

IMPORTANCE OF ELECTRONIC SUPPORT OF MATHEMATICAL EDUCATION IN PROFESSIONAL TRAINING OF PROSPECTIVE TEACHERS OF ELEMENTARY EDUCATION: PART TWO

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Abstract. Electronic support of teaching is a prospect of future education, especially for students of tertiary education. Since 2005/2006 academic year the study at the Faculty of Education, University of Prešov, has been implemented by the combination of methods. Mathematical disciplines have been taught in the form of contact classes and electronic support through LMS Moodle. The article analyzes the importance of the electronic support for mathematical education and professional training of prospective teachers in the elementary stage.

1. Introduction

Current higher education training of future teachers in the primary stage requires incorporation of modern technological instruments into the pedagogical processes. Electronic support becomes an inseparable part of education. The point of departure is, on the one hand, the utilisation of information technologies, and the modification in the conception of didactic system of mathematics, on the other.

According to Scholzova [4], the process of conceptual and curricular transformation of mathematical education in the field of Pre-school and Elementary Education put forth new challenges for modernisation of content, methods and forms of undergraduate training. We think that a need for such a transformation dwells also on a follow up graduate field of study – Teaching in Primary Stage.

Utilisation of e-learning in teacher training has found its way also at the Faculty of Education, University of Prešov. Since the 2005/2006 academic year we have strived for the effective incorporation of e-learning into education in both undergraduate and graduate levels of study programmes. The e-courses are accessible at <http://moodle-pf.unipo.sk/>. Selected e-courses offered by the Faculty of Education, University of Prešov, are analysed in [2], [3], and [5].

2. Aims and methods of the research

The aim of this research was to obtain information on the employment of electronic support for teaching at the Faculty of Education, University of Prešov. The principal method of the survey was a questionnaire. The students could express, via questionnaire, their views on utilization of electronic support of teaching during their own study. The questionnaire was distributed to full-time students who studied in 2010/2011 academic year in the Teaching in Primary Stage field of study. The research sample included 62 students of the 1st year and 49 students of the 2nd year – full-time students of the graduate degree programme. In creating and analyzing the questionnaire items we departed from Coufalová questionnaire [1].

3. Research findings

We were trying to identify the information sources utilized by the students during their study of mathematical disciplines.

Real utilization of information resources during study of mathematical disciplines are presented in Table 1.

Table 1

Information resource	Average utilization of the information resource	
	1st year	2nd year
Higher education textbook (scriptum)	100.00 %	93.88 %
Notes from contact classes (lectures, seminars)	100.00%	95.92%
Scholarly literature (from library)	75.58%	77.55%
Internet courses delivered by Moodle	95.16%	87.76%
Internet information (www pages)	67.74%	51.02%
Discussions with peers	67.74%	51.02%
Consultations with tutor	19.35%	16.33%
Consultations with teacher of mathematics in primary or secondary school	4.84%	10.20%
Other resources	0.00%	2.04%

The students have utilized primarily traditional information resources. This confirmed the prevailing trend from the undergraduate (Bachelor) degree level in which the dominant position was occupied by the specialized higher education textbooks and the notes from contact classes (either lectures or seminars). Relatively important position was held by the electronic courses designed for the Moodle interface. Another group of information resources includes scholarly literature, information from Internet (www pages) and discussions with peers. We have registered a decrease in interest in the information from Internet, which might be attributed to a more critical approach to consuming unreviewed information due to a higher level of students' expertise.

The second questionnaire item reads: "If I have an access to all information resources offered, in which order would I use them?" Students had to rank the list of resources following the criterion of importance when studying mathematical discipline (the scale ranged from 1 to 9). The offered options with their average order position regarding their usage are presented in the following Table 2.

Table 2

Information resource	Average order position of information resource by students' preference	
	1st year	2nd year
Higher education textbook (scriptum)	2.00	2.33
Notes from contact classes (lectures, seminars)	1.84	1.84
Scholarly literature (from library)	4.02	4.51
Internet courses delivered by Moodle	2.97	3.49
Internet information (www pages)	6.24	6.18
Discussions with peers	5.87	5.86
Consultations with tutor	5.74	5.24
Consultations with teacher of mathematics in primary or secondary school	7.50	7.08
Other resources	8.79	8.73

The presented data indicate that the position of the most preferred information resource is again taken by the contact classes in the form of lecture or seminar and the information obtained from higher education textbooks. Another group representing the information resources of comparable rating (from the aspect of their utilization) are electronic courses designed for the Moodle interface and scholarly literature. Consultations with tutor of the

given course, discussions with peers and information from Internet pages form the third category. Consultations with teacher of mathematics in primary or secondary school are the least preferred information element.

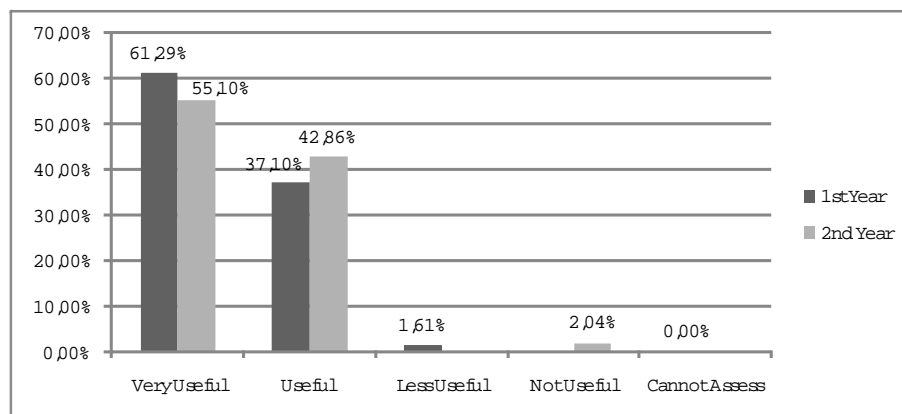


Figure 1

In the third questionnaire item we have focused on finding students' opinion on the usefulness of e-learning in their study. The findings, presented in the form of graph (Figure 1), indicate that almost all the students in the observed years of study consider e-courses during their study as very useful or useful. Based on the given data, we find e-courses designed in the Moodle interface to be a suitable complement for full-time students.

Table 3

Study unit in LMS Moodle	Average choice of unit element	
	1st year	2nd year
Concise outline of a lecture in electronic format (e.g. Word document)	98.39 %	90.91 %
Collection of exercise	88.71 %	54.55 %
Electronic test with feedback	77.42%	68.18%
Complementary study materials (e.g. video sequences)	62.90%	59.09%
Discussion forum for electronic consultation of study problems	17.74%	18.18%
Other	1.61%	4.55%

In the following part of the questionnaire we wanted to establish what the electronic course designed in the Moodle should contain. The data from the

analysis of this item are presented in Table 3. Based on the data, we conclude that students' views correspond with the view of Turčáni [6] on the structure of an e-course in which each unit should contain theory (outline of a lecture, in our case), exercises (batteries of task, in our case) and a test (self-corrective on-line tests, in our case).

Based on the above findings, the electronic courses designed for mathematical disciplines in the Teaching in Primary Education programme have the following structure:

- Theoretical points of departure (elements from mathematical domains)
- Exercises (collections of tasks)
- Pedagogical interpretation (follows from mathematical domains)
- Tests (self-correcting on-line tests).

In Table 4 we present students' reasons for preferring the Moodle system.

Table 4

I have used the Moodle system because (you can enter more options)	Average choice of study unit	
	1st year	2nd year
It is a source of new information necessary for study	98.39 %	87.76 %
I have access to new information at any time	90.32 %	83.67 %
It offers a possibility of taking self-corrective tests (immediate feedback)	33.87%	8.16%
It offers an opportunity to consult with tutor (teacher)	1.61 %	8.16 %
It was required by a tutor	6.45%	4.08%
It opens possibilities to consult with other students (e.g. via discussion forum)	0.00%	4.08%

From the given data we conclude that time independence and relevance of study elements are the dominant factors in utilizing an e-course during study. Very important element in e-courses is a possibility of taking self-corrective on-line tests. 33.87 % of the respondents from the 1st year labelled it as a reason for utilizing Moodle. However, taking advantage of the consultations with tutor via the Moodle system did not appear as a strong factor of e-courses preference. We attribute the given finding to the relative amount of time necessary for written electronic communication and inadequate skills of students to formulate their study question.

4. Conclusion

Based on the survey results, it is possible to conclude that mathematical training of the students of the Teaching in Primary Stage programme supported by e-learning is a tool which enables students (and tutors) more efficient use of their contact meetings. From full-time students' point of view, electronic support of mathematical training is a preferred information resource. Thus, in such a case Moodle is a suitable tool enabling the processing, presentation and distribution of electronic study units.

From the aspect of tutor, it is necessary to employ new information technologies, on the one hand, and to adapt individual elements of curriculum to the needs of e-learning, on the other.

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