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## TEACHER PRACTICES IN USING LEARNING ANALYTICS TO ENHANCE LEARNING IN BLENDED ONLINE STUDIES

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### Abstract

While higher education institutions (HEIs) are exploring innovative ways to enhance and facilitate learning experience of students and so to improve the overall quality of studies, technology enhanced learning (TEL, henceforth) becomes inevitable. Having explored the possibilities and benefits of TEL, HEIs encourage teachers to develop blended online courses in virtual learning environments, to use new tools and solutions available for student learning monitoring and enhancement and to research how these practices are successful and what are the factors that make impact to teaching and learning success. This paper aims to identify teacher practices how the use of learning analytics in virtual learning environment may enhance learners' engagement in blended online studies in HE.

### Introduction

Higher education institutions (HEI) are constantly searching for ways of improving the quality of studies, enhancing learning experience for students through engaging them into studies and increasing flexibility, mobility, and accessibility, though at the same time trying to meet all organizational and institutional guidelines (De George-Walker & Keeffe, 2010; Bonk, Kim, & Zeng, 2006; De George-Walker, Hafeez-Baig, Gururajan, & Danaher, 2010; Graham, 2006). The adoption and integration of technological advancements and the promotion of technology enhanced learning, which is the usage of information and communication technologies to further the learning/teaching processes, has become rather common practice among HEIs (George-Walker & Keeffe, 2010; Kirkwood & Price, 2014). This paper aims at describing teacher practices at Vytautas Magnus University (Lithuania) in adopting technology enhanced learning through the development of blended online studies, and using virtual learning environment tools such as learning analytics (LA) to increase learners' engagement and enhance the learning/teaching processes.

## **The Benefits of Blended Online Learning**

TEL includes different forms of learning using technological advancements; however, it should be noted that the most commonly used type at HEIs is blended learning. Blended learning has a variety of modes, and each university may decide which definition is mostly meeting the forms adopted by university teachers. Vytautas Magnus University has institutional regulations that define the application of technologies in teaching and learning following the intensity of the use of technologies, that is measured using specific quality assurance tools. There are online courses and programs available for students, but the majority of the courses in university correspond to blended online learning courses, which means that all curriculum is online, but following the needs of the students some classes may take place in face to face mode, if needed and if agreed with the students and the teacher. As this is the most popular mode at this particular university, the paper will address this mode and will refer to it as blended online studies further on.

There are many advantages for HEIs to use blended online learning. It should be stated that blended online learning has changed the traditional teacher-centred approach, with a more learner-centred practices, with more learner engaged activities in teaching and learning (Bonk, Kim, & Zeng, 2006). As a result, teaching/learning processes have become more personalized and flexible. A note should be made that digital tools, integrated in virtual learning environments, i.e. learning analytics, may assist teachers while adopting a more learner-oriented approach, designing curriculum that satisfies learners' needs, and increasing students' engagement (Van Harmele & Workman, 2012; Siemens, 2015). In addition, blended online learning can contribute to enhancing learning/teaching processes, and at the same time, addressing organizational requirements (Bonk, Kim, & Zeng, 2006; Garrison & Kanuka 2004; Laurillard, 2002; Graham, 2006; Macdonald, 2008). Finally, a note should be made that integration of technologies in teaching and learning can grant access to massive amounts of study materials at any given time (Teresevičienė et al., 2015). In a similar manner, virtual learning environments, with the help of learning analytics, can produce a lot of data about learners and the contexts where learning occurs (Siemens & Long, 2011). Such data may be useful for teachers who are working on improving curriculum that would address real-time learner's needs and promote personalized learning. Thus, it should be stated that courses developed for blended online studies in a virtual learning environment benefit from the learning analytics as tools integrated in the environment, allowing much greater potential for student monitoring and activity completion tracking, as well as student behaviour analysis for study purposes. The data of student behaviour in one particular blended online course may enhance study experience, increase students' engagement, and address learning and teaching quality issues.

## **Description of VMU Experience Using Virtual Learning Environment**

To begin with, it should be noted that the university offers a huge selection of different courses in different fields of study such as humanities, social sciences, natural sciences, arts, computer sciences, as well as different types of instruction, including traditional face-to-face classrooms, blended, and online learning. The university actively promotes technology enhanced learning and encourages teachers to be innovative and to adopt new types of instruction, including blended and online, in order to enhance the learning experience, to increase availability of education, and to raise the overall quality of studies.

In fact, it should be noted that the university has integrated a virtual learning environment (Moodle) in 2009 and been using it since. Even though, the virtual learning environment was not popular among teachers at the very beginning, later, the situation changed as more teachers have opted for registering their courses in Moodle and exploring new ways of instruction (see Figure 1 below).

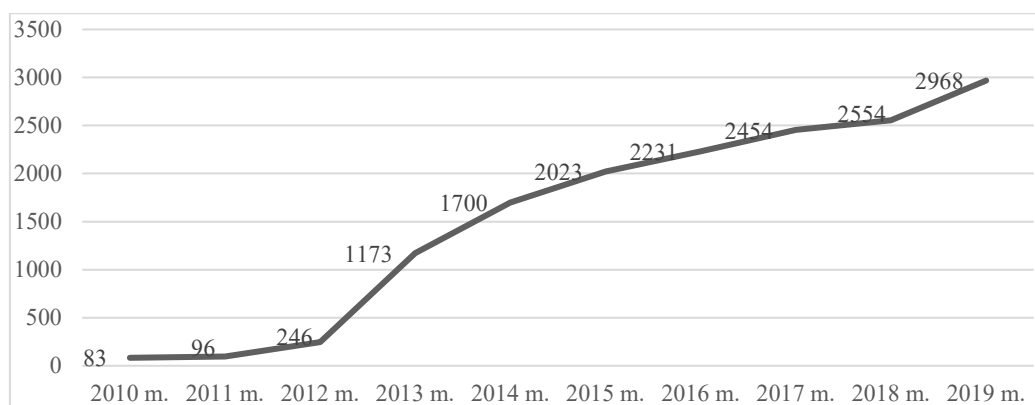


Figure 1. Numbers of blended online courses available in Moodle, 2010 – 2019.

As demonstrated above, for the first three years the growth of study courses in the Moodle platform has been rather slow. Prior to adoption, there were several competing systems for student-teacher communication, including Moodle, First Class, various websites or blogs of the teachers, individual email, and the fledgling Facebook interfaces. Thus there was a need to centralize and manage the learning/teaching, communication, and collaboration processes. As a result, administrative regulations and guidelines have been established which set obligations for teachers to start using the Moodle platform for teaching by developing blended or online courses for the virtual learning environment. Besides, it should be stated that these guidelines have provided organizational, content, and structural criteria for blended online learning course quality criteria. Thus, it can be stated that the university supports integration of blended online learning on the institutional level.

Another fact should be noted that three levels of study course preparation for the online learning platform have been described. In order to fulfil the requirements for the first level,

study course preparation and adaptation for Moodle platform, a teacher has to register the course in the online platform and upload approximately 20-49% of the curriculum. With the second level, blended learning has been promoted because the teacher would have to upload approximately 50-90% of the study content and choose such study activities that would not always require face-to-face interaction. Finally, the third level has defined the parameters for completely online learning offered by the institution, meaning 91 though 100% of the study content to be uploaded and the whole course curriculum has to be designed for fully online learning and teaching (interactions, learning assignments, mid-term and exams).

Again, since establishment of these administrative guidelines, a significant increase in study courses registered in Moodle can be observed. To illustrate this, before the announcement of guidelines, only 246 study courses existed in the Moodle environment, however, once the guidelines were announced, the number of study subjects increased dramatically, to a total of 1173 (see Figure 1). Moreover, it should be stated that the number of study courses in Moodle is constantly growing due to academic staff turnover and establishment and accreditation of new study programs. For instance, by the fall semester of 2019, a total number of 2968 study courses exist on the Moodle platform, out of which 729 courses have been newly created and 293 courses have been erased in order to eliminate courses that have not been used in that way of optimizing study programs. Besides, it should be stated that the vast majority of study courses registered in Moodle belongs to the Agriculture Academy (i.e. 568 study courses), followed by the Faculty of Humanities with 476 courses registered in Moodle in second place, while Music Academy holds the smallest number of subjects in Moodle (54 courses). However, overall a rather small number of study courses are prepared for blended or online mode. For example, last semester 264 study courses were taught in blended learning mode, while only 104 study courses have been accredited for the fully online mode. The reason why such a small number of study courses have been accredited for fully online mode is that there is a relatively long list of criteria (that are described in documentation) that have to be met in order to gain said accreditation.

Another important thing that needs to be mentioned is that the university has not only implemented and promoted the usage of the virtual learning environment, but also purchased licenses for the Adobe Connect tool, which enables video conferences. This tool is supposed to ease communication between teachers and students when face-to-face interactions are not possible, eliminate any physical restrictions, and increase accessibility of study materials (lectures can be recorded and students can participate in the lecture at convenient time for them by simply listening to the recording). Besides, it should be noted that every year, the university invests both financial and human resources into

maintenance and renewal of the learning platform, Adobe Connect tool, and operating systems. In addition, the university is even offering to buy licenses for additional external tools, i.e. collaborative tools that are compatible or can be integrated within the learning platform if the existing Moodle tools cannot meet the needs of teachers while trying to ensure efficient teaching/learning processes.

A note should be made that integration of the Moodle platform and various tools, including Adobe Connect, and active promotion of blended and online learning, have enabled mobility and flexibility of teachers and students. For example, in 2019, students and teachers have logged in to Moodle, using IP addresses from 97 different countries. In Figure 2, a pie chart with the list of countries from which more than 100 unique logins have been registered is provided.

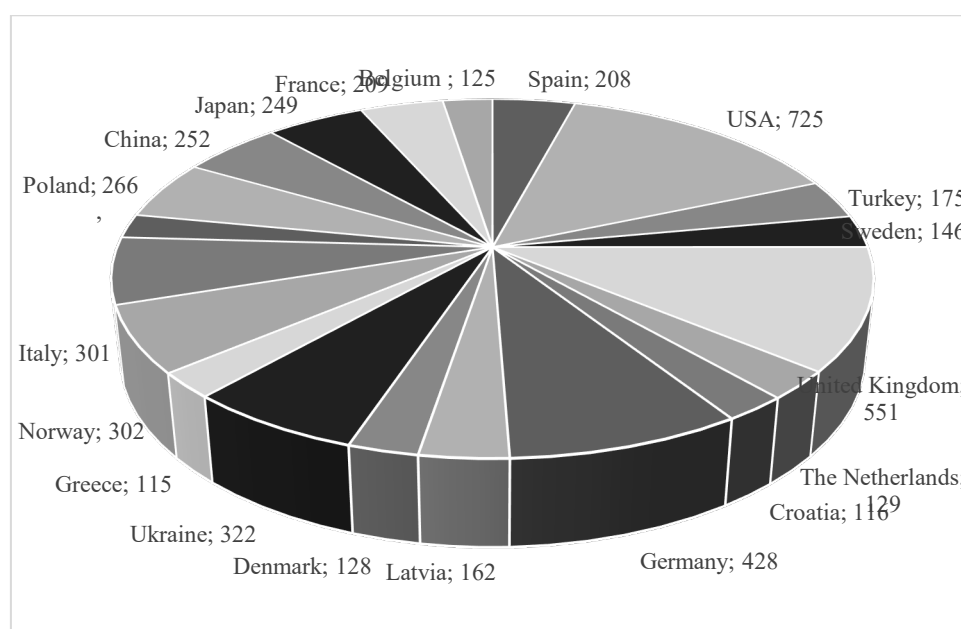


Figure 2. Logins to VMU Moodle from different foreign countries

As seen above, the vast majority of logins to the VMU Moodle platform (i.e. 725) has been noted from the USA, whereas, the lowest number of logins (i.e. 115) has been observed from Greece. Nonetheless, it should be stated that 9176 students have been using the online learning platform on a daily basis. Thus, it can be stated that the Moodle platform is used actively, frequently, and even internationally. As a result, it becomes rather obvious that integration of the Moodle platform and other related tools increased accessibility of education, allowed flexibility, and contributed to internationalization.

Besides, the university has introduced digital badges for both students and teachers as a means to raise motivation, to acknowledge a variety of soft skills or professional competencies, and to assist in digital assessment. At VMU, teachers can be awarded with digital badges on four different occasions. For instance, teachers can get a digital badge if

they have fulfilled the requirements and prepared or adapted their courses for the Moodle platform. Additionally, teachers can get a badge that is given for experts in online learning to acknowledge skills, experience, and certain competencies, too. They can also receive a digital badge if they attended courses or seminars. Finally, they can be awarded with digital badges when they receive positive evaluations from students. In the meantime, students at VMU can receive digital badges that are issued by their teachers at course level. The most typical reasons for earning digital badges for students are the following: assessment, motivation/encouragement, and finally, recognition of so-called soft-skills such as leadership, collaboration, etc. In short, it can be stated that the university is trying to integrate and popularize digital tools such as digital badges in order to encourage the academic community to use and explore the virtual learning environment possibilities for recognition of skills, competences, and assessment.

Finally, it should be stated that the university actively invests in support systems and trainings for teachers who are integrating and using Moodle and other digital tools in the teaching process. There is a technical support team who can answer any questions regarding Moodle and the Adobe Connect tool. Teachers and students can either fill out online request forms, where they describe their issue, or contact support directly and arrange individual meetings in order to solve their problem regarding the usage of Moodle. For instance, in 2019, teachers have created 1337 online requests, whereas, students have filled out 1609 request forms for the VMU Moodle technical support team regarding various technical or organizational questions. Additionally, user manuals are available in both English and Lithuanian. The university is constantly organizing trainings for teachers that cover such topics as usage of Moodle, Adobe Connect tool, design and development of technology enhanced curriculum, content licensing, and arrangement of teaching in a virtual learning environment.

## **Methodology**

The empirical part of the research aims at describing teachers' experiences of using LA in order to engage students into the blended online courses. This research is part of a wider scope of research on the needs of digital and networked society for open and online learning. This research aims to contribute to the research field of LA by revealing existing practices and disclosing pedagogical LA data-driven decisions.

### ***Research participants***

A qualitative approach was used to take 25 interviews from university teachers, delivering blended and/or online courses in Moodle. Research participants covered 10 study fields: economics, natural sciences, education, agriculture, philology, law, mathematics,

informatics, communication, and psychology. The age of interviewees varied from 29 to 63, with the online teaching experience varying from 2 to 15 years.

### **Data collection**

Semi-structured interviews were used to collect data, following the set of topics as interview guidelines.

### **Data analysis**

Qualitative content analysis was chosen to analyse interviews and present research findings.

### **Results**

A note should be made that data analysis was driven by the research question – “What are teachers’ practices of using LA to engage students into blended and/or online courses?” The research question has been analysed and results are being discussed in a category which summarises teachers decisions about changes in course curriculum based on LA data.

The interviewers emphasized the fact that it is very significant for a teacher to be open to changes. These changes can be induced by the urge to improve course curriculum based on the data from LA in response to one or the other activity. Despite being aware that in most cases the course does not go on the way they have planned in advance, some of the research participants feel rather confused when the discussion comes to the timely changes of the course curriculum. Therefore, it is important not to be afraid to experiment with the learning activities and reflect with students on them.

Trying different learning activities uncovers the teaching presence. Analysis of this experience demonstrates that designing of the curriculum is not a static process; instead, it should be seen as going through continuous changes that are related with the improvement and designing of learning activities or tasks. Research participants confirm that next to the grades, data given by learning analytics helps them grasp challenging moments related to students’ task implementation or engagement. Sometimes, from the teacher’s perspective, the task may seem much more engaging and interesting than it is for students:

*“I created a blog, where I asked students to upload their analysis of different articles in the media, discussing the same topics from the perspective of state, the resident, or the business. But this blog failed, as it got absolutely formal and did not evolve into some format that could stay by itself. As my initial*

*idea was that we could have a place to upload news. <...> but they did what I asked them to do and that's it." (I01)*

As analysis reveals, formally, the task that was given by the teacher was delivered by the students. But despite the fulfilment of formal requirements, students showed no interest in getting involved in the suggested blog any deeper. It could have happened because of the lack of students' motivation or because the teacher did not explain expectations s/he had and how it was supposed to help everyone for the further learning process. In this case there was a lack of social and teaching presence in the course.

Research participants demonstrate different practices and experiences related to the application of new approaches towards the development of learning activities. Some teachers tend to make timely changes related to the improvement of activities:

*"if I feel that there are some difficulties in my course, that tasks are too difficult, there's too many of them and so bigger part of students do not deliver them, <...> that there's a significant delays <...>, I make a decision to make changes, either by shifting individual activities into group work, or by simply ignoring them." (I22)*

Others tend to revise their curriculum each semester by observing learners' level of knowledge and preparation:

*"it is impossible to teach the same material each semester, this is not English language, history, or philosophy. I always observe if we are in time with the themes, if there is any delay, what students understand and what not" (I13).*

Nevertheless, they all share a unanimous understanding that having the possibility to observe learners' activities and engagement, provide them with at least basic directions on what changes should be made. As it was observed, in most cases, when the tasks were not working well with the students, teachers tended to change tasks only the next year, when new students would join the course. This kind of decision may not seem very reasonable when thinking that all groups of students are different and so, if the task does not work well with one group, it might be a success with the other.

## **Conclusions**

In conclusion, it should be stated that the university is trying to ensure transition from traditional face-to-face teaching/learning organization to a more modern and flexible teaching/learning in a virtual learning environment. The university has taken administrative measures to promote technology enhanced learning and to accelerate usage of the Moodle platform. Besides, it should be stated that the university invests both



financial and human capital in development of support mechanisms for teachers and students who are using Moodle. Training is offered where teachers can find out about the possibilities of the virtual learning environment and its tools, to learn how to use these online tools, to understand the different pedagogic approach that dominates in blended or online learning, and, finally, to get some skills in creating curriculum for online or blended studies. The university's efforts seem to have paid off because Moodle is being actively used on daily basis. Moreover, it should be mentioned that the integration of Moodle has increased the accessibility of education and mobility of teachers and students.

The application of LA tools to monitor learners' engagement has facilitated teaching and learning processes and enabled teachers to quickly interact and intervene into learning processes whenever needed. Teachers report that they make changes in curriculum design and pedagogical approaches that would correspond to actual learners' needs and to make learning more personalized.

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