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Evaluation of Using LMS Moodle for Training Specialists of the Transport Complex in the Context of Distance Learning

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Abstract

The purpose of the study is to assess the interest of technical university students in using LMS Moodle, which allows to train specialists of the transport complex and solve tasks based on the use of modern software with a developed modular architecture and extended functional capabilities. For the analysis, a set of research methods was used: testing,

questionnaires, methods of primary and secondary statistical data processing. The research results will help to identify the main difficulties and problems of students in the process of transition to distance learning, determine ways to solve them.

Keywords: Distance Learning, Learning Management System Moodle, Multivariate Analysis of Variance MANOVA

1. Introduction

Currently, many higher education institutions are searching for new, more flexible, and effective forms and methods of teaching. Over the past few years higher education institutions have been offering distance learning course studies^[1].

Distance learning has become an integral part of the education system. This form of education allows to solve many goals in the training of transport specialists: obtaining a higher education, advanced training, exchanging experience, getting expert advice, and actively participating in professional communication. Many countries pay great attention to the development of distance learning^[1-4].

Experience has shown that this form of learning has a high demand and gives a chance to get university degree for people who are not able to attend full-time or either part-time course due to certain circumstances^[1].

Distance learning is one of the most convenient forms of education for students who have priorities different from learning, such as work or family^[5]. Sometimes, for various reasons, distance learning is the only way to get an education.

However, this form of education has its own problems connected with the peculiarities of distance education as well as with the organization of the learning process.

The usage of information technologies allows to solve many problems of distance learning.

2. Learning Management System Moodle

Today, there are a large number of Learning Management System (LMS) for distance learning in the world. Existing educational process management programs are divided into two major categories: closed access (commercial) and open source (they are distributed free of charge).

Among open access systems, Moodle environment is becoming increasingly widespread.

LMS Moodle (Modular Object-Oriented Dynamic Learning Environment) is becoming more common among open-source learning platforms with a huge number of implementations^[6-8].

Moodle is popular among teachers all over the world, as it is free, and its technical capabilities and characteristics are superior to commercial LMS.

Many universities, universities of applied sciences, educational institutions, and vocational schools in the world has implemented LMS Moodle.

The LMS Moodle software has the following properties:

- Compatibility, i.e., provides the possibility of interaction between different systems;
- Adaptability, i.e., includes developing information technologies without redesigning the system and has built-in methods for providing individual learning;

- Accessibility, i.e., allows you to work with the system from different places (locally or remotely, from the classroom, from the work-place or from home);
- User-friendly and convenient interface that allows people to work at different levels of education and different physical abilities;
- Cost-effective, because LMS Moodle is distributed free of charge.

The usage of electronic educational resources developed in LMS Moodle, provides:

- Preparing the university’s information and educational environment to support a holistic e-learning process;
- Developing the methods of teaching in electronic environment and the mandatory advanced training in the field of computer technology;
- Effective organization of the educational process in general and independent work in particular;
- Opportunity to develop professional competencies of students;
- Study of academic subjects on an individual plan;
- Taking into account the individual abilities of students, their needs and interests;
- Rational allocation of time spent by a student on studying academic subjects according to the curriculum;
- Free and fast access of students to electronic databases of educational institutions containing educational and methodological literature on academic disciplines;
- Conducting remote electronic testing and determining the level of student development of the content of the discipline;
- The opportunity to study the academic discipline in depth;
- Increasing the social and professional mobility of students, their entrepreneurial and social activity, their outlook, and level of self-awareness.

3. Application of LMS Moodle for Training Specialists of the Transport Complex

Currently, the Belarusian State University of Transport is actively implementing LMS Moodle, which is an important link in the interaction of students with teachers.

Electronic resources for disciplines based on LMS Moodle allows to train specialists of the transport complex and solve tasks based on the use of modern software with a developed modular architecture and extended functional capabilities.

The purpose of the study is to assess the interest of technical university students in using LMS Moodle.

To achieve this goal, a set of research methods and techniques was used: testing, questionnaires, methods of primary and secondary statistical data processing [11-13].

The study was conducted in stages. The subjects were students of the specialties "Traffic Management" – 48%, "Transportation Management and Management in Road and Urban Transport" – 52%, studying at the Belarusian State University of Transport, Gomel, Belarus. The sample consisted of 95 people.

Considering the specifics of the specialties, 29% of young women took part in the study.

The study participants were offered three groups of questions.

The questions of the first group (Q_GR_1) determined the level of motivation to study when using distance learning and LMS Moodle. More than 75% of young women

expressed their interest in using distance learning and pointed out the absolute importance of this issue. At the same time, the number of young men interested in distance learning is 13% less, although they assess the subject under consideration as very popular in their future professional activities.

To the question "What technical problems have you encountered in the process of using distance learning elements in LMS Moodle?" (question of the second group – Q_GR_2) most of the students replied that there were no problems (67%). 25% of students indicated the need to have access to the Internet as technical problems. 3% of students answered that they have insufficient computer knowledge.

To the Question "What did you like about using distance learning elements in Moodle?" (question of the third group – Q_GR_3) the following answers were received:

- Improving the quality of education – 31%;
- Additional amount of material on the discipline – 27%;
- The ability to download materials (lectures, presentations and others) – 23%;
- Individual learning rate – 5%;
- The opportunity to test yourself – 3%;
- Self-study – 8%;
- There is no need to contact the teacher – 3%.

Students consider the following advantages of distance learning in Moodle to be the most important for themselves (question of the third group – Q_GR_3):

- Flexibility of the educational process – 33%;
- Technological effectiveness of the learning process - 25%;
- The ability to combine work with study – 17%;
- Getting practical skills – 15%;
- Training in a comfortable and familiar environment – 7%;
- Ease of updating content and the ability to archive material – 2%.

1% of students did not note any advantages in using LMS Moodle.

The use of multivariate analysis of variation (MANOVA) in the statistical analysis software package Statistica allowed to identify whether there is a significant difference of using LMS Moodle of students of different specialties, courses, gender (Fig 1).

Multivariate Tests of Significance (Spreadsheet1)						
Sigma-restricted parameterization						
Effective hypothesis decomposition						
Effect	Test	Value	F	Effect df	Error df	p
Intercept	Wilks	0,039697	709,5908	3	88	0,000000
Course	Wilks	0,825187	2,9579	6	176	0,008927
Group	Wilks	0,814045	6,7007	3	88	0,000399
Sex	Wilks	0,921874	2,4859	3	88	0,065825

Fig 1: Results of multivariate analysis of variance

For the analysis, the Wilks lambda criterion is used. This is the ratio of the measure of intra-group variability to the measure of overall variability. Intragroup variability means that Wilks lambda can take values from 0 (groups are completely homogeneous) to 1 (dividing objects into groups does not result in intragroup variability being less than the total). So, the lower the value of Wilks lambda, the better the division into groups turns out to be.

Since the level of significance of $p < 0.05$ for the factors

"Specialty" and "Course", answers to three groups of questions about using Moodle statistically significantly differs depending on the course and specialty in which students' study. The gender of the student does not affect the answers to the three groups of questions. Graphs of the results (Q_GR_1, Q_GR_2, Q_GR_3) for the factors "Course", "Specialty" and "Gender" are shown in Fig (2-4).

transition to distance learning and determine ways to solve them.

4. Conclusions

Thus, the introduction of distance learning in the practice of higher education will ensure the development of cognitive activity, in-dependence, initiative, responsibility, freedom of choice, self-control skills and motivation to master new knowledge. The successful implementation of information and communication technology, such as LMS Moodle system, makes education accessible to a larger audience with-out time and space barriers.

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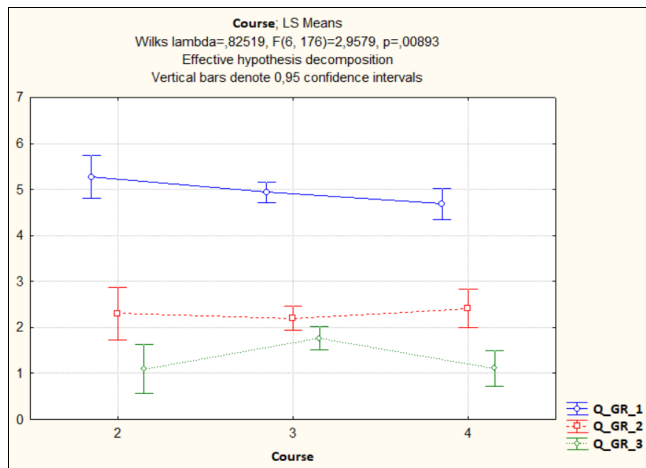


Fig 2: Graph of the analysis results for the factor "Course"

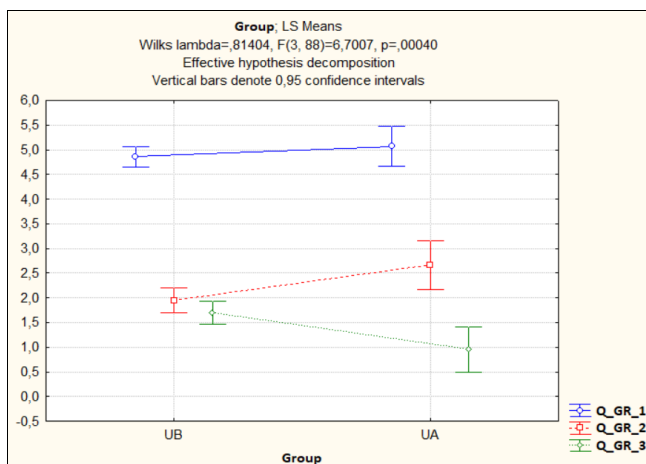


Fig 3: A graph of the results of the analysis for the factor "Specialty»"

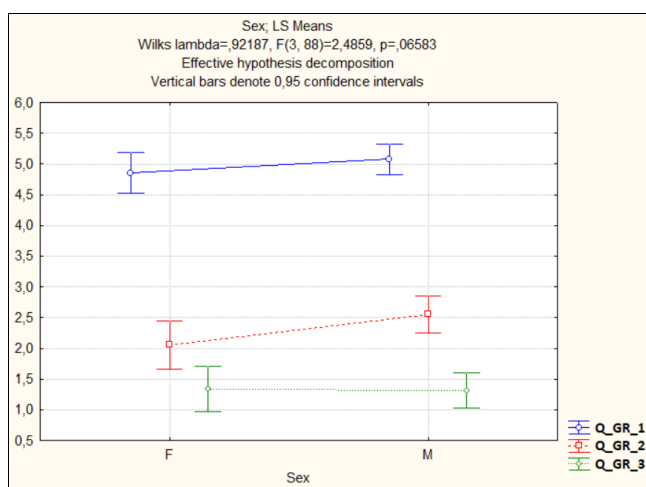


Fig 4: Graph of the analysis results for the factor "Gender"

Thus, the research results will help to identify the main difficulties and problems of students in the process of