

QUALITY ASSESSMENT OF ONLINE LEARNING IN REGIONAL HIGHER EDUCATION SYSTEMS

The quality of online learning mechanisms, widely implemented due to the COVID-19 pandemic, is a significant issue for regional higher education systems. The research aims to assess student satisfaction with the quality of online education by identifying discrepancies between their requirements and the actual learning process. In order to examine the gaps between students' expectations and perceptions, a new approach was proposed based on the integrated use of Gap analysis and SERVQUAL methodology, combining qualitative and quantitative aspects. SERVQUAL questionnaires for measuring student satisfaction with online learning include the following criteria: tangibles, reliability, responsiveness, assurance, empathy. Full- and part-time undergraduates of humanitarian and socio-economic departments of two universities participated in the study. Ural Federal University bachelors, learning via Moodle and Microsoft Teams platforms, could directly communicate with their peers and professors, while students of National Research Nuclear University MEPhI were engaged in massive open online courses (MOOC). As a result, all five criteria were analysed in the proposed model for quality assessment of online learning to reveal the gaps between students' expectations and perceptions of the educational process. Significant discrepancies in the "empathy" and "responsiveness" criteria in both groups demonstrate low student satisfaction with the quality of communication and individualisation of learning. The research findings can be used to construct resource allocation models for implementing educational programmes and developing support measures for regional higher education institutions.

Keywords: higher education, online learning, regional university, regional system, regionalisation of higher education, educational technology, education quality assessment, online learning students, Gap analysis, SERVQUAL methodology, student satisfaction assessment, discrepancies between perceptions and expectations

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Introduction

Regionalisation is one of the key priorities of the Russian state policy in the sphere of higher education. Regionalisation is understood as enhancement of the contribution that universities provide to regional innovation and socio-economic development. A significant role in the regionalisation of higher education is played by online learning, which helps universities build capacity to meet their students' needs and to satisfy the demand for qualified workforce of the regional and local labour markets.

Online learning technologies are of particular importance for the development of small towns and the so-called monocities, that is, the cities whose economies are dominated by a single industry or company (referred to as the 'city-forming enterprise'). There are many such cities in Sverdlovsk oblast and other regions of the Ural Federal District. Their city-forming enterprises may be quite successful or may be struggling. Monocities often have branches of large federal or regional universities offering a limited number of majors, primarily those that correspond to the specialisations of the city-forming enterprises, with limited enrolment. Thus, these branches aim to meet the need of city-forming enterprises for a qualified workforce. Online learning has the potential to help these universities increase access to and attainment of higher education for the inhabitants of small towns and monocities, which, in its turn, will contribute to the retention and development of human capital in Russian regions.

Moreover, the use of online learning technologies will enable universities and their branches to improve their reputation, enhance the quality of education, facilitate flexible learning, attract more students, and help them develop the skills and competencies needed for career and financial success

and thus contribute to the common good. Through online learning, universities can also widen the geographical territory from which they recruit students [1].

The development of online learning is one of the priority areas for the digital transformation in higher education in Russia [2]. Another question that is gaining popularity is the transition from the classical paradigm of education to a more innovative one, which results in some quality changes and leads to the development of tech-enabled learning and teaching [3].

For more than a decade, Russian universities have been striving to integrate traditional and new methods of learning. The abrupt shift from in-person to virtual instruction during the coronavirus pandemic has accelerated the digitalisation in higher education. Russian universities differ considerably in terms of their readiness for digital learning on the technological, material and psychological levels. Current research on the digital transformation in higher education shows not only the opportunities that universities may benefit from but also the problems they are facing, primarily those related to the quality of online education, especially in regions [4].

The differences in universities' resources have a direct influence on the implementation of online learning technologies. As of today, the leading universities in this respect are the Lomonosov Moscow State University, Ural Federal University, Higher School of Economics, National Research Nuclear University, ITMO University, and some others. These universities promote online education and actively use learning management system (LMS) platforms and communication services in their teaching and learning [5]. On the contrary, regional universities with limited funds and, as a result, more limited digital infrastructure and capacity for digital transformation struggle to go online. The technical problems of regional universities are exacerbated by their students' and teachers' lack of proper equipment and reliable Internet access. Another problem is the low level of digital competency among the faculty and students [6].

The problem of the quality of online education gains significance in the light of the increased competitive pressures on universities of different size and levels as online education is expanding. On the one hand, online learning environments where students can access not only the courses offered by their own universities but also those of other universities reduce the location-related barriers to high quality education. On the other hand, such integral environments may have mixed effects on universities' competition for students. Quality assurance in these conditions depends on the university's preparedness to move learning online and to ensure that the quality of online learning matches students' expectations. This leads us to the problem of resource distribution in favour of the most competitive education programmes, which requires decision-makers on the regional level and the level of individual universities to develop a more rational approach to resource allocation. Such approach implies that the opinions of customers (online learners) should be taken into account. We believe that in order to improve the quality of education, the process of resource allocation should include a mechanism to eliminate the gap between customers' expectations and their actual experiences, especially regarding the technologies of online learning.

Assessment of the quality of online learning in universities of different sizes and different levels is an important task in the light of technological, economic and social development of territories. Universities act as catalysts of regional socio-economic development. The technologies of online learning can reduce or lift some of the barriers to higher education; they may also help regions accumulate human capital and thus enhance their competitiveness. Flagship universities can drive digitalisation in higher education in Russian regions and act as centres of innovation and economic agents involved in the processes of regional socio-economic development. However, we should not forget about the role local universities play in their towns: sometimes there is only one such institution of higher education in the town and the high-quality online courses it provides may have a considerable impact on the retention and augmentation of the human capital as well as other aspects of social and economic life.

One of the major problems connected to the quality of online education is the gap between the learners' expectations and their actual perceptions of the process and its outcomes. Large universities located in capital cities and in regions usually have a well-developed digital infrastructure; their online courses are part of the curriculum and seen as essential to the education process by the students. Learners in such universities have high expectations for the quality of education that involves digital technologies and interactive forms of learning. They also expect to benefit from individual educational trajectories and digital teacher-student communication forms. Interestingly, in smaller local universities, the attitudes to online learning are completely different: the limited choice of programmes

constraints potential students' educational aspirations, which is why inhabitants of small towns often opt for distance courses. The problem is that many Russian students share a false impression that online education is an easy and relatively cheap way to obtain a higher education diploma, without investing much time or effort.

All of the above inevitably affects the quality of online education. During the pandemic, when universities were forced to close their doors and shift their classes online, assessment of the quality of learning, aimed at revealing the gaps between learners' expectations and their actual experience, became even more relevant.

The hypothesis we are going to consider in this article includes the following:

1. The quality of online education is a highly complex, multi-dimensional concept, which includes universities' capability to bridge the gap between the learners' actual experience and their expectations;
2. The gap between students' expectations and their actual perceptions of the learning process and its outcomes can be measured by looking at their satisfaction levels;
3. The measurement of student satisfaction should rely on qualitative and quantitative indicators.

Theoretical framework

The Presidential Decree of 2018 sets a concrete task of 'creating a modern and safe digital environment to ensure high quality and accessibility of education of all kinds and levels'¹.

At this point, as systems of education all over the world are embracing digitalisation, such concepts as e-learning, distance learning and online learning are getting more and more mixed up.

The law 'On Education' defines electronic learning (or e-learning) as the way of organising educational activities by using the information contained by databases, technologies and technical means to process this information as well as IT networks to transfer data and ensure student-teacher communication. Distance learning technologies, in their turn, are understood as educational technologies based on the use of IT networks for remote teacher-student communication.²

If we look at the definitions provided by the law, we can notice that distance technologies may be used for e-learning but unlike e-learning, distance learning is not entirely dependent on information telecommunication technologies [7].

The term 'online learning' (onlayn-obuchenie) has appeared in the practice of Russian higher education relatively recently. Although there is no definition of this term in the Russian legislation, the law does clarify the concept of online courses, which is seen as a way of organising learning to enable all students regardless of their location and institution to pursue education programmes and to have their performance assessed with the help of electronic environment which can be freely accessed via the Internet³. This definition implies that online courses are a special type of online learning, which, in its turn, is a type of e-learning based on the use of distance technologies.

In research literature, there is no universally accepted definition of online learning. Nevertheless, it is commonly understood that online learning involves planning and is conducted via the Internet. Sufficient learning and assessment materials should be provided to students so that they should be able to reach their learning goals through online education alone [8–11].

There are different ways of implementing online learning. During the pandemic, regional universities combined more traditional methods (they broadcast learning materials and learners were asked to complete the assignments to be graded by the teacher) and new education technologies (individualised instruction, different scenarios for group work, gamification, the use of simulations, project-based learning, flexible online courses whose content could be adjusted depending on the desired outcomes). Another trend is the growing popularity of massive open online courses (MOOCs).

The choice of online learning methods depends on multiple factors, including the quality of the digital environment and equipment, faculty qualifications, availability and quality of qualified technical support, attitudes of the key participants of the learning process—students and faculty—to online technologies, and so on.

The leading universities normally have robust digital education environments; their online courses involve the use of new education technologies. MOOCs developed by these universities' own specialists

¹ On National Goals and Strategic Objectives of the Russian Federation through to 2024. Decree of the President of the Russian Federation No. 204 of May 7, 2018.

² On Education of the Russian Federation. Amendment of July 1, 2020. Federal Law No. 273-FZ of December 29, 2012.

³ On Approval Of The Procedure For Applying E-learning And Distance Learning Technologies by Educational Organizations When Delivering Study Programmes. Order of the Ministry of Education and Science of the Russian Federation No 816 of August 23, 2017.

and integrated into their education programmes are mandatory for the students, and the students' grades for MOOCs are included into their final scores for the corresponding disciplines. Online learning transforms the roles played by teachers: apart from the digital literacy skills, they now have to be mindful of a multitude of tasks, for example, the ways to facilitate students' understanding of the learning materials and to help them develop professional thinking skills. Instructors' creativity, for example, their ability to improvise, is crucial to the success of their teaching since it is harder to maintain students' attention through online interactions than in the classroom.

University branches located in small towns usually have a low degree of digitalisation, which is why, when going online, these universities continue to rely heavily on traditional methods of teaching. Due to the scarcity of funds, these universities do not always have the necessary technical equipment and technical expertise to create their own online courses. Another challenge is the lack of digital competence of the faculty, who find conducting online lessons difficult. Therefore, local universities choose to benefit from the education resources made available by larger universities through open online platforms. The broadcasting of video materials is usually followed by assignments given to students, which virtually excludes the possibility of any direct communication with the teacher. In these universities, MOOCs are optional since there is no clear understanding as to how they should be incorporated into the curriculum.

The integration of online instruction into higher education is closely linked to the problem of quality. There is a vast body of research, both Russian and international, dealing with the assessment of the quality of online learning [12–15]. To ensure the quality of online education, international quality management standards are applied. In Europe, an important role is played by the European Foundation for Quality in eLearning, whose services include conformity checks for higher education and other educational organisations and certification. The quality of online learning can be assessed according to the following criteria [16]: needs of the target group; information about the education programme and organisation of the learning process; content quality, media design and didactic design; infrastructure and equipment; internal audit and quality assurance.

In the USA, there are The National Standards for Quality Online Courses, which serve as guidelines for districts and organisations implementing blended or online learning. The framework provided by the Standards is used to rank online courses according to the following criteria [17]: students' active involvement in the learning process; learning goals; general description of the course; resources and materials; technologies; course availability; learner support services; assessments and measurements.

In Russia, there is a model of multi-stage assessment of the quality of online courses developed as part of the project 'Modern Digital Educational Environment in the Russian Federation' [15, p. 206]. This model assesses the extent to which an online course corresponds to the technical requirements of certain Internet resources and legislation. It can also be used to assess the correspondence of the course's content (the quality and relevance of the information) and the efficiency of the learning process to the standards. Content-related assessment of the quality of online courses includes the following: expert evaluation conducted by education organisations (compliance with the curriculum, evaluation of the course content); expert evaluation conducted by the Federal Educational and Methodological Association (FUMO); independent expert evaluation (evaluation of the content-related, pedagogical and technological characteristics of the course); employers' evaluation (relevancy of the course to the demands of the labour market and professional standards); evaluation of courses from the students' perspective (evaluation of the content, convenience and support).

It should be noted that, unlike traditional approaches, modern approaches that the above-described quality management standards are based on are not limited to the measurement of the final outcomes of education programmes. No less significant is the assessment of the quality of the process of online learning itself. The core principle is the customer-centric approach: the quality of online learning is considered high if its processes and results meet the learners' expectations. One of the key components of the quality of education is consumer satisfaction, which is understood as the extent to which students' learning experience and the learning outcomes have reached their expectations.

Assessment of the quality of online learning is based on various objective and subjective parameters. Objective parameters include compliance with the Federal Education Standards, the university's results in the Monitoring of Universities' Performance of the Ministry of Higher Education and Science, and so on. Subjective parameters deal with customer satisfaction. Regular assessment of the satisfaction of

various groups of customers such as students and employers may provide a more complete picture of the quality of online learning in Russia.

Students' evaluations reflecting the degree to which their expectations matched the reality are of particular importance in this respect since students are the key participants in the learning process and higher education in general: not only do they choose programmes and disciplines, but they also participate in the learning process and use the university's services and resources.

There is a vast body of research describing different approaches to consumer satisfaction assessment, the most famous of which is the GAP-model and the SERVQUAL method developed by American researchers Zeithaml, Parasuraman and Berry [18, 19].

The GAP-model focuses on customer satisfaction through qualitative assessment based on five types of discrepancies or gaps:

- Gap 1 or the Knowledge Gap corresponds to the difference between the customers' expectations and the organisation management's perception of these expectations;
- Gap 2 or the Policy Gap describes the discrepancy between the organisation management's idea about the customers' expectations and the translation of that understanding into the organisation's policies and standards;
- Gap 3 or the Delivery Gap is the discrepancy between the requirements described in the policies and standards and the actual delivery of the service;
- Gap 4 or the Communication Gap shows the disparity between the quality of services and the promises conveyed through external communications;
- Gap 5 or the Customer Gap indicates a discrepancy between the customers' expectations and their actual perceptions.

The GAP-model brings to light the discrepancies between the actual delivery of services and customers' expectations. It also shows where these discrepancies lie and what causes them.

The GAP-model can be supplemented with the SERVQUAL approach, which measures the gap between customers' expectations and perceptions [24, 25]. This methodological approach implies the use of surveying tools to get feedback from the customers about the quality of services delivered. Our survey consisted of three parts: the first part deals with customers' expectations about the quality of the service; the second part examines their perceptions of the quality of the service; and the third part evaluates the significance customers attach to specific criteria of quality. In each part of the survey, the respondents are asked to assess the quality of the services according to the following five criteria: reliability of the services; the tangibles necessary to deliver the service; responsiveness and empathy demonstrated by the personnel; and confidence [19]. The collected data are then used to calculate the quality coefficient as a difference between the weighted evaluations of perceptions and expectations. This coefficient reflects customer satisfaction with the quality of the service.

As our analysis of the research literature has shown, even though the GAP-model and SERVQUAL approach are widely applied in different areas of economics [20–23], these tools are rarely used in the studies of customer satisfaction in the sphere of education. Our contribution to the existing body of knowledge is the adjustment of the GAP-model and the SERVQUAL methodology to evaluate the disparities between perceptions and actual experiences in the sphere of education. The use of these mutually complementary tools to study the quality of online learning determines the novelty of our research.

Russian universities often develop their own methodologies to analyse their students' expectations and experiences regarding online learning. The lack of a single methodological framework for studying customer satisfaction may lead to distortions in measurements and a lack of understanding of the reasons why students get failing or poor grades. This leads to biases and errors in the allocation of resources to education programmes.

Data and methods

The survey covered students from two universities—the Ural Federal University (UrFU) and the National Research Nuclear University MEPhI—which use different methods of online learning. Although these universities differ in size, each of them plays a key role in the development of their respective regions. The Ural Federal University is the leading institution of higher education in the Ural region. The university has a digital education environment and uses platforms such as Moodle and Microsoft Teams as well as modern education technologies to organise its online learning process.

Gaps between students' online learning experiences and expectations

Gaps	Reasons
Gap 1 — the discrepancy between students' expectations about the conditions and outcomes of online learning and the university management's perception of these expectations	The university management lacked objective information about students' expectations
Gap 2 — the discrepancy between the students' expectations about the content of online learning and the content of online learning specified in programmes and regulations	The universities lacked the mechanisms for identifying students' expectations and, therefore, these expectations were not taken into account in the documents regulating online learning
Gap 3 — the discrepancy between the approved education programmes and regulations and their actual implementation	The universities lacked the mechanisms necessary for the implementation of the approved education programmes and regulations in the process of online learning
Gap 4 — the discrepancy between the information available from the university website, advertising leaflets, etc., and the actual process of online learning	Students and other potential customer groups had unrealistic expectations about online learning
Gap 5 — the discrepancy between the expected and actual perceived outcomes of online learning	Students' actual outcomes of online learning differed from their expectations

The table is compiled by the authors.

Novouralsk Technological Institute located in a small town of Novouralsk in Sverdlovsk oblast is a branch of MEFHI and has a low level of digitalisation. During the pandemic, local universities, like their larger counterparts, had to move their classes online. To compensate for the lack of technological resources, local universities combined traditional methods of teaching with the use of MOOCs from the platform 'Open Education'¹.

To adjust the GAP-model for the sphere of online education, we needed to specify the gap between customer expectations and management perception, where customers are students and the management are the leaders of the universities offering online learning courses.

In accordance with the methodological approach described above, our study comprised several stages.

The first stage of the survey was aimed at identifying the gaps between students' expectations and their actual experience of online learning as well as the possible causes of these gaps (Table 1).

According to the GAP-model, the quality of online learning is determined by the existence and size of the discrepancies between students' expectations and their actual perceptions. The absence of gaps means that the actual quality of online learning fully meets students' expectations.

If at least one gap is detected, the above-described methodology recommends starting the second stage of the research — quantitative measurement of the size of gaps based on the SERVIQUAL approach. For each type of gaps (Table 1), it is necessary to set the criteria to measure the respondents' expectations, perceptions and the significance they attach to particular aspects of the service in question.

The authors of the GAP-model consider Gap 5 as the key one, pointing out that it stems from the previous gaps. There is a considerable amount of research on all kinds of gaps, but, following the recommendation to specify the key gap, we decided to focus on Gap 5—the discrepancy between customers' expected and actual learning outcomes.

The five aspects highlighted in the SERVIQUAL approach were taken as a point of departure. We then developed and described the criteria to measure Gap 5 in relation to the quality of online learning:

- 1) tangibles — the quality of modern online learning technologies;
- 2) reliability — the quality of electronic learning materials;
- 3) responsiveness — the quality of communication between the participants of the learning process;
- 4) assurance — the quality of teaching and control;
- 5) empathy — individualised attention to learners.

These criteria were used to formulate the questions for the questionnaire survey whose content varied depending on the practices of online learning in different regional universities. The purpose of

¹ See: <https://openedu.ru>.

the questionnaire survey was to measure students' attitudes to online learning. We devised questions for two groups of respondents using as a point of departure expert opinions and the approaches to measuring student satisfaction applied in different universities [2, 10, 15–16]. We asked the respondents to describe their expectations and perceptions of each of the characteristics of the learning process. The respondents were also asked questions aimed at identifying the significance they attached to these characteristics (see Tables 2 and 3 below). The first group of respondents were students of the Ural Federal University (UrFU), whose online learning was more personalised and was conducted through Moodle and Microsoft Teams. The second group consisted of students from the National Research Nuclear University MEPhI, who took massive open online courses (MOOCs). Our study involved full- and part-time students of the 1–4 years majoring in the humanities, social and economic studies. The representative sample was 1,308 students for UrFU and 160 students for MEPhI.

Students were asked to fill in the questionnaires comprising Likert scale questions. The data were then used to calculate the coefficients showing the differences between the respondents' expectations and perceptions and taking into account the significance of each criterion. If the value of the coefficient differed from zero, it pointed to a gap between expectations and perceptions.

At the last stage, recommendations for the improvement of the quality of online learning were developed. These recommendations are aimed at eliminating the performance-expectations gaps in the education process, which may require extra resources (financial, temporal, labour, information). The decision-making regarding resource allocation to programmes should take into account the coefficients of quality presented above. The lower are the values of these coefficients in this or that criterion, the larger is the gap between students' actual experience of online learning and their expectations. Since a university's resources of any type may be limited, it makes sense to follow the principle of resource redistribution by looking at the proportions of the quality coefficients and identifying the gaps.

Results

The data collected through questionnaire surveys of UrFU and MEPhI students were used to calculate the coefficients of online education quality (Tables 2 and 3).

The results of the survey (Table 2) demonstrate the gaps between the students' expectations and their actual experience of online learning via Moodle and Microsoft Teams in all aspects highlighted in the questionnaire. The largest gaps deemed significant by students were detected in relation to such indicators as the remote access to specialised software, sufficiency of the learning materials and their quality, the quality of teacher feedback, the clarity of instructions, and the use of various strategies to increase student engagement.

As Table 3 illustrates, students' expectations are below their actual perceptions of their learning experience in MOOCs in all the statements of the questionnaire. The largest gaps were detected in such indicators as the balance between the number of hours assigned to the course and the amount of material that needs to be covered; the courses' potential to stimulate learners' self-organisation and self-motivation skills.

In general, despite the negative values of the disparities between students' expectations and their actual experience of online learning via Moodle and Microsoft Teams and MOOCs, in most of the criteria in the section 'Perceptions' the coefficient values exceed 3, which means that the respondents agreed with the statements and were quite satisfied with the quality of online learning.

To assess student satisfaction, we calculated the mean values of such parameters as expectations, actual experience and significance for each group of criteria (see Table 4).

Regardless of the methods of online learning, in all five groups of the criteria, the coefficients were negative, which shows the discrepancies between the students' expectations and their actual learning experiences.

The experiences of students participating in MOOCs met their expectations better in all the five criteria than for students who learnt via Moodle and Microsoft Teams platforms. In our opinion, this

Table 2

Assessment of student satisfaction with learning via Moodle and Microsoft Teams platforms

Criteria	Expectations	Perceptions	Gap	Significance	Quality coefficient
<i>Tangibles</i>					
The tools and services used for online learning are functional	4.87	3.81	-1.06	4.60	-4.89
The instruments and services for online learning are simple, easy to understand and user friendly	4.90	3.64	-1.26	4.87	-6.12
The tools and services used for online learning are supported by different operating systems	4.71	3.83	-0.88	4.56	-4.03
For disciplines that require laboratory work, remote access to laboratory equipment is provided	4.25	2.84	-1.41	4.57	-6.46
For disciplines that require the use of software, remote access to the necessary software is provided	5.00	3.12	-1.88	4.82	-9.08
<i>Reliability</i>					
The content of digital learning materials corresponds to the topics and goals of the corresponding disciplines	4.67	3.58	-1.09	4.90	-5.36
Online learning materials are sufficient for students to succeed in the course	4.83	3.08	-1.75	5.00	-8.77
The content and form of the learning materials stimulate students' interest in the subject	4.98	2.72	-2.26	4.63	-10.46
Learning materials are easy to understand	4.97	3.31	-1.66	4.90	-8.15
Learning materials are diverse	4.20	3.14	-1.06	4.52	-4.77
The number of credit hours assigned to the course is aligned with the amount of course material	4.31	2.90	-1.41	4.77	-6.71
<i>Responsiveness</i>					
Teachers' comments and feedback are apt and to the point	4.94	3.25	-1.69	4.91	-8.30
Teachers' instructions for independent work are sufficient and clearly formulated	4.89	3.20	-1.69	4.98	-8.41
The teacher-student feedback is effective and meaningful/ there are extra opportunities for informing the students	4.94	3.29	-1.64	4.97	-8.16
<i>Assurance</i>					
Teachers explain the course material clearly and concisely	4.75	3.11	-1.64	4.85	-7.97
Teachers are competent and knowledgeable	5.00	3.72	-1.28	4.83	-6.18
Teachers' assignments are clearly formulated and easy to understand	4.82	3.20	-1.62	4.97	-8.04
There is a number of ways for students to voice their concerns or ask questions about the material being discussed during online sessions	4.63	3.76	-0.87	4.91	-4.27
The course content is aligned with the assessments	4.88	3.62	-1.26	4.99	-6.31
It does not take too long for teachers to mark and grade students' assignments	4.69	2.96	-1.73	4.47	-7.73
<i>Empathy</i>					
Teachers' feedback on students' assignments and tests enhances understanding	4.89	3.20	-1.69	4.86	-8.20
Teachers use various motivational strategies (e.g. setting deadlines, sending reminders) to help students succeed in the course	4.93	2.97	-1.96	4.71	-9.23

The table is compiled by the authors.

Table 3

Assessment of student satisfaction with MOOCs

Criteria	Expectations	Perceptions	Gap	Significance	Quality coefficient
<i>Tangibles</i>					
The tools used for online learning via the platform 'Open Education' are functional	4.92	4.26	-0.66	4.65	-3.08
The tools used for online learning via the platform 'Open Education' are simple, easy to understand and user friendly	4.96	4.37	-0.59	4.52	-2.66
The tools are supported by different operating systems and devices	4.89	4.54	-0.35	4.69	-1.63
The learning materials are helpful and easy to use	4.54	4.46	-0.08	4.90	-0.41
<i>Reliability</i>					
The content of the learning materials corresponds to the topic, purpose and goals of online courses	4.87	4.60	-0.27	4.98	-1.34
Online learning materials are sufficient for students to succeed in the course	4.77	4.06	-0.71	4.99	-3.56
The content and form of the learning materials stimulate students' interest in the subject	4.68	3.94	-0.74	4.62	-3.41
Learning materials are easy to understand	4.6	4.40	-0.20	4.89	-0.98
Learning materials are presented in diverse formats	4.87	3.83	-1.04	4.70	-4.89
There is a disparity in the number of hours allocated to online courses and the amount of material to be covered	4.81	2.71	-2.10	4.96	-10.39
<i>Responsiveness</i>					
Instructions for independent learners are sufficient and easy to understand	4.98	4.26	-0.72	4.99	-3.61
Students can ask questions and voice their concerns during online sessions (e.g. through the chat feature)	4.96	3.63	-1.33	4.86	-6.47
<i>Assurance</i>					
The teacher explains the course material clearly and concisely	4.54	4.40	-0.14	4.98	-0.70
The teacher is competent and knowledgeable	5	4.46	-0.54	4.80	-2.61
Students' course grades are included in their final scores for the corresponding discipline by their universities	4.8	4.60	-0.20	4.95	-0.99
<i>Empathy</i>					
The online courses use various motivational strategies (e.g. setting deadlines, sending reminders) to help students succeed	4.63	4.11	-0.52	4.80	-2.48
The course includes different forms of assessment: tests, assignments, and forum discussions	4.95	4.14	-0.81	4.77	-3.85
Education incorporating online courses helps learners to improve their self-organisation and self-motivation skills	4.77	2.89	-1.88	4.89	-9.21

The table is compiled by the authors.

Average scores of student satisfaction with the quality of online learning according to general quality criteria

Criteria	Moodle & Microsoft Teams					MOOCs				
	Expectations	Perceptions	Gap	Significance	Quality coefficient	Expectations	Perceptions	Gap	Significance	Quality coefficient
Tangibles	4.75	3.45	-1.30	4.68	-6.11	4.83	4.41	-0.42	4.69	-1.94
Reliability	4.66	3.12	-1.54	4.79	-7.37	4.77	3.92	-0.84	4.86	-4.10
Responsiveness	4.92	3.25	-1.67	4.95	-8.29	4.97	3.94	-1.03	4.93	-5.04
Assurance	4.80	3.39	-1.40	4.84	-6.75	4.78	4.49	-0.29	4.91	-1.43
Empathy	4.91	3.09	-1.82	4.79	-8.72	4.78	3.71	-1.07	4.82	-5.18

The table is compiled by the authors.

situation results from the fact that the students who were taking MOOCs were less prone to expect feedback. In addition, students enrolled in university branches (such as Novouralsk Technological Institute) tend to demonstrate lower levels of expectations about the quality of education. After entering a large federal university, however, students tend to expect more frequent and intensive contacts with the faculty. For example, there is a considerable discrepancy between the coefficients in the group of criteria 'Tangibles'. This coefficient was 6.11 for the first group of respondents, and -1.94 for the second. Remarkably, during the pandemic, the Ural Federal University provided its students with access to specialised software and laboratory equipment while its branch in Nizhny Tagil did not.

Analysis of the average scores has shown that for both groups of respondents the most significant were the disparities in the criteria 'Empathy' and 'Responsiveness'. Platforms such as Moodle and Microsoft Teams used for online learning have significant technological capacity for the realisation of individual educational trajectories and are capable of providing a high degree of students' involvement. Nevertheless, the scores of student satisfaction with the quality of communication and individualised learning were poor. The low satisfaction levels may be explained by the stress and anxiety students experienced as a result of the sudden shift from classroom instruction to online learning.

Since the lowest coefficient values are in the criteria 'Empathy' and 'Responsiveness', it would make sense to reconsider the feedback system and encourage teachers to maintain consistent communication with their students. It might also be productive to provide some extra training for teachers to help them communicate with their students more effectively in a digital learning environment. Moreover, it is likely that the gap in the criteria 'Empathy' and 'Responsiveness' will be minimised if online learning courses are supplemented with blended learning, which combines online learning and more traditional, face-to-face learning formats.

Conclusion

An important role in the regionalisation of higher education is played by online learning, which enables universities to build capacity to meet their students' expectations and to satisfy the need for a qualified workforce of the regional and local labour markets. It is impossible to enhance the quality of online education without proper monitoring and evaluation of its quality, which would bring to light the discrepancies between customers' expectations and the actual service delivery. Moreover, it would make sense to research people's attitudes to online learning in large and small cities.

According to our hypothesis, the main parameter of the quality of online learning is the university's capability to ensure that the services it delivers meet the expectations and needs of its students. The correspondence between the perceived quality of the service and the students' expectations was measured with the help of the GAP-model and SERVQUAL methodology adapted specifically for this purpose.

Our findings allowed us to develop a series of corrective actions to improve the quality of online education. The decision-making regarding resource allocation or reallocation should take into account the coefficients of quality presented above. This would help eliminate or narrow the gaps between customer expectations and perceptions.

The proposed approach may be used not only to evaluate student satisfaction with online education but it may also be applied in other spheres, for example, to evaluate employers' satisfaction with the qualifications of their employees.

On the practical side, our findings can be used by different groups of stakeholders such as government agencies to control the quality of online learning; university management to identify students' needs and expectations regarding the quality of online education; employers to make decisions regarding investment in academia; and potential customers to choose suitable education programmes.

References

1. Denisov, I. V. & Kovalchuk, A. P. (2018). E-learning resources: implementation problems and their solution. *Rossiyskiy ekonomicheskiy internet-zhurnal* [Russian Economics online-journal], 4(33). Retrieved from: <https://readera.org/142220192> (Date of access: 23.02.2021). (In Russ.)
2. Ivanov, M. N. (2019). Digital transformation of the educational process. In: *EdCrunch Tomsk. Materialy mezhdunarodnoy konferentsii po novym obrazovatelnyim tekhnologiyam* [EdCrunch Tomsk: Proceedings of the International Conference on New Educational Technologies] (pp. 28–33). Tomsk: Tomsk State University Publishing House. (In Russ.)
3. Dalsgaard, C. & Godsk, M. (2007). Transforming traditional lectures into problem-based blended learning: challenges and experiences. *Open Learning: The Journal of Open, Distance and e-Learning*, 22(1), 29–42. DOI: <https://doi.org/10.1080/02680510601100143>.
4. Frolov, S. Yu. (2015). Regional universities: problems of development in modernization of higher education. *Vestnik CHelGU* [Bulletin of Chelyabinsk State University], 9(364), 103–107. (In Russ.)
5. Abramyan, G. V. & Katasonova, G. R. (2020). Peculiarities of the organization of remote education in higher education institutions under conditions of self-insulation of citizens under the viral pandemia. *Sovremennye problemy nauki i obrazovaniya* [Modern Problems of Science and Education], 3. Retrieved from: <http://science-education.ru/ru/article/view?id=29830> (Date of access: 22.02.2021). DOI: <https://doi.org/10.17513/spno.29830>. (In Russ.)
6. Shtykhno, D. A., Konstantinova, L. V. & Gagiev, N. N. (2020). Transition of Universities to Distance Mode during the Pandemic: Problems and Possible Risks. *Otkrytoe obrazovanie* [Open education], 5, 72–81. DOI: <https://doi.org/10.21686/1818-4243-2020-5-72-81>. (In Russ.)
7. Sergeev, A. G., Zhigalov, I. E. & Balandina, V. V. (2012). *Vvedenie v elektronnoe obuchenie* [Introduction to e-learning]. Vladimir: VISU Publ., 182. (In Russ.)
8. Strizhenko, A. A. (2016). Online education: theory and practice. *Ekonomika. Professiya. Bizness* [Economics. Profession. Business], 1, 75–79. (In Russ.)
9. Dozhdikov, A. V. (2020). Online Learning as e-Learning: The Quality and Results (Critical Analysis). *Vysshee obrazovanie v Rossii* [Higher education in Russia], 29(12), 21–32. DOI: <https://doi.org/10.31992/0869-3617-2020-29-12-21-32>. (In Russ.)
10. Fomina, A. S. (2016). Online learning in a higher school: methodology, content, technologies. *Obshchestvo. Sotsiologiya, psikhologiya, pedagogika* [Society: sociology, psychology, pedagogy], 1, 101–106. (In Russ.)
11. Grifoll, J. (2010). E-learning in the context of the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). In: J. Grifoll, E. Huertas, A. Prades, S. Rodríguez, Yu. Rubin, F. Mulder, E. Ossiannilsson, *Quality Assurance of E-learning* (pp. 7–10). Helsinki.
12. Malinin, N. V. (2014). E-learning quality models. *Prepodavatel XXI vek*, 3, 93–98. (In Russ.)
13. Krasnov, S. V., Kalmykova, S. V., Abushova, E. E. & Krasnov, A. S. (2018). Problems of Quality of Education in the Implementation of Online Courses in the Educational Process. In: *2018 International Conference on High Technology for Sustainable Development (HiTech)*. DOI: <https://doi.org/10.1109/HiTech.2018.8566618>.
14. Peres, P., Lima, L., & Lima, V. (2014). B-learning Quality: Dimensions, Criteria and Pedagogical Approach. *European Journal of Open, Distance and E-Learning*, 17(1), 56–75. DOI: <http://doi.org/10.2478/eurodl-2014-0004>.
15. Karasik, A. A. (2019). Quality assessment system of online courses in the project «Modern digital educational environment in the Russian Federation». In: *EdCrunch Tomsk. Materialy mezhdunarodnoy konferentsii po novym obrazovatelnyim tekhnologiyam* [EdCrunch Tomsk: Proceedings of the International Conference on New Educational Technologies] (pp. 205–209). Tomsk: Tomsk State University Publishing House. (In Russ.)
16. Soboleva, E. Y. (2012). Expert projects for e-learning quality assessment. *Prikladnaya informatika* [Applied Informatics], 6(42), 15–23. (In Russ.)
17. Adelstein, D. & Barbour, M. K. (2017). Improving the K-12 Online Course Design Review Process: Experts Weigh in on iNACOL National Standards for Quality Online Courses. *The International Review of Research in Open and Distributed Learning*, 18(3). DOI: <http://doi.org/10.19173/irrodl.v18i3.2800>.
18. Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing*, 49(4), 41–50. DOI: <http://doi.org/10.2307/1251430>.
19. Zeithaml, V. A., Berry, L. L. & Parasuraman, A. (1996). The Behavioral Consequences of Service Quality. *Journal of Marketing*, 60(2), 31–46. DOI: <http://doi.org/10.2307/1251929>.
20. Gritsova, O. A. & Tissen, E. V. (2019). Approach to the assessment of the competitiveness of the master programs. In: *Rossiyskie regiony v fokuse peremen. Sb. dokladov XIV mezhdunar. konf. 14–16 noyab. 2019 g.* [XIV International Conference «Russian Regions in the Focus of Changes». November 14–16, 2019] (pp. 257–236). Ekaterinburg: UPI. (In Russ.)
21. Dentsura, S. S. (2017). Theoretic-methodological aspects of the problem of evaluation of customer satisfaction. *Vestnik CHelGU* [Bulletin of Chelyabinsk State University], 10(406), 7–14. (In Russ.)

22. Fedoskina, L. A. (2008). SERVQUAL methodology as a tool to increase innovation activity in service organizations. *Kreativnaya ekonomika [Creative Economy]*, 3, 73–83. (In Russ.)
23. Nabokov, V. I., Mingalev, V. D., Pustuyev, A. L., Sharapova, V. M., Grytsova, O. A., Rubaeva, O. D. & Rasorvin, I. V. (2018). Marketing information analysis on educational service quality in terms of innovative activity. *The Turkish Online Journal of Design Art and Communication*, 8(S-MRCHSPCL), 31–38. DOI: <http://doi.org/10.7456/1080MSE/104>.
24. Parasuraman, A. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality. *Journal of retailing*, 64(1), 12–40.
25. Berry, L. L., Parasuraman, A. & Zeithaml, V. A. (1988). The service-quality puzzle. *Business Horizons*, 31(5), 35–43. DOI: [https://doi.org/10.1016/0007-6813\(88\)90053-5](https://doi.org/10.1016/0007-6813(88)90053-5).

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