ competencies in clusters of communication and digital competencies received the highest expert ratings (fig. 5). All participants’ ability to negotiate and persuade others was rated above average (6.63 to 9 points). Only one participant’s assessment of this competency was below the average level (3 points). The IQR was 1.75 points; the difference between the results of the participants is not significant. The finalists took an active part in the discussion, drew attention to their words, ideas, suggestions, “heard” the arguments of others and took
them into account in further discussion, when making decisions. Most of the participants showed the ability to communicate with each other in a dialogue format. It is the communicative competence that is one of the basic competencies of a modern teacher, which is confirmed by the opinions of the students themselves received at the first stage of the competition, as well as by numerous studies [e.g. 2; 3]. The importance of developing modern teachers’ digital competencies is obvious, which is understood by both the expert community and students, whose opinion on the competencies of teachers of the 21st century we studied [22]. The average score for the development of digital competencies was 6.03 points, which corresponds to the average level. The IQR was 1.88 points; the average scores of participants do not have a large range. All the assessment tasks were related to the use of digital technologies in one way or another, and not all participants were able to navigate them quickly and prepare digital solutions to their tasks (fig. 5).

![Figure 5](https://studvesna.info/student/2017-2030) Final assessments of participants for the communicative and digital competencies clusters

4. DISCUSSION

The transition of the educational process to a digital position is a turning point in education. In this regard, we should note three important documents “Strategy for the development of the information society in the Russian Federation for 2017-2030” and the Federal project “Digital educational environment” (2018). And the third document that defines what professional qualities and skills a teacher should have in the Russian Federation is the professional standard of a teacher. It makes a division between teachers for different levels of education, however, there is a common thing that a modern teacher should be able to do: master various forms and methods of teaching; master, develop, apply modern technologies; use special approaches for different categories of students; possess computer literacy; organize extracurricular activities, if necessary, and more [23].

One of the optimal forms for the development and formation of professional qualities and skills of future teachers indicated in the standard is are various competitions. Today, student competitions are diverse in their content, specifics and level. Active students are invited to take part in the following projects: the student olympiad “I am a professional”, “Professional training 2.0”, the festival “Russian student spring”, the Russian national award “Student of the year”, as well as competitions and olympiads in the areas of training (table 2). Analysis of information materials (website, regulations / newsletter) shows that the organizers of these projects are most interested in students in technical and natural science areas of training, which is due to the rapid development of the country’s economy.

### Table 2 Target orientation of competitions for university students

<table>
<thead>
<tr>
<th>Name</th>
<th>Purpose</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student olympiad “I am a professional”</strong></td>
<td>testing of professional knowledge in technical, humanitarian and natural science areas of training</td>
<td><a href="https://yandex.ru/profi/">https://yandex.ru/profi/</a></td>
</tr>
<tr>
<td><strong>Project “Professional Training 2.0” (Competition)</strong></td>
<td>is aimed at increasing the motivation of students and teachers to apply the mechanisms of a practice-oriented approach and project methods in the educational process with the direct participation of employers</td>
<td><a href="https://xn--80aeliblxdekein0a.xn--p1ai/">https://xn--80aeliblxdekein0a.xn--p1ai/</a></td>
</tr>
<tr>
<td><strong>Festival “Russian student spring”</strong></td>
<td>support and development of student creativity in Russia</td>
<td><a href="https://studvesna.info/dokumenty/">https://studvesna.info/dokumenty/</a></td>
</tr>
<tr>
<td><strong>Russian national award “Student of the year”</strong></td>
<td>identification and support of students of professional educational organizations of the Russian Federation who have special achievements in the field of science, creativity, sports, journalism, youth policy, student leadership, social activities and volunteerism</td>
<td><a href="https://studvesna.info/student-goda-vo/">https://studvesna.info/student-goda-vo/</a></td>
</tr>
</tbody>
</table>

During the development of education in Russia, the general provisions and requirements for professional skill competitions for teachers have changed. For example, O. V. Stepanov notes that the content and forms of various competitive pedagogical events reflect the specifics of a particular stage in the evolution of education. The author emphasizes that “the development and reformation of pedagogical skill competitions are carried out on the basis of the state’s educational policy and reflect the ideology and national policy in the field of education” [24, p. 145].
O. V. Vedernikova et al. believe that participation in competitions of pedagogical skills affects the competitiveness of modern teachers [20]. It should be noted that most of these competitions, both for teachers and students - future teachers, are aimed at knowledge of the subject and methods of teaching it, therefore, competitions are held in line with professional competencies. In our opinion, this is insufficient, since modern society imposes strict requirements on teachers. The range of competencies of teachers in connection with the digitalization of education has expanded significantly. As the period of the first wave of the COVID-19 pandemic has shown, a modern teacher must not only possess the necessary set of digital competencies, but also be able to use them to motivate and activate the cognitive activity of students; to create educational content that meets modern requirements; to organize communications with students, their parents and colleagues.

The results of the competition “Teachers of the 21st century” indicate the need to form and develop supra-professional competencies of future teachers. Stages, formed in the basis of the assessment centre, show how students have already formed professional (general) competencies: work in a situation of uncertainty, limited resources (e.g. time), in a team with strangers under stressful conditions.

Following the results of the competition, a reflexive conversation was held with the participants. Some of them indicated that “the expectations were not fully met, because I did not read the regulations carefully; when I applied, I thought that the competition would be on pedagogy”. At the same time, participants note that “such competitions are necessary for students, they allow them to look at themselves from a different angle”. One of the participants said that “I was a little worried and in a hurry, because I was afraid that the results would not be counted if I didn’t answer all the questions; I had to make a decision quickly and believe in myself!”. The participants noted that the assessment of experts with personal wishes and recommendations for the future, allows them to conduct self-analysis and refine weaknesses: “The experts gave personal wishes and recommendations for the future, which allow us to conduct self-analysis and refine our weak qualities”; “I did not expect that feedback would come so quickly”. Participants summarized that such competitions are necessary for self-development.

All the participants noted the pithy content of the competition, as well as its remote format. For example, “I really liked that Google services were used, it was interactive and convenient. The “Meeting” task was especially unusual, because it was possible to interact and work with other participants (although I was initially afraid that everyone would talk at the same time, and no one would understand anything, but we quickly coped”) .

Thus, it should be noted that the competition was the starting point for the next stage of self-development. The four-hour experience of interaction between participants from different towns, universities, directions, and courses in an online format can be considered positive. Organizational and technical aspects, of course, still need to be refined and improved.

5. CONCLUSION

Modern research conducted by scientists on the problem of assessing students’ competencies during higher education is aimed at testing and analyzing the effectiveness of using online assessment tools and technologies as the most relevant in the digital age [e.g. 1; 4; 6].

In the article, the authors reveal the use of the online assessment centre as an approach to assessing the supra-professional competencies of students of pedagogical training areas. In the format of the assessment centre, a competition of supra-professional competencies of students “ Teachers of the 21st century” was held.

The assessment is aimed at evaluating 11 supra-professional competencies that determine effectiveness in current and new professional activities. The results of the competition and the analysis of experts’ assessments made it possible to get information about the level of development of supra-professional competencies among students of pedagogical training areas. The assessment was conducted with the involvement of students and experts from all over the country, regardless of the place of residence, type of territory and distance from the administrative centres of the country’s regions.

An individual report on the results of the competition was created for each participant, the purpose of which was to show the level of development of the participant's competencies and give recommendations for their development. These recommendations will help strengthen qualities that are already at a high level, or compensate for qualities that are developed at a low level.

The main conclusions of the assessment centre in an online format are:

1. The accuracy of the results obtained, everything is calculated automatically. The choice of techniques that are used is important here.
2. Convenience of the organization. This refers to the fact that participants are in a familiar environment as well as the host, experts; the ability to plan the date and time of the event flexibly.
3. Budget. It is very expensive to gather participants from different regions in one place, and the remote format significantly reduces these costs.
4. Objectivity. Participants are evaluated by independent experts. In each exercise, experts evaluate different participants.

In the future, it is planned to launch the first marathon for the development of supra-professional competencies of students - future teachers, in which the finalists of the competition will take part.
ACKNOWLEDGMENTS

The research was carried out with the support of the Russian Foundation for Basic Research in the framework of the scientific project No. 19-29-07435 'Theoretical and methodological aspects of the formation of supra-professional competencies of students of institutions of higher education.

REFERENCES


