

# DEMONSTRATIONS OF THE BEST PRACTICE OF E-LEARNIG IN THE SUBJECT OF QUANTITATIVE METHODS FOR MANAGERS IN THE DAILY AND EXTERNAL FORMS OF STUDY DONE BY THE ATTENDANCE, DISTANCE AND COMBINED METHODS OF EDUCATION

**Renata Janošcová**

School of Management in Trenčín

Department of Math, Statistics, and Information Technologies

64 Bezručova Street

Trenčín, Slovak Republic

e-mail: rjanoscova@vsm.sk

## Abstract

*The paper is a demonstration of the best practice of e-learning in the subject of Quantitative methods for managers in the daily and external forms of study done by the attendance, distance and combined methods of education. The goal of improving the quality of higher education is to bring different forms of study closer to content. Based on my own experience, I know it is possible. But only with motivated teachers, technically talented teachers using electronic tools appropriate for a specific subject on the sustained LMS platform, but especially with the necessary institutional support of top management. This paper describes the system of work while applying the most demanding subject in Moodle. The course is intended for both students of the day-to-day full-time study method and for students studying via a distance method. The platform of the subject is also used by students of both branches of the School of Management - in Trenčín and Bratislava.*

**Keywords:** *E-learning, E-course, Distance method of education, LMS – Learning Management System, Webinar, QMM - Quantitative methods for managers*

**JEL Classification:** *I23, I24*

# 1 Introduction

There are teachers who cannot imagine a teaching process without modern tools. There are also those who are afraid of them, and they deliberately prevent their usage. I belong to the first group, and I am lucky that the institution I work for does not only support this approach but also requires it from all teachers. E-learning has had a long tradition in the School of Management in Trenčín. Almost since its inception, e-learning has been a full-fledged form of teaching (Dávidková & Hvorecký, 2017). The paper presents examples of good practice in teaching selected topics from operational research. Operational research is taught at most universities in the world. It is found in the study programs that focus on agriculture, industrial production, ICT, services and public administration. That is why we chose it as the subject of our research. There have also been more than fourteen years of experience of the author in teaching via e-learning.

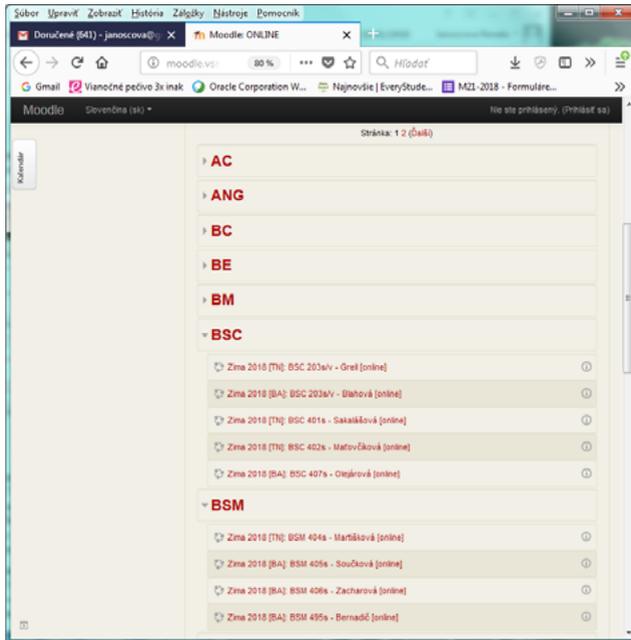
## 2 Course information and organization of study activities

The course (subject) "*Quantitative methods for managers*" (QMM) thematically covers two areas of operations research: queuing systems and linear programming. These include the third area of quantitative methods - time series (similar to the content of a similar subject at City University of Seattle) (Melicheríková & Bušíková, 2012). The course draws on the sources: JABLONSKÝ, J. 2007. *Operational Research: Quantitative Methods for Economic Decision Making*, PACÁKOVÁ, V. et al. 2009. *Statistical Methods for Economists* (Mandatory Resources). Optional sources include: BREZINA, I. - PEKÁR, J. 2014. *Operational Analysis in Business Practice*, HILLIER, F. S. - LIEBERMAN, G. J. 2010. *Introduction to Operations Research*. 9<sup>th</sup> edition, PLEVNÝ, M. - ŽIŽKA, M. 2010. *Modeling and Optimization in Managerial Decision Making* (Janošcová, 2018).

The target group of the e-course is represented by the students of the School of Management, studying in the daily form of study, who, based on the guidelines of the study counsellors of the School of Management, can choose by which method the given subject will be provided. Under certain internal rules of the School of Management, students choose the subject taught by the attendance method, or the "online" subject which is taught by a distance method and has standard e-course support in the open source LMS Moodle.

The E-course is part of the e-learning system of the study program "Business Management" in the field of study "Economics and Business Management". The entrance to the educational environment of the School of Management in Trenčín is in Figure 1.

Figure 1 LMS Entry Gate and distribution of e-courses to categories



The "Online Center Administrator" job is created to manage the e-courses. All the e-courses for all the School of Management courses (both in daily and in external form for both branches) are regularly updated, and after the end of the trimester,<sup>1</sup> they are backed up and stored in the archive. There is a specific amount of time (two trimesters) in which the archive is available to the teacher. Subsequently, e-courses go to the "Scrap yard", where they will be deleted after a certain time. The subjects for the following trimester are recovered from the backup in the "Preparation".

This system provides the maintenance, reusability and sustainability of the on-line education system of the School of Management, which is very extensive (it contains cca 160 different e-courses per trimester). The e-course is divided into 10 blocks, each for one week of the trimester.

The teachers can have a separate e-course for each combination of learning, for example, for students / external students, for students from Bratislava /

<sup>1</sup> A trimester represents 10 weeks at the School of Management, during which the student can enroll for the maximum of 4 subjects (5 credits each). In one academic year, there are 3 such trimesters, and in the summer it is also possible to study, but only through a distance method.

Trenčín, for those who have chosen to study the subject separately through a distance method, and so on.

The e-course QMM is used by students at the same level of study (Master's), but from both branches studying in the daily form via both methods - both full-time and distance<sup>2</sup>. The necessary section is implemented by placing students into groups (BA, TN, daily<sup>3</sup>, online). In Figure 2 there is the name of the merged course in one e-course ("Zima 2018 [BA + TN]: ... [daily + online]").

The range of the subject matter previewed in the syllabus of the subject is fully covered in this e-course. This is especially because it is required to have an electronic support for the students of the distance method.

The educational goals (learning objectives) are summarized in the syllabus, divided and then inserted into individual learning blocks in the sense of Bloom Taxonomy (Hvorecký et al., 2015). Each topic has a tutorial in various forms. In the practical part, most of the examples from the required sources are processed in MS Excel, which contains a clear commentary and formulas for a better understanding of the results of the solution mentioned in the sources.

Their range varies from theme to subject, but does not exceed five spreadsheet sheets per topic or problem solved. The explanation of the theory of each topic for each week has a tutorial in the form of video-conductions, created in the multimedia studio in Trenčín<sup>4</sup>, as well as created with the support of *Office Mix* (2017). This tool allows splitting longer video lectures into smaller parts that are acceptable to students.

Figure 2 Merged e-course MC 506s at the LMS



<sup>2</sup> At the School of Management, instead of the term "distance ...", "online" is a common name for historical and marketing reasons.

<sup>3</sup> In the jargon of the School of Management, "day" means an attendance method for full-time study.

<sup>4</sup> The studio was created with the support of the ESF within the project "Recovery and building of technical infrastructure for research and development of adaptive e-learning methodologies", ITMS code: 26210120030.

The calendar alerts students to different dates of activities (assignments, forum submissions, tests, etc.) and greatly helps organize the study, which is especially important while using the distance method. In case of a merged e-course, the syllabus for both methods is in the opening block. The standardized syllabus provides basic information on the subject, academic ethics (Kročitý, 2017) and a timetable with specific dates.

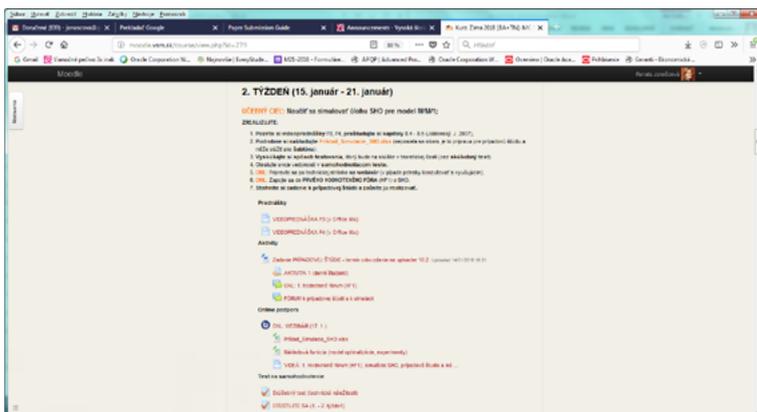
The Webinar is a tool that allows a regular teacher contact with students studying distance but is also suitable for "day" students who cannot attend classes, whether due to disease, representative duties, or similar reasons. A great help for the students of both methods are the recordings of the past webinars, placed in the "Online Support" block.

### 3 Course implementation

The QMM e-course uses LMS Moodle v. 3.1, in an online form. In 2017, migration from LMS Moodle 1.9 took place, as well as migration to a new, more powerful server, with both systems running for the year. The structure of the QMM e-course is in line with the standardized "template" of the School of Management, the minimum content structure of which must be observed by all teachers (so far only in the distance study). There is a minimum number of media sources (custom videos, online support files, audios, video clips, hyperlinks, etc.).

The e-course QMM also exceeds the minimum standards because it requires an emphasis on understanding quantitative methods rather than memorizing them (Figure 3).

Figure 3 Structure of QMM in accordance with the template of the online study



## 4 Activation of students

The e-course QMM combines the elements of both synchronous and asynchronous communication. Synchrony is ensured by the possibility of gradually making the content prepared visible in accordance with the timetable and the syllabus, as well as the terms for the fulfilment of different tasks and the terms of regular webinars (online consultations) for distance students. Many of the well-known e-learning tools are used by the students studying via a full-time method: sharing electronic materials (lectures, examples, case studies, task assignments), electronic tests with random choices of different types of questions (including self-assessment), polls and teamwork. Distance students use, in addition to these tools, constructive forum discussions and webinars, which are an interface between the classroom and the e-course (students meet a teacher at the same time from different places). Some tools are shared by both "day" and "online" students, even collaborating on some activities, thus enriching each other.

The subject is a balanced number of activities in which students work in a team (for example, structured forums) and activities aimed at practicing individual skills (practical assignments in MS Excel, etc.).

## 5 Conclusion

At the end of each semester, students evaluate the e-course. Here are some of their views on this e-course (Janošcová, 2018):

Table 1 A survey of students' views on the QMM

Which moment did you like best?	Which moment was the most annoying?	What helped you most in communication?	Which event surprised you most?
The first virtual class <sup>1</sup> .	Problems connecting to a net meeting.	Initially, the way I work in Moodle, but now I've already appreciated it, you just have to get used to it.	A webinar, which was totally new for me, and I think that was a great help.
I like the whole Moodle, mainly virtual lessons are perfect and help to master the curriculum.	When I got caught in my own inattention.	Fundamentally different-size classes on Moodle.	Online tests during the trimester.

Which moment did you like best?	Which moment was the most annoying?	What helped you most in communication?	Which event surprised you most?
Among the moments that I'm most interested in would be online tests :)	The very beginnings of Moodle work in the first week when I wanted to ask how to post a Moodle post on a Moodle question forum, but I did not find a way to add a post. But gradually, I tried to work it out - I just got it myself.	I find a webinar very helpful overall with the opportunity to ask questions and to get answers directly online, and I am very grateful to use this new, more efficient way of sharing knowledge, which really helped me to explain the problematic parts.	Webinars, I was probably the most surprised by them. I did not know what it was about, but finally I'm very glad! :-)
Overall, I'm interested in webinars that I consider to be a very effective way of teaching.	When I found out that the assignments would be about the same calculations in Excel :) But it could be done!	Personal, voice contact in class, good teacher response.	I was pleasantly surprised by the webinar and then video recording and a lot of background to study - an electronic book and very well prepared presentations.

<sup>1</sup> Thinking – the webinar.

The outcomes of these students' surveys make future work directions. Webinars have proved to be the most popular with the students. We want to explore the dependence of student success in the subject Quantitative methods for managers on their participation in the webinars. Another object of the research are online tests. Students use the self-assessment adaptive testing. In the future, we intend to examine the dependence of students' achievements on the successful exams and final examinations on their success in the adaptive self-assessment tests.

The aim of improving the quality of higher education is to bring the forms of study closer to the content.

Based on my own experience, which is also described in this article, I know that it is possible, with motivated and technically competent teachers, to use electronic tools appropriate for a particular subject on a sustained LMS platform, but only with the necessary institutional support of the top management (Janošcová, 2017).

## References

1. DÁVIDEKOVÁ, M., HVORECKÝ, J. (2017). ICT Collaboration Tools for Virtual Teams in Terms of the SECI Model. *International Journal of Engineering Pedagogy*, 7(1), p. 95-116. doi: 10.3991/ijep.v7i1.6502.
2. HVORECKÝ, J., ŠIMÚTH, J., LIPOVSKÁ, A. (2015). Ways of Delivering Tacit Knowledge in e-Learning. *Proceedings of 2015 International Conference on Interactive Collaborative Learning*. New York : IEEE, pp. 523-526.
3. JANOŠCOVÁ, R. (2017). Statistical Proces Control Education using distance learning. *12<sup>th</sup> International Workshop on Knowledge Management*. Trenčín : School of Management in Trenčín.
4. JANOŠCOVÁ, R. (2018). *MC 506s Quantitative methods for managers : e-course*. School of Management in Trenčín. Retrieved }January 15, 2018) from <http://online.vsm.sk/moodle/course/view.php?id=3133>.
5. KROČITÝ, P. (2017). Raising Awareness About Scholastic Honesty At Higher Education Institution. *Conference on Plagiarism Across Europe and Beyond*. Brno : Mendel University in Brno. p. 59-70.
6. MELICHERÍKOVÁ, Z., BUŠÍKOVÁ, A. (2012). Adaptive E-learning - a Tool to Overcome Disadvantages of E-learning. *10<sup>th</sup> IEEE International Conference on Emerging e-learning Technologies and Applications (ICETA)*. New York : IEEE, p. 263-266.
7. Office Mix. (2017). *My Mixes*. Microsoft. Retrieved (January 20, 2018) from <https://mix.office.com/en-us/Home>.