MOODLE ENVIRONMENT AND ITS USE WITHIN FORMAL AND INFORMAL EDUCATION AT A VOCATIONAL SCHOOL

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Abstract. *The widespread development of digital technology contributes to the creation of pedagogical innovations using e-learning and m-learning technologies. The platform (e-learning environment) MOODLE, which unites these technologies, makes it possible to master the educational material both within the field of formal, as well as within informal and non-formal education. The MOODLE environment has not been yet sufficiently used in general and vocational education. The possibilities of using this learning environment at vocational schools in Latvia and Poland are considered in the article. Students who studied programs using the capabilities of the MOODLE environment, after completing the training, have evaluated the importance of such work for the acquisition of professional knowledge and skills. To do this, they were asked to answer questions of the questionnaire. The content of the questions can be found in the text of the article. The study identifies general and regional features of learning outcomes using the MOODLE environment.*
Keywords: *vocational education, e-learning, MOODLE learning environment, formal training, informal education.*

Introduction

Modern education includes three inseparable and complementary types: formal, informal and non-formal ones. The essence and significance of each one have been laconically formulated by H. Ainsworth and S. Eaton: „Whether learning take place in a formal setting such at a school, a non-formal setting such as a community or cultural center or an informal setting such as a home, all learning is good, and all learning is valuable. All learning contributes to an individual's growth, not only cognitivelly, but also emotionally and socially" (Ainsworth & Eaton, 2010: 12).

With the development of technical means of creating, storing and transmitting information, the boundaries between formal, informal and non-formal education have begining to disappear. With the introduction of e-learning, l-learning and m-learning technologies, training courses can be

simultaneously used in both formal and informal and nonformal learning. Today practically every vocational school student has a mobile phone, a home computer and / or a tablet.

The widespread use of digital technology contributes to the development of pedagogical innovations using e-learning and m-learning technologies. The platform MOODLE (e-learning environment) that unites these technologies, makes it possible to master the educational material both in the field of formal and informal and non-formal education as well. It should be noted that the MOODLE platform is used mainly by universities, and practically not used by vocational high schools. The strong points in the use of MOODLE are the following ones:

- the fact that it is an excellent repository of multiple types of contents;
- being able to access the platform at any location;
- being able to work at any time;
- it is useful to get the students' assignments;
- Moodle is useful for teaching.

MOODLE can be upgraded by various modules and plugins; it can be used to create well-structured learning scenarios; it contains many types of collaboration activities and communication modules. MOODLE collects various logging data for all student interactions.

MOODLE platform is the most flexible tool for a variety of interactive teaching methods. Properties of MOODLE help to solve one of the major challenges of modern education - formation of students' critical thinking and communicative competence.

The proposed study was carried out within the framework of the project ERASMUS+ "International Partnership for Improving the Quality of Teaching in Vocational Schools". Project participants are the following: School of Economic and General Education no 6 in Lomza, Poland; Vilnius Technology School of Business and Agriculture, Lithuania; Daugavpils Trade Vocational Secondary School, Latvia; Perfect Project LLC from Bialystok, Poland. Partners have developed the courses "Electronic Marketing", "ICT", "Communication", "Business Ethics". The course materials in English were downloaded on the MOODLE platform. These materials are also available in the mobile version.

In the research we were interested in the answers to the following issues:

- what is the point of view of scientists and practitioners on the effectiveness of using MOODLE platform (environment) in the process of teaching pupils and students?
- how do project participants (students) evaluate the effectiveness of learning using the MOODLE platform?

The concept of continuing education and modern teaching technologies

In the scientific and methodological literature one can find various interpretations of the notion of continuing education:
- continuous education as a lifelong learning;
- continuous education as adult education;
- continuing education as an increase in professional qualifications (Беляков, Вахштайн et al., 2006: 17).

It should be noted that the second and third interpretation is a special case of the first, since the concept of lifelong learning is not limited to age, modal (satisfaction of professional or personal interests) or time constraints.

Formal, informal and non-formal education are singled out in the structure of lifelong learning. The characteristics provided by us in the introduction in relation to these learning forms, we supplement with the following information.

Formal education is an institutional formation. It is carried out within the framework of public educational institutions on the basis of training programs approved by higher authorities. The main disadvantage of formal education is the lack of flexibility and focus on the "average" student.

Informal education is also constitutional, as it is implemented by various registered (licensed) courses, hobby groups, creative unions and sports associations. In the process of informal education, the individual independently studies, analyzes information and discusses it with other individuals.

In recent decades, the boundaries between these three educational forms are beginning to disappear. Formal education is actively and purposefully supplemented with elements of non-formal and informal education. This is facilitated by the development of modern means of searching, transmitting and analyzing information (Did, 1988; Pasko, 2015).

With the advent and spread of the Internet, e-leaning technologies have been appearing. One of the first e-leaning technologies was the so-called l-learning method, or distance learning via the Internet. Researchers noted that Internet translations of lectures by leading scientists allow to equalize the quality of education in the leading educational institution and its branches. Employees of different universities could unite their capabilities. However, shortcomings were revealed: not all teachers were able to communicate in this way with their students (Andrews & Daly, 2008; Schunk, 2000).

Researchers of the Michigan State University conducted a comparative analysis of traditional formal education and training using new technologies. The results are shown in Table 1.

Table 1 **Traditional and New Learning Environments**

Traditional Learning Environments	New Learning Environments
Teacher centred instruction	Student centred instruction
Single sense stimulation	Multi sensory stimulation
Single media	Multimedia
Isolated work	Collaborative work
Single path progression	Multi path progression
Information delivery	Information Exchange
Passive learning	Active/exploratory/inquiry based learning
Factual, knowledge based	Critical thinking and informed decisions
Reactive response	Proactive/planned action
Isolated, artifical context	Authentic, real- world context

Sourse: An Analysis of e-learning impact (2011).

The analysis of the two education systems, which was presented by researchers at the University of Michigan, predetermined the further development of educational technologies. The principles formulated on the right side of Table 1 form the basis of education for sustainable development. It should be noted that there is an indication in the article that this comparative analysis was carried out in 1988.

The spread of mobile telephony and the availability of mobile phone acquisitions made it possible to use these technological advances in the field of education. M-learning technologies have been appearing. Mobile communication allows you to get answers to the questions that arise not only from the teachers, but from all other subscribers with whom the individual is connected. In other words, the non-formal and informal communication network begins to serve as a basis for better mastering of the formal education program. This way of cooperative learning Russian researcher Zakharova suggests to call "we-learning" (Захарова, 2013).

The MOODLE environment and its use in education

The MOODLE (Modular Object-Oriented Dynamic Learning Environment) environment was created in the development of e-learning technologies. It allows you to place video, audio and printed materials at the rate, organize chats, which can be attended not only by teachers and students, but also by others interested in the topic proposed for discussion.

MOODLE capabilities are now widely used in higher education (Garrison, 2011; Lopes, 2011; Watanabe, 2005 and others). Along with this, the tools capabilities begin to be used not only in education, but also in the management of the educational process (Tomsons, 2010).

Researchers actively discuss the advantages and disadvantages of using the MOODLE environment within education. S. Vijaykumar notes that the student, using MOODLE, can apply his individual style of teaching. At the same time, he concretizes that he understands the learning styles in the interpretation of Kolb (Kolb, 1984). In addition, the author notes that the MOODLE environment allows you to create materials with different levels of complexity. Conventional approaches to learning make it expensive to develop three levels of didactic material. In the electronic version, this is easier to achieve. (Vijaykumar, 2013).

Canadian researcher Cristoforos Pappas notes that the development of training courses designed for use in e-learning technologies should take into account the requirements of the theory of cognitive loading (Cognitive Load Theory). According to this theory, students can effectively absorb and remember information only if it does not overload their brain. In a short-term, or working, human memory, a limited amount of data can be stored at a time. The more information the teacher gives at a time, the less likely that students will remember it and can apply it in the future (Pappas, 2014). Materials with different levels of complexity, about which S. Vijaykumar writes, meet the requirements of this theory (Vijaykumar, 2013).

An important point is the development of criteria for assessing the knowledge and skills of students. The Russian scientist G. V. Kravchenko proposes to take into account the following features of students' intellectual activity when using the MOODLE environment:

- level of activity (number of speeches);
- the ability to answer questions arguably;
- the ability to ask questions about a topic;
- information;
- knowledge of primary sources of information;
- the ability use concepts on a topic accurately;
- the ability to highlight the main idea;
- the ability to apply the knowledge gained in solving problem problems.

At the same time, the student should be allowed to study the next section only if he has acquired 70 % of the material in the previous section (determined by testing) (Кравченко, 2015). Here it should be noted that not all evaluation criteria that the author suggests can be automated. Testing in this case should be supplemented with a dialogue with the teacher. Concerns about the reliability of the results of automated testing are expressed by other researchers (Walker & Handley, 2016).

Let's turn to the opinion of teachers of higher schools who use MOODLE environment in their work. In the field of exact sciences, the opportunity for the

teacher to offer more theoretical material to the participants of the course (Skorniakova, 2012) is emphasized as an advantage of the MOODLE environment. Representatives of the humanitarian direction (teachers of English as a foreign language) note that teaching using MOODLE increases the motivation of students to improve their language skills. So, Erdal Ayan, analyzing the situation with the study of English in Turkey, notes that the student environment is heterogeneous. We can distinguish three groups of students: teachers-oriented, self-employed and problem-solving within this environment. Working in the MOODLE environment, combined with traditional lectures, increases the interest in learning English from all three student groups (Ayan, 2015).

Among the reasons that do not contribute to the active introduction of the MOODLE environment into the practice of education, the researchers mention insufficient knowledge of teachers to organize and manage the learning process through the MOODLE environment. According to the data of A. Valdemiera, among the teachers of Latvian higher education institutions in 2015 there were more than two thirds of the total number of teachers (Valdemiers, 2015). In addition, the use of the MOODLE environment can also be hampered by technical reasons. For example - low speed of the Internet (Vijaykumar, 2013) or an incorrectly selected font (Dirksen, 2012) and other problems related to the aesthetic side of developments that do not rise interest (Kong, Chan, Griffin et al., 2014).

Conditions description of the experiment and the investigation method realisation

Students from Daugavpils (Latvia) and Lomza (Poland) took part in the experiment. Among 20 students who took part in the project from Latvia, all 20 ones took part in the experiment. Among 20 students from Poland – 17 ones.

A questionnaire which contained 20 questions has been offered to testees. These questions were grouped into 5 groups. Each group contained 4 questions.

The first group. Testing. Using the questions of this group, the availability of technical capabilities for using the MOODLE network has been tested, as well as the ability of students to use these technical capabilities. This group included the following questions.

- I can use modern electronic means for information obtaining.
- My mobile phone has Internet access.
- With the help of my mobile phone I can receive necessary training information available on MOODLE.
- I have a personal computer at home.

The answer options for this group of questions were yes or no.

The next group of questions was called motivational. Its purpose was to identify the motives for using the MOODLE network in the learning process. The following questions were included in this group.

- I prefer to work with MOODLE, dealing with other people, whom we together study this or that subject witth.
- I would be happy if the information on all subjects were in MOODLE.
- MOODLE gives you the opportunity not only to receive information, but also to test your knowledge.
- I prefer to attend classes and directly contact the teacher. MOODLE provides an additional opportunity to obtain the necessary information.

By means of the third group of questions (operational-motivational unit), we have checked how the students' motivation is realized in practice. These included the following.

- I like to learn the necessary information with the help of MOODLE.
- Since I have started working with MOODLE, my interest in my profession has increased.
- I believe that the information I receive in MOODLE is not enough for mastering professional knowledge and skills.
- I highly appreciate the opportunity to work with educational information anywhere, where it is possible to enter the Internet using a mobile phone.

The fourth part was comparative. Its purpose was to find out what advantages students see in using the MOODLE environment in comparison with traditional training. This included the following questions.

- It's much more interesting for me to work in MOODLE than to read relevant educational literature.
- If there was an opportunity to choose between attending training sessions and working in a MOODLE environment, I would choose MOODLE.
- I consider MOODLE a successful addition to the work in the classroom (lecture hall).
- It is difficult to master a profession, not working with information in MOODLE.

The fifth part was productive. Here, students, answering questions, determined how work in the MOODLE environment affected their level of competence (including communicative) within their profession. Here were the following questions.

- Thanks to MOODLE, I began better to understand the features of my profession.

- Thanks to MOODLE, I found my supporters, with whom I continue to communicate on professional topics.

- Thanks to MOODLE, I started to get higher marks for examinations and examinations.

- Thanks to MOODLE, I became more confident in my profession.

Responses to the second, third, fourth and fifth parts have been differentiated. The following scale has been used: completely agree (5 points); partially agree (4 points); it's hard to say (3 points); partially disagree (2 points); completely disagree (1 point).

Results of research and discussion

First of all, let us turn to the respondents' answers which relate to the first check part. In the group of respondents from Poland, all the questions were answered: "Yes." In the group of respondents from Latvia, two "no" answers were received. In one case, the respondent had no access to the Internet in his mobile phone; in the second case, the mobile phone did not have a connection to the MOODLE network. Nevertheless, these respondents had the opportunity to connect and work on the MOODLE network using a home computer.

Now we turn to the general results of the study. By common results we mean the average score for all the answers to the questions of the second, third, fourth and fifth parts of the questionnaire. This average score could be equal and exceed the number of 4. We named such respondents as optimists who believe that their professional training and development is impossible outside the MOODLE environment. Those who received an average score ranging from 3.0 to 3.99 will be called doubters. These respondents prefer to use the MOODLE environment as an addition to traditional activities. The third group (average score from 2.0 to 2.99) - skeptics. For them, traditional lessons are more important, but sometimes they are prone to work with the MOODLE environment. The fourth group - pessimists (average score from 1.0 to 1.99). These respondents do not recognize the MOODLE environment as a teaching tool. The distribution of respondents by these groups is shown in Table 2.

Table 2 **Distribution of respondents by categories**

Categories	Optimist	Doubting	Skeptic	Pessimist
Group from Latvia	3	12	4	1
Group from Poland	0	8	9	0

It can be seen from the table that a group of respondents from Latvia is more likely to study using the MOODLE environment than their peers from Poland. Now consider the motivational part of the questionnaire. The results are shown in Table 3.

Table 3 **Motivational part of the questionnaire. Average values of respondents' answers**

Questions	1	5	9	13	Average value by group
Group from Latvia	3,45	3,75	4,15	2,45	3,475
Group from Poland	2,94	3,0	4,765	3,47	3,54

The leading motive for both groups is the opportunity to test their knowledge when working with the MOODLE environment. At the same time, the desire to receive knowledge in direct contact with the teacher from respondents from Poland is more pronounced than among respondents from Latvia.

The next part of the questionnaire is presented by the operational-motivational block of questions.

Table 4 **Operational-motivational part of the questionnaire. Average values of respondents' answers**

Questions	2	6	10	14	Average value by goup
Group from Latvia	3,45	3,4	3,0	3,9	3,44
Group from Poland	4,06	3,4	3,7	4,8	4,0

The indicators for this part of the questionnaire for three of the four questions for the respondents from Latvia were lower than for the group of respondents from Poland. The greatest indicators for both groups are related to the position: "I highly appreciate the opportunity to work with information in any place where it is possible to enter the Internet using a mobile phone."

The purpose of the third part of the questionnaire was to compare traditional education and education using the MOODLE environment.

Table 5 **Comparative part of the questionnaire. Average values of respondents' answers**

Questions	3	7	11	15	Average value by group
Group from Latvia	3,85	3,0	3,8	3,15	3,45
Group from poland	4,0	2,8	4,65	2,65	3,525

The average values for the indicators in this part of the questionnaire for one and the second group are close. Both groups believe that MOODLE is a

good complement to the traditional method of teaching, they would like that MOODLE could have information on all subjects, but they doubt that it is possible to master the profession using only MOODLE.

The fourth part of the questionnaire is productive. Here we found out the impact of work in the MOODLE environment on the personal and professional development of the respondents. Let's look at table 6.

Table 6 **The productive part of the questionnaire. Average values of respondents' answers**

Questions	4	8	12	16	Average value by group
Group from Latvia	3,6	2,15	3,25	4,25	3,6
Group from Poland	4,35	1,6	3,35	3,4	3,18

For respondents from Latvia, the most important aspect was the personal aspect in the process of mastering the profession (thanks to MOODLE): I became more confident. For respondents from Poland, the cognitive aspect was important: I began better to understand the characteristics of the profession. However, it seems that this has little impact on academic performance (12th question 3.25 and 3.35 respectively). According to the results of the study, it can be judged that the chat is used occasionally or not at all (the eighth question is 2.15 and 1.6, respectively).
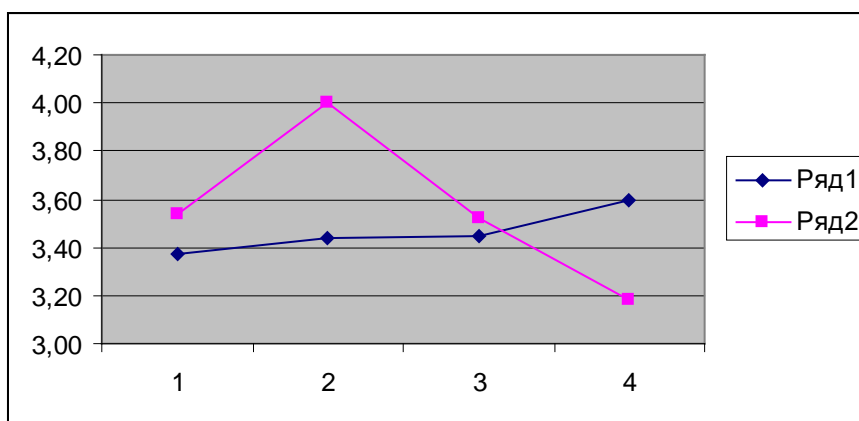

Figure 1. **Distribution of average values of indicators of thematic groups of the questionnaire in a group of students from Latvia and a group of students from Poland**

The obtained results will be displayed on the graph (Fig. 1). On the horizontal axis of the chart, the numbers indicate the thematic parts of the questionnaire:

- motivational part - 1;

- motivational and operational part - 2;
- comparative part - 3;
- productive part - 4.

The vertical axis shows the average values of the indicators for each group. The group from Latvia is designated by number 1. Number 2 - a group from Poland.

From the figure it can be seen that the first group is dominated by the productive part. In the second - motivational and operational.

The Mann Whitney U criterion, calculated for all thematic groups, showed that significant differences exist only in the third thematic group (U = 47.5 at U kr = 87, p ≤ 0.01). This means that the result can be interpreted as follows: Respondents from Poland believe that MOODLE is a supplement to the usual training sessions, willingly use it, but only as one of the training tools. In the opinion of respondents from Latvia, thanks to MOODLE, their ratings are being raised, it means, they are beginning to be more proficient and become more confident in their profession. Both groups express a wish that in the MOODLE environment one could work with all studied subjects.

Conclusions

1. Modern education needs innovative approaches. Given the wide spread of mobile communications and the Internet, the efforts of scientists and educators in the field of education modernization are now associated with the development of curricula using e-learning technologies.
2. One of such technologies is the development of training programs using the MOODLE environment. In this environment, it is possible not only to present information in various modalities (texts, videos and audio recordings), to test your knowledge using tests, but also to organize professional communication in chats, to which everyone can connect.
3. MOODLE is currently used more often in higher education. Less often - in general and vocational education. Participants in the project "International Partnership for Improving the Quality of Teaching in Vocational Schools", teachers of vocational schools in three countries (Poland, Lithuania and Latvia) have decided to fill this gap. In the MOODLE environment, they developed several training courses.
4. The study showed that students from Latvia and Poland, who were asked to answer questions from the questionnaire, positively assess their participation in the project. At the same time, in the responses of respondents from these two countries there are general trends and regional differences in the answers.

5. All respondents believe that MOODLE is a successful addition to the traditional form of training. At the same time, respondents are not inclined to take an active part in professional chats.
6. Regional features are manifested in the fact that respondents from Latvia emphasize the personal aspect of the results of work with MOODLE (I became more confident in my profession), and respondents from Poland - on a cognitive aspect (I began to understand better features of my profession).

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