

# Readiness of teachers of agricultural universities to manage the process of distance learning

*Konstantin Zakharov*<sup>1,\*</sup>, *Olga Kunina*<sup>1</sup>, *Olga Kalashnikova*<sup>1</sup>, and *Ekaterina Tuana*<sup>1</sup>

<sup>1</sup>Peter the Great St. Petersburg Polytechnic University, St. Petersburg, 195251, Russia

**Abstract.** The electronic educational environment is now being actively implemented in the field of vocational education all over the world. The concept of digital competence and the readiness of a university teacher to use the Moodle distance learning management system are considered. The study involved 45 respondents - teachers of the humanities at a technical university, 23 - with an academic degree, 21 - higher education without an academic degree. The described study based on the analysis of questionnaire answers reveals significant differences in the components of digital competence of teachers of different generations.

## 1 Introduction

The electronic educational environment is now being actively implemented in the field of vocational education all over the world. Teachers, as organizers of the educational process, have to master the skills of working in this environment, solving new educational and professional tasks that they have not previously encountered [1], [2]. It is becoming important to acquire competencies related to communication in the electronic information and educational environment, the main elements of which are massive open online courses (MOOCs) hosted on the National Open Education Platform and the Coursera international platform. The ability to interact with the Moodle Learning Management System becomes essential.

Studies [3] show that the use of MOOCs, although they are one of the most affordable and simple educational products, is not given to everyone. About 90% of learners drop out before receiving a certificate of completion. According to experts, the reason for the dropout of students is the loss of motivation, which is largely determined by the quality of management of the learning process.

The learning management system in most Russian universities (including our Peter the Great SPbPU) today is Moodle. By definition, a learning management system is a software application that allows you to manage training courses in online learning [4]. This system allows you to change course settings, classify, add or remove materials and assignments, change the educational trajectory of both the group and each student individually, track the digital footprint, i.e. to individualize the educational process of each student.

---

\* Corresponding author: [okun96@mail.ru](mailto:okun96@mail.ru)

Moodle distance learning system has become popular and widespread due to its technical parameters as well as the variety of tools included [5]. These tools can be divided into four groups. The first group includes tools that allow you to present theoretical materials. The second group includes tools for formative and summative assessment, including peer assessment, which enables students to rise to the highest level of knowledge of the Bloom-Anderson taxonomy [4]. The third group of tools allows you to organize communication within a training course or within a lesson. Finally, the fourth group - reporting - allows you to track all the progress of students, monitor their attendance at training courses, classes and track statistics on passing tests and assignments.

All the variety of elements in the Moodle distance learning system allows the teacher to be in different role positions in relation to the students: moderator-coordinator (establishing contact with the student, introducing him into the educational environment, demonstrating its capabilities); mentor (demonstration of how and what to do - hard-skills); facilitator (creating feedback with students, determining their level of development, setting new tasks - forming soft-skills, developing the learning community); tutor (integration of the functions of a moderator, mentor, facilitator, supplemented by helping students to advance not only within the studied discipline, but also in the reflection of their self-building in general (in the terminology of T.M. Kovaleva - self-skills). The Moodle distance learning system has sufficient the number of tools so that the teacher can be in different role positions [6].

Are educators ready for these positions in the digital environment? We studied the digital competence index of teachers and their skills in the Moodle learning management system, and identified the degree of teachers' interest in the program of psychological and pedagogical support.

## 2 Methodology

The concept of digital competence is one of actively developing, it is constantly being changed in accordance with the development of modern info-communication technologies [7-9]. Most authors include in the concept of digital competence the ability and skills to effectively use digital technology in everyday life, the ability and skills to critically assess technology, motivation to participate in digital culture, as well as technical skills, most often associated with computer literacy [4, 10-11].

According to G.U.Soldatova [12], digital competence is understood as the ability of an individual to confidently, effectively, critically and safely select and apply info-communication technologies in different spheres of life (work with content, communication, consumption, technosphere), as well as his readiness for such activities. The structure of this concept includes the needs and desires of a person, the degree of his readiness for development (motivational sphere) and his attitude to the Internet, the degree of his understanding and acceptance of the norms, rules and values of the digital world and his readiness to follow them (value sphere).

In the course of diagnostics, we used the “Digital Competence Index” questionnaire (authors: G.U. Soldatova, T.A. Nestik, E.I. Rasskazova, E.Yu. learning Moodle (authors: Zakharov K.P., Kunina O.O.)). The questionnaire includes 45 questions. The questionnaire aims to study various aspects of Internet use and digital competence. The questionnaire includes a block of questions aimed at studying the features of user activity (use and activity). This block includes questions aimed at identifying the frequency and intensity of Internet use, identifying the devices that the user uses to access the Internet and the services used. In addition, this block contains questions about the substantive aspects of online activities, self-assessment of oneself as a user in various parameters: confidence, preferred roles, perception of one's “I” on the Internet.

There is a block of questions aimed at identifying the level of digital competence. This includes questions to determine the level of knowledge, skills, motivation and responsibility when using the Internet. This block also includes a number of cases that allow you to identify the skills of safe behavior in certain situations.

In addition, the questionnaire contains a block of questions aimed at studying the image of the Internet. This block includes questions on the emotional perception of the Internet, attitude to technology.

All these questions allow us to calculate the main index of digital competence of the respondents. According to the Soldier, the digital competence index includes 4 categories - Knowledge, Motivation, Responsibility, Skills, and four areas - Content, Technosphere, Communication, Consumption.

The purpose of the survey using the author's questionnaire "Skills in the learning management system Moodle" (Zakharov K. P., Kunina O. O.) was to determine whether teachers have experience in the distance learning system Moodle, as well as to determine what elements the teachers own, and which would like to master.

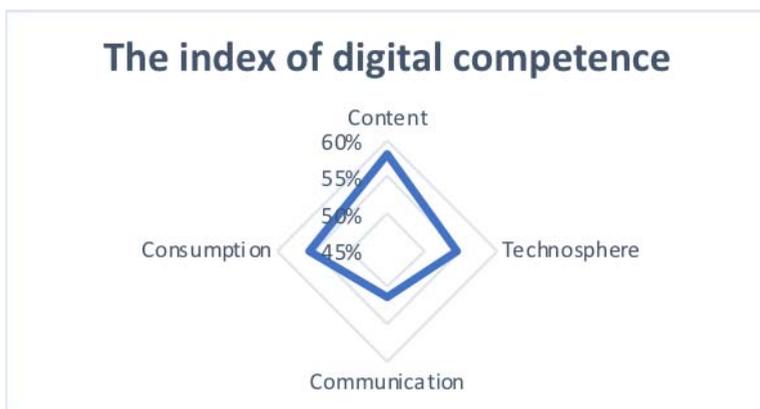
### 3 Results

The study involved 45 respondents - teachers of the humanities at a technical university (39 women and 6 men). 23 - with an academic degree, 21 - higher education without an academic degree.

The respondents were classified according to Hove-Strauss's adapted generational theory. Thus, representatives of several generations took part in the study :

- Generations of baby boomers - 6 people;
- Generation X - 15 people;
- Generation Y - 24 people.

The index of digital competence of each respondent was calculated and on the basis of this the average index of digital competence of teachers of humanitarian disciplines in a technical university was calculated. The average main index of digital competence of the respondents was 54.9%. Moreover, the values of this index in various areas turned out to be close (Figure 1).



**Fig. 1.** The values of digital competence index in various areas.

### 4 Discussion

During the survey using the author's questionnaire "Skills in the Moodle Learning Management System", it was revealed that three-quarters of the respondents had taken an advanced training course in Moodle, and half of the rest would like to take it. More than half of the respondents were satisfied with the course they took, but one in three failed to transfer theoretical knowledge to a practical area.

Four out of every five respondents would like to improve their knowledge of working with the learning management system Moodle. At the same time, almost everyone positively perceives the idea of remote support of the process of entering and adapting a teacher in a digital educational environment at a university.

According to the interviewed teachers, they own such tools as a questionnaire, glossary, lecture, feedback, survey, attendance, seminar, test, chat, hyperlink, book, folder, explanation. Those, from the point of view of the teachers themselves, they own the basic tools of the Moodle learning management system in order to organize the educational process there.

Tools that educators are interested in and would like to become familiar with are video conferencing, interactive content, and an oral response module. This suggests that there is a lack of personal interaction in the digital educational environment, which is what teachers aspire to.

The data obtained were processed by methods of mathematical statistics using the Fisher angular transformation. We looked for significant differences between two age groups - the group of respondents under 37 years old and the group of respondents after 37 years old. Differences were revealed in three categories: the main index of digital competence (at the level of significance  $p < 0.01$ ), skills (at the level of significance  $p < 0.01$ ) and communication (at the level of significance  $p < 0.05$ ).

Representatives of the younger group have a higher index of digital competence, and this is largely manifested in the category of skills. No significant differences were found in the categories of knowledge, motivation, and responsibility.

In the areas of digital competence, significant differences were identified in the field of communication - the younger generation has a higher level of digital competence in the field of communication. No significant differences were found in the areas of content, consumption and technosphere. There were also no significant differences in the degree of proficiency in the elements of the Moodle learning management system. In general, the results obtained indicate the importance of implementing network forms of interaction in a digital educational environment.

## 5 Conclusion

We have developed a program of psychological and pedagogical support for university teachers in the process of mastering the Moodle learning management system. The program is based on the levels of assimilation of the content of instruction of V.P. Bepalko and the disciplinary matrix of T. Kuhn in relation to education. Training can be carried out at three levels:

- 1) practical skills (primary training) - specific actions;
- 2) meta subject skills (secondary education) - such as 4-K;
- 3) methodological reflection (tertiary education) - which hinders my professional development.

The program is based on a networked form of the training organization. This is a system, the structural elements of which are: participants in the educational process; information educational resources available, as well as created by participants in the learning process; interaction of participants through a network service.

The program covers all the elements of the Moodle learning management system that users may encounter there when organizing the educational process. In the process of implementing the program, teachers will develop new skills in building the educational process in the Moodle learning management system.

The Moodle distance learning system with its capabilities is only a tool in the hands of a teacher. He puts into it his vision of the taught course, his ideas about what should be the output of the students. Like any tool, it can be used at different levels of assimilation of the learning content, moving from the reproduction of the experience of others to the creative productive use within the taught course. Fluency in new modern tools will allow teachers not to experience difficulties in introducing them into the educational process, will allow organizing new forms of dialogue with students, and will help them in building an effective individual educational route. However, we emphasize once again that online and offline education is not considered by us as a substitute for each other, but only as interrelated complementary forms.

The goal of the program is to create conditions and build an individual educational trajectory for the formation of skills in organizing the educational process in a digital educational environment (hereinafter DSP)

Objectives of the program:

- to carry out an entrance diagnostics in order to identify the needs of each teacher;
- develop an individual route based on the results of the entrance diagnostics;
- organize support at each stage of the program;
- to carry out the final reflection.

The methodological basis of the program of psychological and pedagogical support is the personality-activity approach.

Subjectivity, understood by S. L. Rubinstein as the ontological essence of an active human individual, is realized, formed and developed in the conditions of activity: according to Rubinstein, activity is characterized primarily by the following features:

- it is always the activity of a subject, a person (i.e., a person, not an animal and not a machine), more precisely, subjects carrying out joint activities;
- activity is the interaction of a subject with an object, that is, it is necessarily objective, meaningful;
- she is always creative and independent.

The program is based on a networked form of the training organization. This is a system, the structural elements of which are: participants in the educational process; information educational resources available, as well as created by participants in the learning process; interaction of participants through a network service.

In addition, the design of the program is based on the ALD (Agile Learning Design) methodology, which in the process of mastering the program allows you to focus on the specific tasks and interests of the program participant.

The program of psychological and pedagogical support consists of 60 lessons and is designed for 60 academic hours.

The program is viewed not as linear, but as concentric, which is based on the request and interests of the program participant in the system.

Before each lesson, program participants are offered cards with elements. By voting on the basis of their own request, the participants choose the element of the Moodle distance learning system, which will be used for classes in the webinar format.

The lesson is built on the basis of the theory of transformational learning. For fundamental concepts of transformational learning, see J. Mezirow, Robert Boyd, Paulo Freire.

Transformational learning occurs at the moment when a person needs to act in such circumstances that present a challenge for him, which are difficult and seem insoluble,

since the person has not done it before [19]. In such a situation, a person goes beyond the usual receipt of information and, with the help of reflection and tracking his progress, consciously goes through the path of change under the influence of the experience he receives in the learning process.

Below are the stages of the lesson within the framework of transformational learning theory:

1. Situation of uncertainty and discomfort. A person does not understand what needs to be done to complete the task, how to use a certain element in Moodle, and the task seems impossible to him.

2. Self-analysis. At this stage, the program participant analyzes his capabilities in the designated area.

3. Critical assessment. The participant critically assesses his capabilities and draws conclusions about what he can and cannot do.

4. Acknowledging that there is a problem or dissatisfaction. The participant identifies what gaps they have and fixes them.

5. Exploration of options and alternatives. The participant and the maintainer consider the available options for solving the problem.

6. Planning a course of action. The participant and the companion plan the trajectory along which they will move to achieve the result of the participant.

7. Acquisition of the necessary knowledge for implementation. The maintainer gives the participant the knowledge necessary to solve the problem.

8. Practice of new models of behavior. The participant works out the acquired knowledge in practice, performs actions independently.

9. Competence formation. The participant develops competence and becomes confident in the new behavior.

10. Integration into the model of the human world. A new model of behavior is built into the picture of the participant's world, and he can form new perspectives for himself.

Forms of work:

- Case
- Problematic learning
- Simulation

Motivational component:

- After studying the track "Theory", the program participant receives a badge and the status - "Expert in adding content";
- After completing the track "Evaluation", the program participant receives a badge and the status - "Expert in Evaluation";
- After completing the "Communication" track, the program participant receives a badge and status - "Expert in the organization of communication";
- After completing the track "Reporting", the program participant receives a badge and status - "Expert in processing learning outcomes";
- After completing the lesson "How to prepare for proctoring", the program participant receives a badge and the status of "Expert in preparation for proctoring".

In the process of implementing the program, teachers will develop skills in building the educational process in the Moodle learning management system. The program covers all the elements of the Moodle learning management system that users may encounter there when organizing the educational process.

Input control - a questionnaire - will help users to define themselves and understand where they are now, as well as build a roadmap - an individual educational trajectory. In the process of going through the tracks of the program, users have formed the necessary skills, which will minimize the possibility of a state of frustration.

Each lesson ends with reflection and fixing on the roadmap which stage the user has passed. In the process of reflection, the participant needs to answer the questions: did he manage to complete a certain task in practice, was it difficult for him, was there enough available knowledge, what emotions he experienced at the same time, what worked out and what did not. Webinars also help participants analyze their progress, share their experiences with other participants, and feel like part of a group moving towards a common goal. The implementation of the support program will help reduce the problems of educational subjects in the digital educational environment, as well as improve the emotional climate.

In conclusion, fluency in new modern tools will allow teachers not to experience difficulties in introducing them into the educational process, will allow organizing new forms of dialogue with students, and will help them in building an effective individual educational route. However, we emphasize once again that online and offline education is not considered by us as a substitute for each other, but only as interrelated complementary forms.

## References

1. T. Baranova, A. Kobicheva, E. Tokareva, Digital Science 2019. DSIC 2019. Advances in Intelligent Systems and Computing, Springer, Cham **1114** (2020)
2. T.A. Baranova, I.R. Trostinskaya, A.M. Kobicheva, E.Y. Tokareva, *Proceedings of the 2020 The 3rd International Conference on Big Data and Education (ICBDE '20)* (Association for Computing Machinery, New York, NY, USA, 2020) DOI: <https://doi.org/10.1145/3396452.3396454>
3. V.N. Kruglikov, M.V. Olennikova, N.A. Matveeva, O.O. Kunina, Integrating Engineering Education and Humanities for Global Intercultural Perspectives. IEEEHGIP 2020. Lecture Notes in Networks and Systems, Springer, Cham **131** (2020)
4. Y. Kats, *Learning Management Systems and Instructional Design: Best Practices in Online Education* (IGI Global, 2013) ISBN 9781466639317
5. T. Baranova, A. Kobicheva, E. Tokareva, Knowledge in the Information Society. PCSF 2020, CSIS 2020. Lecture Notes in Networks and Systems, Springer, Cham **184** (2021) [https://doi.org/10.1007/978-3-030-65857-1\\_26](https://doi.org/10.1007/978-3-030-65857-1_26)
6. F. Husain, *Education service delivery and students' satisfaction: a study of private colleges in Malaysia* (2018)
7. T. Baranova, N. Almazova, A. Tabolina, O. Kunina, I. Yudina, Integrating Engineering Education and Humanities for Global Intercultural Perspectives. IEEEHGIP 2020. Lecture Notes in Networks and Systems, Springer, Cham **131** (2020)
8. A.A. Akhayan, A.N. Sazonova, *On the relation between the concepts of "high-tech information and educational environment" and "info-knowledge-sphere". The Emissia. Offline Letters* (2015)
9. Y. Patarakin, O. Shilova, Procedia – Social and Behavioral Sciences **214**, 1083–1090 (2015) <http://www.sciencedirect.com/science/article/pii/S1877042815060644>
10. K.N. Polivanova, D. Koroleva, Russian Education and Society **60(6)**, 496-505 (2018)
11. P. Gilster, *Digital Literacy* (Wiley, New York, 1997)
12. G.U. Soldatova, T.A. Nestik, E.I. Rasskazova, E.Y. Zotova, *Digital competence of teenagers and their parents. Results of the all-Russian research* (Internet Development Fund, Moscow, 2013)
13. L. Anderson, *Rethinking Bloom's Taxonomy: Implications for testing and assessment* (1999)

14. M.J. Rodríguez-Triana, L.P. Prieto, T. Ley, et al., Intern. J. Comput.-Support. Collab. Learn (2020) <https://doi.org/10.1007/s11412-020-09331-5>
15. P. DeVaughn, J. Stefaniak, Education Tech Research Dev **68**, 3299–3326 (2020) <https://doi.org/10.1007/s11423-020-09823-z>
16. F.J. Palacios Hidalgo, C.A. Huertas Abril, M.E. Gómez Parra, Tech Know Learn **25**, 853–879 (2020) <https://doi.org/10.1007/s10758-019-09433-6>
17. E.G. Oh, Y. Chang, S.W. Park, J Comput High Educ **32**, 455–475 (2020) <https://doi.org/10.1007/s12528-019-09243-w>
18. T. Valtonen, U. Leppänen, M. Hyypiä, et al., Learning Environ Res (2020) <https://doi.org/10.1007/s10984-020-09339-6>
19. T.A. Barysheva, V.V. Gogoleva, T.F. Zyabkina, E.V. Maksimova, Integrating Engineering Education and Humanities for Global Intercultural Perspectives. IEEEHGIP 2020. Lecture Notes in Networks and Systems, Springer, Cham **131** (2020) [https://doi.org/10.1007/978-3-030-47415-7\\_96](https://doi.org/10.1007/978-3-030-47415-7_96)