2014-2020 Operational Programme for the European Union Funds Investments in Lithuania

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# MODELLING TEACHER PRACTICES TO APPLY LEARNING ANALYTICS AS A METACOGNITIVE TOOL IN LEARNING TO ENHANCE STUDENT SUCCESS

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# Research background

- Teaching and learning in virtual learning environments is much different than in traditional face-to-face educational settings, and often it might be even more challenging on both students and teachers (Bennet and Lockyer, 2004; Oliver, 2001).
- Teachers are obliged to explore the possibilities and features of virtual learning environments in order to create a coherent and comprehensive learning experience for students.
- By applying learning analytics, educational institutions can improve study experiences, raise overall quality of studies, increase students' motivation and learning success, and, finally, reduce drop-out rates

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# The Concept of Learning Analytics

- The usage of data which is produced by learners in order to attain information that can be used to enhance the learning experience for the learners (Siemens, 2010).
- A method used for evaluation and analysis of learner-produced data, attained from a virtual learning environment, in order to facilitate and to enhance learning and teaching processes (Siemens and Long, 2011).
- A tool for observation and monitoring of learners' activities and progress, which enables teachers to predict learning outcomes (Diaz and Brown, 2012).

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# Learning Analytics for Enhancing Teaching and Learning (I)

- Assists teachers in adjusting didactic content or approach, providing feedback, and selecting proper communicative strategies with the learners, especially with those who are at higher risk of dropout (Martin and Whitmer, 2015; Kim et al., 2016)
- Provides teachers with the possibility to examine learners and detect any subjects that the learner is or will be struggling with, then teachers can take certain steps to address these issues (Leitner, Khalil, and Ebner, 2017; Gasevic, Dawson and Siemens, 2015; Greller and Drachsler, 2012; Fritz, 2011; Dietz-Uhler and Hurn, 2013).

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# Learning Analytics for Enhancing Teaching and Learning (II)

- Increases teachers' awareness of a number of educational practices and supports the development of various strategies that would help to enhance those learning/teaching processes (Siemens and Gasevic, 2012).
- Assists teachers in designing curriculum or selecting adequate teaching methods and techniques that would fulfil the learners' needs (Chatti, et al., 2012; Van Harmelen and Workman, 2012; Siemens, 2015).
- Eases the transition from more teacher-oriented to a more learner-centred approach (Chatti, et al., 2012; Van Harmelen and Workman, 2012; Siemens, 2015).
- Useful for implementing assessment strategies (e.g. assessment for learning) that would enhance learning.

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# Metacognition and Teaching (I)

- Metacognition is a phenomenon which includes active control over cognitive processes in learning in two different ways such as one's thinking and learning, and a critical awareness of oneself as thinker and learner (Flavell, 1979).
- Metacognition is a critical element of successful learning because it deals with the self-regulation and self-reflection of a learning process (Medina et al., 2017).

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# Metacognition and Teaching (II)

- Teachers are constantly re-thinking their pedagogical knowledge and pedagogical content knowledge; in such way improving their teaching expertise and choose most appropriate didactic approach and methods (Griffith, 2017).
- It is rather important for teachers to understand their beliefs, objectives, and knowledge about planning, assessing, and revising because this helps to develop skills and knowledge to make fruitful decisions regarding teaching (Griffith, Bauml, 2016).

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# Aim of the Research

To evaluate the usage of LA as a metacognitive tool to enhance students' learning success and to reveal teacher practices in using LA in the teaching process.

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# Research Questions

1. Which data from learning analytics tools and which teacher metacognitive strategies may help to improve teaching and learning?
2. Which teacher metacognitive strategies, based on LA data, may help to improve learning design?
3. How can teachers create learner metacognitive strategies to improve the learning process?
4. How can teachers create learner metacognitive strategies to improve learning design?
5. Which Moodle tools are most reflected in case studies and teacher interviews in terms of creating metacognitive strategies?

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# Methodology

**Research sample.** 12 online and blended study courses chosen for analysis following the criteria: the course has to be either blended or online, the teacher agrees to share the contents of the course for the research purposes, teacher uses LA in the course, metacognitive strategies have been applied and are evident in the virtual learning environment, and the teacher has at least 5 years of experience in blended teaching.

**Data collection.** Semi-structured interviews with teachers; observation and examination of 12 study courses in social sciences and humanities in Moodle.

A **case study** method has been applied.

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# Findings (I)

- **Metacognitive Activities.** Metacognition is used in order to increase awareness of the students and to facilitate or enhance learning and teaching processes.
- **Metacognitive Strategies:** They are used to establish a safe learning environment for students, to better understand what type of learners they are, and to learn about their learning needs and expectations.
- **Profile Information.** Teachers often check a learner's Moodle profile information and use log data in order to learn about how attentive a student is to learning the material.

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# Findings (II)

- **Learning Design.** Trying to improve learning design, teachers spend a lot of time planning, selecting material, types of assignments, and providing relevant information, including goals to be achieved, deadlines, assignments and criteria for assessment, and learning outcomes, in a very structured and clear way.
- **Monitoring Performance.** Teachers are actively using various internal Moodle tools such as discussion forums, logs, the activity completion tool, task assessment tools, progress bar, and calendar, as well as external tools, including Adobe Connect, Google docs, Padlet, and mapping tools in order to improve learning and teaching.

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# Findings (III)

- **Feedback.** Feedback serves a double purpose, e.g. feedback from both peer-students and the teacher helps learners in their learning process, while feedback from students to teacher can be used to improve learning design.

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# Conclusions (I)

- Metacognitive activities can be traced in all the courses analysed. Metacognitive strategies are applied when there is a need to establish a relationship between students and teachers, to find out more about students, and, overall, to create a friendly learning atmosphere.
- LA as metacognitive tool is often used to monitor students' progress and to evaluate how attentive they are to learning material.

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# Conclusions (II)

- LA has enabled the monitoring of students' performances through various tools. The usage of such tools supports teachers in identifying real time problems that students are facing, and improving learning design to enhance learning experience.
- The provision of feedback becomes rather significant because it may facilitate student learning as well as assisting teachers in improving learning design to suit learners' needs better.

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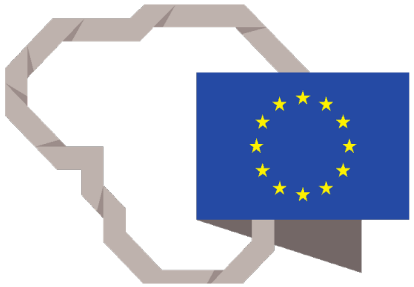

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