

VYTAUTAS MAGNUS UNIVERSITY

Rasa GREENSPON

**SUPPORTING TEACHERS IN DESIGNING LEARNING-ORIENTED
ASSESSMENT IN A TECHNOLOGY ENHANCED LEARNING
ENVIRONMENT**

Doctoral Dissertation

Social Sciences, Education Science (S 007)

Kaunas, 2023

Dissertation was prepared at Vytautas Magnus University in 2019–2023. The right of doctoral studies was granted to Vytautas Magnus University on 18 May, 2020, by the decision No. V-739 of the Government of the Republic of Lithuania.

Scientific Supervisor:

Prof. dr. **Airina Volungevičienė** (Vytautas Magnus University, Social Sciences, Education Science S 007).

Scientific Advisor:

Prof. dr. **Erno Lehtinen** (University of Turku, Social Sciences, Education S 007).

Council of defense of the doctoral dissertation:

Chairman:

Prof. habil. dr. **Vilma Žydžiūnaitė** (Vytautas Magnus University, Social Science, Education S 007).

Members:

Prof. dr. **Auksė Balčytienė** (Vytautas Magnus University, Social Sciences, Communication and Information S 008);

Prof. dr. **Nijolė Burkšaitienė** (Vilnius University, Social Sciences, Education S 007);

Assoc. prof. dr. **Viktorija Mažeikienė** (Mykolas Romeris University, Social Sciences, Education S 007);

Prof. dr. **Ana Balula** (University of Aveiro, Social Sciences, Education S 007).

The official defense of the dissertation will be held at 11 a.m. on 21st September 2023 at the Aula Magna of Vytautas Magnus University.

Address: Gimnazijos str. 7, Kaunas.

The dissertation is available at Martynas Mažvydas National Library of Lithuania and the libraries of Vytautas Magnus University.

VYTAUTO DIDŽIOJO UNIVERSITETAS

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**PAGALBA DĖSTYTOJAMS KURIANT Į MOKYMAŠI ORIENTUOTĄ
VERTINIMĄ TECHNOLOGIJOMIS GRINDŽIAMOJE MOKYMOSI
APLINKOJE**

Mokslo daktaro disertacija
Socialiniai mokslai, edukologija (S 007)

Kaunas, 2023

Mokslo daktaro disertacija rengta 2019–2023 m. Vytauto Didžiojo universitete pagal LR švietimo, mokslo ir sporto ministro 2020 m. gegužės 18 d. įsakymu Nr. V-739 suteiktą doktorantūros teisę Vytauto Didžiojo universitetui.

Mokslinis vadovas:

Prof. dr. **Airina Volungevičienė** (Vytauto Didžiojo universitetas, Socialiniai mokslai, Edukologija S 007).

Mokslinis konsultantas:

Prof. dr. **Erno Lehtinen** (Turku universitetas, Socialiniai mokslai, Edukologija S 007).

Disertacijos gynimo taryba:

Pirmininkė:

Prof. habil. dr. **Vilma Žydžiūnaitė** (Vytauto Didžiojo universitetas, Socialiniai mokslai, Edukologija S 007).

Nariai:

Prof. dr. **Auksė Balčytienė** (Vytauto Didžiojo universitetas, Socialiniai mokslai, Komunikacija ir informacija S 008);

Prof. dr. **Nijolė Burkšaitienė** (Vilniaus universitetas, Socialiniai mokslai, Edukologija S 007);

Doc. dr. **Viktorija Mažeikienė** (Mykolo Romerio universitetas, Socialiniai mokslai, Edukologija S 007);

Prof. dr. **Ana Balula** (Aveiro universitetas, Socialiniai mokslai, Edukologija S 007).

Disertacija bus ginama viešame Edukologijos krypties tarybos posėdyje 2023 m. rugsėjo 21 d. 11.00 val. Vytauto Didžiojo universiteto Didžiojoje auloje.

Adresas: Gimnazijos g. 7, Kaunas.

Disertaciją galima peržiūrėti Lietuvos nacionalinėje Martyno Mažvydo bibliotekoje bei Vytauto Didžiojo universiteto bibliotekose.

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VOCABULARY OF ACTUAL NOTIONS

Assessment in a Technology-Enhanced Learning (TEL) Environment. The usage of learning technologies or various digital tools to enable assessment procedures, including designing, and implementation of assessment strategy and its separate components, i.e., assessment and learning tasks, grading students' submissions (i.e., fully automated machine-grading or grading, performed by teachers, using various tools in a TEL environment), gathering and analyzing the information on student progress and achievements to make informed changes in pedagogy (Osuji, 2012).

Assessment Method. The term refers to a specific element, procedure, tool, or technique, that is used to check students (Almond 2009; Daniel, 2021).

Assessment Strategy. Assessment strategy usually is depicted as a plan how to manage assessment throughout the course to achieve certain goals (Daniel, 2021; Kumari, 2022).

Assessment as Learning (AaL). The concept is explained as follows: "assessment is not merely an adjunct to teaching and learning but offers a process through which pupil involvement in assessment can feature as part of learning – that is assessment as learning" (Dann, 2002, p. 153). AaL is strongly related to formative assessment.

Assessment for Learning (AfL). It is defined as a "part of everyday practice by students, teachers and peers that seeks, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning" (Klenowski, 2009, p. 264). AfL is associated with formative assessment.

Assessment of Learning (AoL). The concept is used to describe assessment which primary goal is to certificate learners' achievements (Bennett, 2011). AoL relies on the ideas of summative assessment.

Assessment Tool. A technological component or a piece of software that is embedded in a particular TEL environment (or it can be external element, but it can be incorporated within or used outside a TEL environment) and is used to perform or support learning as well as assessment tasks (Atkinson, 2013).

Digital Badges (DB). The term is used to refer to certain type of micro-credentials which are used to indicate and identify achievements attained via both formal and/or non-formal education or monitor knowledge, skills and competences which could possibly be concealed through academic processes (Dyjur & Lindstrom, 2017).

Expert. The notion of expert is used to refer to researchers who are well-informed and skilled in the analyzed field. In this context, a researcher is considered to be an expert if they have met the following criteria: the researcher has been researching in the fields of assessment and TEL for at least 10 years, they have at least 20 publications in indexed databases on the topics of interest, including assessment, LOA, and TEL.

Feedback. Feedback is understood as information on student's work which is supposed to be for the purpose of learning improvement. Feedback exchanges happen between peers or teacher and students (Carless, 2015).

Formative Assessment. Formative assessment is an assessment strategy which is implemented throughout the entire study period and is used to provide guidelines for modification of teaching, and in the meantime, give insight to the teacher what learners are capable of (Bennett, 2011). Formative assessment strongly relies on feedback provisions (Bennett, 2011).

Learning-Oriented Assessment (LOA). The concept refers to assessment which aims to circumnavigate competing functions of assessment by placing primary emphasis on the learning potential of assessment. The rationale lies in both rehabilitating the learning potential of well-designed summative assessment as well as in building formative potential from assessment sequences (Carless, 2015).

Peer learning. Peer learning is a shared learning activity, where learners do not engage in any power relationships, as both learners are equal when it comes to their status or accountabilities (Keppell et al., 2006).

Progress monitoring. A process when teacher is tracking individual student's learning and engagement in learning process. This is often done using various a TEL environment tools for progress measuring.

Self-regulated learning. The concept is used to refer to an on-going process where learners are responsible and actively engage in their own learning process by setting their learning goals, enlisting the necessary materials and resources for learning, selecting, and applying adequate learning methods and strategies, and foreseeing and assessing their learning outcomes (Knowles, 1975).

Student. In the context of this dissertation, student is defined as an active participant and a collaborator in teaching/learning, and assessment process. A student is positioned in the center of

teaching/learning and assessment and their main role is to actively engage into learning and assessment by monitoring their own learning, engaging with assessment criteria and participating in various self-regulated and peer learning activities.

Summative Assessment. Summative assessment is defined as “any assessment activity which results in a mark or grade which is subsequently used as judgement on a student performance. Ultimately judgements’ using summative assessment marks will be used to determine the classification of award at the end of a course or programme” (Iron, 2008, p. 7).

Teacher. In the context of this dissertation, teacher is seen as a facilitator and/or a mentor rather than an active participant in teaching/learning and assessment. Teacher designs learning design with embedded assessment strategy, then develops it within a TEL environment, using its adequate technological tools and other compatible solutions, and oversees student learning and assessment.

Technology Enhanced Learning (TEL). The concept is used to refer to different digital learning forms, including e-learning, distance learning, mobile learning, Web 2.0 tools, and online and blended learning to make teaching/learning and assessment dynamic and to increase accessibility of education (Teresevičienė et al., 2015).

INTRODUCTION

Within a technology enhanced learning (TEL) environment, teaching/learning and assessment practices often require different approaches, as the application of face-to-face pedagogical practices does not work, because a TEL environment allows for new interactions and feedback options. In fact, the recent pandemic situation, when all teaching/learning and assessment procedures have had to be moved online, has once again pointed out the critical necessity to examine and rethink the approach to teaching/learning and assessment before moving to blended or online learning contexts. For instance, during the 2020 examinations, assessment faced a serious challenge as previous formats would not work, even for higher education institutions (HEIs) that already had experience with teaching/learning and assessment in a TEL environment, as no assessments could be held in person. Teachers had to improvise, combining assessment methods to achieve satisfactory results (Cirlan & Loukkola, 2021). However, it should be noted that other assessment strategies, such as LOA, in a TEL environment allows for frequent assessment interventions throughout the study period, which enables teachers to monitor students' learning, thus the importance of summative assessment at the end of the study period becomes less relevant. Nonetheless, research suggests teachers are often unacquainted with innovative and constantly emerging tools (Boud, 2000; Dikli, 2003), or they simply lack digital assessment competences. While trying to minimize risks related to poor performance in assessment, some HEIs have permitted their students to delay their examination sessions or offered flexible conditions for re-takes (Cirlan & Loukkola, 2021). However, this solution cannot address the issues related to teaching/learning and assessment in a TEL environment and should only be used as a stopgap measure, not as a permanent solution.

Some researchers claim there is one precondition for LOA to be designed in an efficient way so that students can benefit from it the most; LOA should be developed and implemented in innovative learning environments (Zeng et al., 2018). Besides, assessment should be well-matched with a TEL environment (Istance & Kools, 2013). Nonetheless, assessment is often copied and transferred from a traditional learning context to a TEL environment without making any adjustments. This may be problematic and begging a question whether face-to-face assessment strategies and methods can still be valid and efficient in a TEL environment (Zeng et al., 2018). Researchers Zeng et al. (2018) have stated assessment in a TEL environment can only be efficient, and facilitate and enhance learning, if it is aligned with the objectives of TEL and designed considering the parameters of a TEL environment. In fact, acquiring new media knowledge must contain an adjustment in the way conditions for assessment have been set to adapt to the rigors of the technology (Laurillard, 2002).

Nonetheless, LOA in a TEL environment has not been thoroughly analyzed, only multiple attempts have been made to investigate assessment strategies and methods for the purposes of enhancing the student learning experience, improving the overall process of learning, improving learning achievements, increasing student engagement and collaboration, and raising levels of motivation (Carless, 2002; Keppell & Carless, 2006; Cheng & Warren, 1997; Sivan, 2000; Zeng et al., 2018; Klute et al., 2017; Bayat et al., 2017; Blasco-Arcas et al., 2013; Zeng et al., 2018; Carless, Joughin & Liu, 2006; Carless, 2002, 2015; Klenowski, 2006; McLaren, 2012; Mok, 2010; 2013; Volante, 2010; William, 2011; Taras, 2005; Winter, 2003; Webb & Jones, 2009; Boud, 1995; 2000; Boud & Falchikov, 2006; Carless, 2006; 2007; 2013; 2015; Carless & Boud, 2018; Carless, Joughin & Mok, 2006; Bayat et al., 2017, Falchikov, 1995; 2005; Hattie & Timperly, 2007; Hattie & Jaeger, 1998; Hounsell, 2003; Hounsell et al., 2007; 2008), however, all these studies have been bound by a physical classroom setting. Only a few empirical studies have been carried out on how to use learning technologies to facilitate and enhance teaching/learning and assessment and feedback provision (Lunt & Curran, 2010). Besides, the scholarly literature lacks good practice examples on how to efficiently implement LOA in a TEL environment. As a result, there is a gap in research which could reveal the potential of a TEL environment to support teachers in the development of LOA to facilitate and enhance learning. Thus, the author asserts that in the context of this dissertation, the potential of a TEL environment is considered to be a possibility of the technological element to support design and implementation phases of LOA.

Consequently, the **aim** of the research is to identify the potential of a technology enhanced learning environment to support teachers in designing learning-oriented assessment.

The **object** of the research is learning-oriented assessment in a technology-enhanced learning environment.

The following **research questions** are being formulated:

1. How is learning-oriented assessment understood in relation to assessment theories?
2. How can technology support teachers in developing learning-oriented assessment in a technology enhanced learning environment for facilitating and enhancing student's learning?

Constructivism Paradigm. This dissertation strongly relies on the constructivism (Vygotsky, 1962; 1978) ideas. One of the main ideas, embedded in constructivism paradigm is knowledge is constructed by the learner and learning is influenced by social interactions (Vygotsky, 1962; 1978). Vygotskian constructivism sees learning as a social process, thus,

learning with peers becomes rather important (Cohen, Manion & Morrison, 2018; Lund & Tannehill, 2010). In fact, the entire learning process is influenced by a series of interactions (Lund & Tannehill, 2010; Sultan, Woods & Koo, 2011). According to the constructivism paradigm (Vygotsky, 1962; 1978), learning is a socio-constructivist process. Therefore, a TEL environment works proactively to stimulate individual action, i.e., learner agency to drive knowledge acquisition, and learning overall, towards thinking, feeling, and acting.

According to Vygotskian constructivism paradigm (1978), students are pro-active participants in teaching/learning, and assessment, rather than passive bystanders. By its nature, constructivism promotes the idea that students are responsible for their own knowledge building (Vygotsky, 1962; 1978). To put that in other words, constructivism relies on the idea that the process of knowledge construction is rooted in the learner; learner is depicted in the center of process of knowledge building, while their primary responsibility is their own learning process (Vygotsky, 1962; 1978; Lund & Tannehill, 2010, Sosibo, 2019). In fact, the process of knowledge acquisition is perceived as an accumulative process, wherein recently acquired knowledge and skills are integrated within currently existing mental structures (Mcleod, 2022).

In fact, there is evidence in scholarly literature that active participation and involvement in assessment procedures, facilitate learning and offer deep learning experience (Boud, 2003; Sharma et al., 2016; Gehringer, 2017; Ryan & Henderson, 2018). Taking part in self-assessment is a required precondition for fostering development of vital skills and competences in students for learning (Beaumont, O'Doherty & Shannon, 2011; Sosibo, 2019). When taking an active role in assessment, students are obliged to critically evaluate their work and their learning to know the direction how to proceed forward, which is the key in constructivism.

In constructivism, the learner oversees their own acquisition of knowledge, whereas the teacher is seen as a facilitator or, even, a mentor. As a result, teachers have to adapt a more learner-centered approach instead of the teacher-centered teaching style. The transition from a teacher- and content-centered approach becomes inevitable as learners start being pro-active and taking control over their own learning (Gamoran, Secada & Marrett, 1998). In fact, the constructivism claims that teachers have to step aside and embrace new role in the teaching/learning and assessment (Vygotsky, 1962; 1978; Bauersfeld, 1995; Lund & Tannehill, 2010), which is becoming a facilitator or a mentor who guides learners through their knowledge acquisition process. The main function of a learning facilitator is to allow learners to explore and build their own understanding of a phenomenon, rather than straightforwardly explaining the phenomenon, (Vygotsky, 1962; 1978; Bauersfeld, 1995; Braunstein, 2001; Lund & Tannehill, 2010). In the meantime, the learning environment should facilitate learner's development and challenge them to learn (Cohen, Manion & Morrison, 2018).

In the constructivism approach to qualitative research, wherein the point of the research is the comprehension of an occurrence and the way it is witnessed and understood by those who are participating (e.g., Vygotskyian constructivism) within a viewpoint understood to contain various aspects of legitimacy, the researcher has to work within that viewpoint as it is understood by those involved (i.e., bottom-up) (Creswell & Plano Clark 2011, p. 40).

Since in this dissertation, the phenomenon of interest is LOA, which is based on idea that teaching/learning is continuous process and is relying on a student-centered approach, the importance of student agency is undeniable. Students are in the center of knowledge construction process. However, students also are considered as recipients in the process of teaching/learning and assessment. In meantime, teachers are primary providers of teaching/learning and assessment. Therefore, considering the aim and the research questions, the dissertation only focuses on teacher agency because teachers are primary designers and developers of LOA in a TEL environment.

Epistemology. Taking into consideration the findings of both parts of empirical research, *Technology Acceptance Model* (TAM, henceforth) (Davis, 1989) has been selected as a conceptual framework. The framework itself focuses on question how users accept the technology (Davis, 1989). The entire model advocates the importance of user's perceptions towards usage of technologies (Davis, 1989). According to TAM, every time when users are introduced to new technology, there are a couple of different factors that may determine users' decision whether to start using as well as when and how to use new piece of technology (Davis, 1989). Davis (1989) explains these two factors that determine how users may react to new technology are *perceived usefulness* and *perceived ease-of-use*. By the perceived usefulness, the degree, to which users think technology can facilitate and boost their performance, is explained, whereas the perceived ease-of-use implies the level to which users think technology is effortless (Davis, 1989). To illustrate, even if the developers or engineers of the new technological advancement assume or have gathered enough evidence that the innovation is user-friendly and worthwhile for the potential users, the success of the technological advancement or innovation entering the market and reaching out the consumers is not guaranteed as it strongly depends on users' perceptions. If they do not think that the innovation or technology is worthwhile or do not believe that it is user-friendly, the acceptance of that innovation or technology is condemned.

In the context of this dissertation, it is believed that teachers are more likely to accept and use a TEL environment for teaching/learning and assessment if they hold certain attitudes towards the use of technology for teaching/learning and assessment and believe that it is worthwhile. Teachers play a key role in decision making process on how to design and to develop LOA, selects adequate technological solutions to support the desired pedagogical interventions. A teacher's responsibilities cover designing, developing and implementing assessment strategy within a TEL

environment as well as exploring learning technologies and their functionality to support development of the assessment strategy. As a result, a teacher is considered to be a primary user and their opinions and perceptions about the use of the technology can have significant input how the assessment strategy will be implemented and to what extent the advantage offered by the technology will be taken.

Methodology and Methods. Due to the intricacy of the aim and the research questions, the dissertation employs qualitative approach to the research as this allowed comprehensively addressing the analyzed phenomenon and to deliver insightful yet valid and reliable findings. The dissertation is divided in several parts, including the following: the first part where theoretical analysis of scholarly works has been conducted, then second part – the empirical part of the research has been applied, which has been conducted in several stages.

In the first stage of empirical research, qualitative research has been conducted by performing semi-structured interviews with experts in the areas assessment and technology enhanced learning. The criterion sampling method has been applied to determine the potential research participants, i.e., the experts. This stage of the empirical research has stepped out the boundaries of the country as the input from internationally recognized experts was considered to enrich the research by offering valuable insights. The collected data through semi-structured interviews with experts have been transcribed and analyzed using an inductive content analysis method.

In the second stage of empirical research, a case study has been implemented by conducting 1) qualitative research through semi-structured interviews with higher education (HE) teachers, who designed and are teaching courses, followed by 2) the analysis of a database (a TEL learning environment, to be more specific, Moodle, which contains blended and fully online courses at the selected HE institution). Again, the purposeful sampling, i.e., criterion sampling method has been applied to determine the research participants within the selected HEI. Once the research participants have been identified, data has been collected through semi-structured interviews, which later were transcribed in a word-by-word manner and analyzed by applying inductive content analysis method, which allowed identification of relevant categories and subcategories.

For the analysis of a database, i.e., Moodle learning environment within selected HEI, the courses have been selected by using criterion sampling. The selected courses on Moodle have been analyzed by using a template which was specifically design for this research and is based on the findings of theoretical research and first stage of empirical research, i.e., qualitative research through semi-structured interviews with experts. The template is provided in Appendix. The

collected data has been analyzed and summarized by highlighting the main tendencies on how LOA is practically implemented within a TEL environment.

Data collection and analysis methods, listed in an alphabetical order: *case study*, *comparative analysis*, *concept analysis*, *database*, *document analysis*, *inductive content analysis*, *literary analysis*, *semi-structured interviews*.

Structure of the Dissertation. This dissertation consists of one theoretical chapter (see Chapter 1) which consists of two sections, a chapter on research methodology (see Chapter 2), a chapter which presents the findings (see Chapter 3), a discussion, and conclusions. The first theoretical chapter is devoted to analyzing the phenomenon of LOA in relation to assessment theories (see Section 1.1. and the related subsections) as well as looking at how a TEL environment supports teachers in LOA implementation (see Section 1.2. and the related subsections). In Chapter 2, research methodology is discussed by presenting the first empirical study with experts in Section 2.1. and a case study, conducted at a selected HEI in Section 2.2. This Chapter 2 also encompasses information on data validity, reliability, challenges and limitations, and research ethics. Then in Chapter 3, findings are presented. This chapter is divided in three sections, each presenting the findings of the different stage in the research: Section 3.1. presents findings from the research with experts, Section 3.2. discusses findings from research with HE teachers, while Section 3.3., summarizes the findings from database analysis. This is followed by a discussion and conclusions, interpreting, and summarizing the findings. Finally, in Appendices, templates and other documents related to research are provided.

1. LEARNING-ORIENTED ASSESSMENT IN RELATION TO ASSESSMENT THEORIES

1.1. Understanding Learning-Oriented Assessment

Over a period, many different assessment strategies have evolved, which have played a significant role in the development of learning-oriented assessment. Researchers have introduced the terms of *formative* and *summative* assessment, now considered traditional assessment strategies (Scriven, 1967; Bloom 1969), on which fundamental ideas LOA is built. Later, the notions of *assessment of*, *assessment for*, and *assessment as learning*, which characteristics are borrowed by LOA, were broadly discussed in scholarly literature (Black & William, 1998; Sadler, 1989; Earl, 2003; LeMahieu & Reilly, 2004; McMillan, 2017). In addition, as learning is becoming more and more learner-centered, self-assessment and peer assessment, which are considered to inseparable parts of LOA strategy, become a center of discussion (Black, 2003; Reinholz, 2016; Strijbos & Sluijsmans, 2010).

Due to the aim and scope of this dissertation, assessment strategies, including formative, summative assessments, and the related phenomena, such as *assessment of learning* (AoL), *assessment for learning* (AfL), and *assessment as learning* (AaL), self-assessment and peer assessment are going to be discussed in a more sophisticated manner, as they have played a key role in development of learning-oriented assessment.

1.1.1. Formative and Summative Assessment in relation to Learning-Oriented Assessment

Assessment has become an inseparable part of learning and teaching. Assessment is categorized by its purpose, i.e., to provide certification and increase the liability of educational institutions and to facilitate learning process, thus, it is referred to as summative and formative assessment, respectively (Black, 1993; Boud & Falchikov, 2006; Boud, 2000; Sadler, 1989; Bennett, 2011; Shute & Kim, 2014; Nicol & Macfarlane-Dick, 2006). Assessment should be managed at the course level as it may help to find equilibrium among formative and summative assessment strategies, assist in choosing or designing complex assignments that would allow deeper and sophisticated learning experience for learners, and enable feedback provision (Hounsell et al., 2008).

However, the attitude towards summative and formative assessment methods has changed. The transition to a learner-centered approach in teaching and learning has played a major role in rethinking the value and benefits of assessment strategies (Bennett, 2011; Kim & Bonk, 2006). In

fact, the popularity of formative assessment has increased significantly (Bennett, 2011; Black, 1998; Birenbaum et al., 2015), which created preconditions for LOA to take precedence. In the meantime, summative assessment is more often being negative and even detrimental to both learners and their learning (Boud & Falchikov, 2006; Ecclestone, 1999; Knight, 2002; Knight & Yorke, 2003). Since, LOA largely depends on the fundamental ideas of the afore-mentioned assessment strategies, it is important to take a look at both summative and formative assessment strategies in relation to LOA.

Summative Assessment. Summative assessment, often referred to as assessment of learning (AoL) is defined as “any assessment activity which results in a mark or grade which is subsequently used as judgement on a student performance. Ultimately judgements’ using summative assessment marks will be used to determine the classification of award at the end of a course or programme” (Iron, 2008, p. 7). A rather strict separation of summative and formative assessment is promoted due to their very different natures and purposes (Black, 2003). While both formative assessment and LOA aim at facilitating the learning process, summative assessment appears to be a completely opposite phenomenon. The main goals of summative assessment are to provide certification to rank learners in accordance with their learning outcomes and to guarantee that standards are met (Sadler, 1989). Consequently, learning outcomes and grades become of a crucial importance, while any graded activity is considered to be a part of summative assessment.

While summative tests are believed to have a negative effect on students’ learning and psychological state, such belief is supported by negative teachers’ and students’ experiences, it is highly suggested to re-evaluate the impact of these tests (Black, 2003), as there is evidence showing that active involvement of students in the testing process can be beneficial because it helps to enhance their learning experience by eliminating the misconception of “students as victims of testing” (Black, 2003). Besides, it is unfeasible to apply this differentiation in real-life settings due to a variety of institutional, pedagogical, and individual requirements; thus, teachers tend to combine both formative and summative assessment strategies, which is the core of LOA.

Regardless its primary purpose, i.e., to certificate learner’s achievements (Bennet, 2011), summative assessment may contribute to the learning process and can be used to support LOA (Bennett, 2011; Shepard, 2006; Rohrer & Pashler, 2010). To illustrate, a preparation for a well-designed summative test may enhance learning experience, while the actual testing has been shown to not only retard the rate of information loss, but can, in fact, strengthen the retention of the information recalled (Shepard, 2006; Rohrer & Pashler, 2010). Therefore, sometimes to refer to summative assessment as assessment of learning achievements may be inadequate because if

summative assessment is carried out thoughtfully and its subordinate goal, i.e., to support learning, is reached, summative assessment may significantly contribute to and facilitate teaching/learning.

Formative Assessment. On the contrary, formative assessment aims at supporting and facilitating teaching and learning and is defined as “a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students’ achievement of intended instructional outcomes” (McManus, 2008, p. 3). Thus, formative assessment is an ongoing process, which is directly in line with constructivism paradigm, where the focus is laid on provision of feedback, through which necessary adjustments to pedagogical approach can be done to enhance students’ learning and is completely opposite to summative assessment, designed primarily to serve the purposes of accountability, or of ranking, or of certifying competence. Indeed, formative assessment should provide guidelines for modification of teaching/learning, and in the meantime, give insight to the teacher what learners are capable of (Bennett, 2011), which directly corresponds to the central ideas of LOA. On the other hand, formative assessment in a TEL environment is criticized as it is time-consuming and dependent on individual effort to be implemented. Finally, since most modifications in pedagogical approach are made based mainly on feedback, adjustment and selection of appropriate teaching and assessment methods may be subjective.

Like LOA, formative assessment has the potential to play a significant role in facilitating and enhancing a learner’s learning (Bennett, 2011; Black, 1993; Black & William, 1998; Brown, 2004; Kazlauskienė & Gaučaitė, 2018; Kingston & Nash, 2011; Panadero & Jonsson, 2013; Shute & Kim, 2014), as formative assessment can be applied repeatedly throughout the semester and enabling continuous feedback provision for further improvements. Besides, the application of formative assessment strategy can describe the main features of the learners (Strijbos and Sluijsmans, 2010), allowing teachers to develop a better understanding of an individual learner’s proficiencies and struggles, which later can be used to adjust pedagogical approaches for facilitation of learning (Mok, 2010).

Additionally, similar to LOA, formative assessment may foster development of self-regulated learning and development of self-assessment skills (Bennett, 2011; Kingston & Nash, 2011; Panadero & Jonsson, 2013; Hattie & Timperley, 2007; Black, 2003), as learners are obliged to continuously monitor their learning and actively participate in feedback provision. Moreover, participation in feedback exchanges between students have a significant effect on teaching/learning (Shepard, 2008). Such exchanges between peers, i.e., peer-assessment, becomes important for developing self-assessment skills (Sadler, 1989; Black, 2003). Peer-assessment adds value when a teacher’s criticisms of a student’s work may be disregarded or considered as inadequate or irrelevant (Black, 2003; Shepard, 2008). Peer-assessment empowers students to

take responsibility of teaching/learning and assessment, correct each other's mistakes, actively engage, and reflect on their own as well as their fellow student's learning (Black, 2003), thus, making students to engage into a variety of metacognitive processes. As a result, students are more likely to set standards and take responsibility for their own learning if they share their hopes, raise questions, receive feedback, and actively engage in teaching/learning and assessment.

Learning-Oriented Assessment. From a historical point of view, the development of LOA is related to the shift from test-oriented to learning-oriented approach which has become dominant in contemporary educational systems (Zeng et al., 2018). The concept LOA is described as a holistic strategy of assessment, derived from already existing assessment strategies such as summative and formative, encompassing features of assessment *of*, *for*, and *as* learning and creating a balance among their similarities and differences (Carless, 2006, 2007, 2015; Keppell et al., 2006; Zeng et al., 2018). The relationship between assessment of, assessment for, and assessment as learning is very important because it may determine the purpose of assessment (Earl, 2003). According to Earl (2003), a configuration of different approaches to assessment has to be as follows: first, assessment as learning (AaL) as the most important, then assessment for learning (AfL), and finally, assessment of learning (AoL), in order to enhance learning and support students, i.e., to serve formative assessment purposes. Otherwise, the entire assessment serves summative purposes, especially when AoL becomes prevailing feature.

Since LOA is rooted in the fundamental ideas of formative and summative assessment, it aims at enhancing and facilitating learning, supporting development of metacognitive, social, and emotional skills, in meantime allowing to certify student's achievements (Carless, 2006; Zeng et al., 2018). Mostly, LOA focuses on features of formative assessment, and it concentrates on the application of assessment methods which would facilitate and/or improve learning, it does not intend to perform tasks of summative assessment, i.e., to provide accreditation and certification,. However, sometimes summative assessment can serve as LOA, as it may force learners to re-evaluate their learning, encourage certain behavior, and stimulate learners' involvement at cognitive and metacognitive levels (Carless, 2015). Thus, formative, and summative assessment strategies can both be learning-oriented if their main goal is to facilitate and improve learning (see Figure 1).

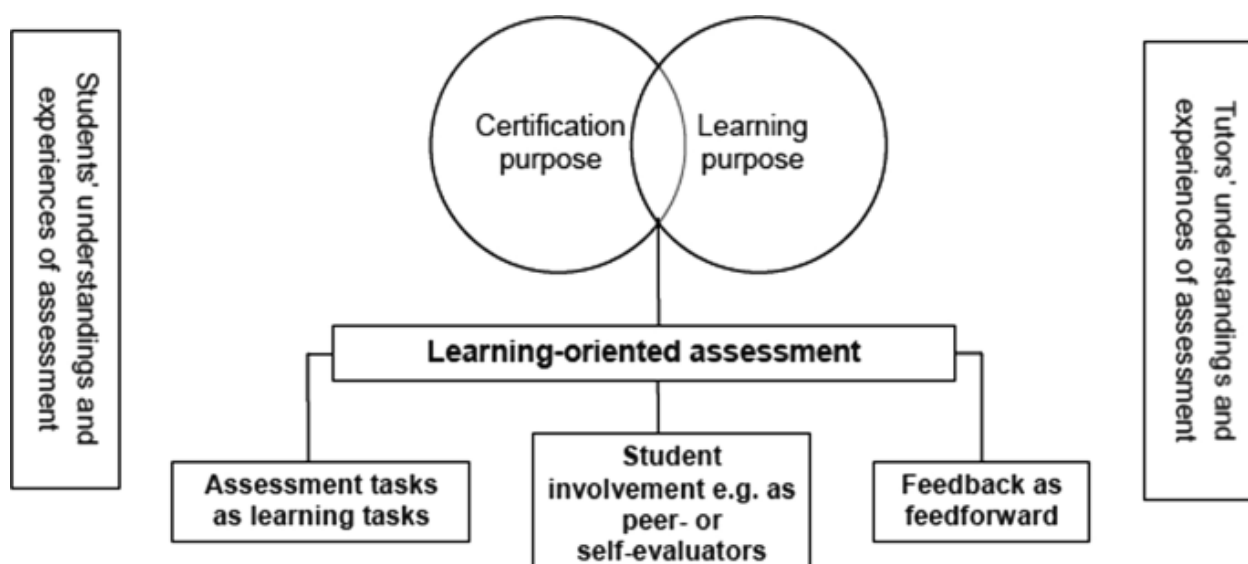


Figure 1. A Framework of LOA (Carless, 2007, p. 60)

As demonstrated in Figure 1, LOA supports the learning process by applying either formative or summative assessment strategy; however, the assessment methods have to be chosen carefully and the main emphasis should be laid on the learning process than assessment of student's knowledge at the end of learning period. In fact, formative and summative assessment strategies have to be in harmony in order to support learning. Thus, two assessment purposes are shown to overlap. For educators, it is crucial to be able to realize this balance and the reasons behind it to be able to apply them in proper situation which would then help to enhance students' learning (Zeng et al., 2018).

As shown above, LOA consists of the following elements, including assessment tasks, student engagement, and feedback (Carless, Joughin & Liu, 2006; Carless, 2007; 2013a, 2013b; Keppell & Carless, 2006; Zeng et al., 2018); however, they are understood in a slightly different manner. For instance, assessment tasks are described as learning tasks, i.e., a certain type of tasks, often real-life tasks, where the anticipated educational results are found within the assessment tasks, the learners are prepared for extensive work by moving forward with those results in mind (Biggs 1999; Carless, 2013a, 2013b). Learning tasks are supposed to keep learners focused through the learning period, contrary to assessment tasks, used at the end of learning period to check learner's knowledge (Carless, 2013a, 2013b). Therefore, learning tasks carry formative aspect of assessment, whereas assessment tasks are more related to summative assessment and refer to high-stake examinations.

Similar to formative assessment, LOA seeks to increase learner's engagement and participation in the teaching/learning and assessment. Students have to get acquainted with learning objectives and outcomes as well as they have to know assessment criteria in order to be

active participants in teaching/learning and assessment (Carless, 2013a; 2013b). Indeed, students perform better, and their learning is much more focused and goal-oriented if they know what for and how they are going to be assessed. Thus, student engagement in assessment is necessary to ensure productive learning because students create a better comprehension of learning objectives, to monitor their own performance as well as to learn more about criteria for their assessment (Carless, 2007; Zeng et al., 2018). Such engagement in teaching/learning and assessment can often be observed through such activities: peer assessment, peer feedback, creating self-assessment skills and competences, discussing assessment criteria, and interacting with various examples of good practice (Falchikov, 2005; Liu & Carless, 2006; Orsmond et al., 2013; Sadler, 1989; 2002). Besides, by participating in teaching/learning and assessment, students are more likely to develop certain skills and competences, including metacognitive skills, building their capabilities to perform self-assessment, critical thinking skills, analytical skills if they are familiar with quality criteria, learning objectives, and standards for assessment (Carless, 2015; Zeng et al., 2018; Sadler, 1989; Sadler, 2010).

Moreover, similar to formative assessment, LOA stresses the importance of feedback to student learning. Carless (2006; 2007; 2015) claims that learners should get adequate feedback, which could be used to improve their current assignments as well as the ones in the future, and in such way their learning would be improved. However, Gibbs and Simpson (2004) argue whether feedback itself is a powerful enough tool to enhance learning. Feedback can only improve learning when students themselves actively engage with it and act accordingly (Gibbs & Simpson, 2004). Besides, feedback has to be adequate, appropriate, and associated with students work; there can be no room for false interpretations or judgements or criticism that can be received as personal offence (Boud, 1995; Carless, 2002; Gibbs & Simpson, 2004). Moreover, feedback can be useful despite the fact whether it is received from the teacher or a peer. A study by Falchikov (2001) has indicated the importance of peer feedback. Nonetheless, feedback can have some negative aspects as well. Since under the framework of LOA, the nature of feedback is described as feed-forward, when it comes to comments, received in a form of feedback, the learner is required to provide closure to any notices which arrived through these feed-forward comments (Carless, 2007). It is not known if learners perceive these conditions as too strenuous, which can lead to a deterioration of their enthusiasm for learning (Gonzalez Perez & Trevino, 2019). In short, the preconditions for feedback to be efficient in enhancing teaching/learning and assessment are its specificity as well as the learner's involvement.

Finally, LOA is considered versatile as it can be implemented within any educational context, e.g., formal, non-formal, internal, and external (Keppell et al., 2006). However, some researchers argue that LOA can be constructed efficiently without an innovative learning

environment. Implementation of LOA in innovative learning environments, e.g., technologically enhanced learning environments, which are flexible and open to alternative methods to teaching/learning and assessment, e.g., self-directed learning, etc., enables learners to be fully in charge of their own learning process, e.g., learners are supposed to actively engage in decision making process regarding learning objectives, materials, approaches, and assessment methods (Zeng et al., 2018). Additionally, such learning environments can be very beneficial in endorsing more inductive approach to teaching/learning and assessment, meaning that learners have engage with criteria and standards for assessment, and have an in-depth understanding of learning objectives, and outcomes (Bandiera & Bruno, 2006; Li, Dong & Huang, 2009; Blasco-Arcas, 2013; Shen & Huang, 2004; Zeng et al., 2018). As a result, it is highly suggested to design and implement LOA within highly innovative, primarily technology enhanced environments, because that may help to increase students' involvement into self-directed learning. Finally, learning technologies can open numerous opportunities for developing and implementing LOA through monitoring of learning progress, ensuring adequate feedback provision, and spotting learning challenges that students are dealing with (Zeng et al., 2018). As a result, the importance of innovative learning environments becomes vital for efficient design and implementation of LOA.

1.1.2. Towards Learning-Oriented Assessment through Assessment *for* Learning, Assessment *of* Learning, and Assessment *as* Learning

In its very nature formative assessment is promoting learning; however, even though, summative assessment seems to be a completely opposite phenomenon, and it serves different purpose, e.g., to rank students and certify their achievements, summative assessment can also promote learning. If summative assessment is developed in such way that it combines both elements, e.g., learning and assessing, then it can in fact support and promote learning (Stiggins, 2005; Volante, 2010). In fact, some studies suggest that there is a distinct connection in terms of purpose between formative assessment, and assessment for learning (AfL), and assessment as learning (AaL), and summative assessment and assessment of learning (AoL) (Stiggins, 2005; Volante, 2010). In short, assessment for learning and assessment as learning rely on fundamental ideas of formative assessment, whereas assessment of learning is based on the principles of summative assessment. In this section, the intricacies of AfL, AaL, AoL will be analyzed by pointing out their relation to the LOA.

Many researchers agree that LOA like formative assessment is an ongoing, complicated process that aims at supporting learning (Boud & Falchikov, 2006; Boud, 2000). Consequently, taking into consideration the purpose of assessment and the aspect of continuity, another term

assessment for learning (AfL) has been proposed to refer to formative assessment (Boud & Falchikov, 2006; Nicol & Macfarlane-Dick, 2006; Strijbos & Sluijsmans, 2010). However, assessment for learning is a learning process which encompasses the following aspects, including metacognition, constructivist thinking, and collaboration (Swaffield, 2011). Therefore, it may be misleading to think that formative assessment is the same as assessment for learning.

The concept of assessment for learning (AfL) is defined as a “part of everyday practice by students, teachers and peers that seeks, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning” (Klenowski, 2009, p. 264). Here, the aspect of integrity of teaching and assessment when it comes to supporting learning is stressed and the focus is laid on the application of various methods, used for improvement of teaching/learning. Besides, Klenowski (2009) emphasizes the significance of continuous observations, reflections, and monitoring. In the meantime, Black and William (2009) support such understanding by adding that: “evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited” (p.10). Accordingly, AfL, as a process, focuses on gathering information on learners and teachers and teaching/learning to improve learning and adjust pedagogical approach. Thus, teaching/learning and assessment become highly interrelated.

There are five main methods used in AfL to support learners and facilitate and promote learning (see Table 1). These methods are frequently used while implementing LOA strategy as well.

Table 1. *Methods for Assessment for Learning to promote Learning*

Method	Explanation	Guiding Questions
Questioning	Gathering information on the current state of a learning process	How far along in the process is the learner currently?
Sharing Learning Expectations	Learning about learners’ hopes and expectations	What are the goals the learner hopes to achieve?
Feedback	Reviewing the work done by identifying strengths and weaknesses	What processes the learner must follow in order to achieve their goal?
Self-Assessment	Empowering learners to take responsibility for their own learning	Where does the learner feel they can improve?
Peer-Assessment	Empowering active engagement and collaboration	How can the learner help other learners?

Source: compiled by the author based on William & Thompson, 2008

As shown in table above, the focus here is laid on the learner and their learning. It is suggested that, at first, it is necessary to evaluate the current situation by positioning the learner within the

learning process and exchange learning prospects. Moreover, provision of feedback becomes of crucial importance for improving learning. Finally, metacognitive abilities are needed for learners to analyze their own learning. Thus, AfL is closely related to the teaching/learning. Since LOA encompasses the ideas of AfL, LOA becomes inseparable part of teaching/learning.

Considering all of the above, AfL is considered as a huge step towards LOA, however, in AfL, learners are not depicted as independent constructors of their learning. In meantime, assessment as learning, which is understood as “not merely an adjunct to teaching and learning but offers a process through which pupil involvement in assessment can feature as part of learning” (Dann, 2002, p. 153), covers this gap by claiming that, both processes, e.g., assessment and learning, are dependent on learner’s self-regulation, self-efficiency, and metacognitive activities, as a result, suggesting that students have to be highly involved in teaching/learning and assessment.

The level of engagement in self-regulated learning can be characterized by learner’s cognitive, social, and behavioral skills, and competences (Pintrich, 2000). Preconditions for self-regulated learning include the following: active construction of own learning, control over own learning and assessment, when learners take full responsibility of their own learning, setting of goals and criteria for learning and assessment (e.g., decision making regarding learning and its elements), and establishment of links between individual learner and the contexts where the learning takes place as well as links between learner’s actual accomplishments and performance (Pintrich, 2000). According to that, one of the most predominant features of self-regulated learning is learners’ active involvement in teaching/learning and assessment. Moreover, Dann (2014) states that “AaL is the complex interplay of assessment, teaching and learning which holds at its core the notion that pupils must understand their own learning progress and goals through a range of processes which are in themselves cognitive events.” (pp. 150-151). Thus, AaL, like LOA, is focusing on the way learners learn, i.e., how learners manage their learning, use, and interpret feedback they receive from peers and teacher, and how learners prioritize own learning goals and then engage in classroom activities to achieve these goals (Dann, 2014). In other words, the emphasis, here, is on the learners and their active involvement in teaching/learning and assessment.

The main purpose of AfL is to support and to enhance student’s learning, while AoL is used to ensure accountability and to provide certification (Black et al., 2002). Nonetheless, AfL is often confused with AoL. Such misunderstanding and confusion occur when teachers, falsely associating frequency of tests with formative assessment, start giving students weekly graded tests that serve summative purposes, rather than providing any feedback that would indeed foster students’ learning (Black et al., 2002). Also, teachers choose using alternative assessment methods, e.g., portfolio assessment, believing that these methods replace summative assessment and help to enhance students’ learning, i.e., serve formative assessment purposes (Black, 2003).

Unfortunately, it is quite the opposite. In the case of portfolio assessment, portfolios are supposed to replace the end of term examination, and such assessment cannot be considered to serve any formative purposes, unless there is continuous feedback provided through the entire process of building up the portfolio (Black, 2003). As a result, any kind of graded examination, especially if given to students at the end of the term, serve primarily summative purposes because there is no opportunity to support learning by providing feedback.

Since assessment as learning, assessment for learning, and assessment of learning are considered to be building blocks for LOA, it is necessary to compare these phenomena to see their intricacies, which would allow to form a better understanding LOA (see Table 2).

Table 2. Comparison of AoL, AfL, and AaL as Building Blocks of LOA

Criteria	Building Blocks of Learning-Oriented Assessment		
	Assessment of Learning	Assessment for Learning	Assessment as Learning
Nature	Summative	Formative	<ul style="list-style-type: none"> • Formative • Engaging students with learning • Based on students' awareness of criteria for assessment
Purpose	To provide certification, accountability, ranking, to measure against benchmarks	To provide information about learning needs	To support self-regulated learning
Frequency	Usually applied at the end of semester/year	Continuous; throughout the entire semester/study year	Continuous
Goals	To rank students	<ul style="list-style-type: none"> • To inform instruction, i.e., how to change pedagogical approach to enhance learning. • to provide feedback for students 	To increase students' metacognitive activities
Type of Feedback	Postponed or non-existent	Immediate, specific	Immediate, specific
Focal Point	Reliability	Validity	Validity
Psychological Effect on Students	Usually negative; causing a lot of stress and anxiety	Positive; motivating to proceed with learning	Positive
Testing	High-stakes tests	In-depth tests	Tests as material for learning

Source: compiled by the author based on Earl, 2003; LeMahieu & Reilly, 2004; McMillan, 2017

On the evidence of the table above, AoL is different from AfL and AaL. In fact, while both AfL and AaL are aiming at enhancing and promoting learning and are formative by nature, main goal in AoL is to rank the students, i.e., AoL carries summative purpose of assessment. Also, AoL procedures are usually implemented at the end of the learning period and are considered of a high importance to all educational stakeholders involved, whereas AfL and AaL promote an ongoing learning, thus, various procedures are being applied throughout the entire learning period, just like in LOA. In fact, tests in AfL and AaL are seen as learning material, which is the core in LOA. Besides, AoL is often associated with negative emotions and anxiety, while AfL and AaL, similar to LOA, is empowering and motivating. Finally, like in LOA strategy, the entire process of assessment in both cases of AfL and AaL rely strongly on continuous feedback provisions, whereas, in AoL practices, feedback is either non-existent or irrelevant. For the dissertation, all the afore-mentioned assessment strategies are directly related to LOA, however, their weight in the LOA depends on the effect they have in support, promote, facilitate, and enhance learning.

1.1.3. Learning-Oriented Assessment for Facilitating and Enhancing Student Learning

Assessment often has negative connotations for students (Sambell, 2016). The domination of summative assessment strategy has had a massive effect on teaching/learning because assessment has become stressful, extremely competitive, and important as it is used to rank students and educational institutions, and it promotes the approach to learning where the most significant part is preparation for the high-stakes examination at the end of learning period (Sambell, 2016; Soilemetzidis et al., 2014). Therefore, it is suggested that “If we want to improve students’ engagement with learning, a key locus of enhancement can be refreshing our approaches to assessment” (Brown, 2015, p. 106). In fact, a well-chosen, developed, and adapted assessment strategy can be beneficial in addressing issues regarding student engagement and motivation as well as facilitation and enhancement of learning (Sambell, 2016). Sambell (2016) enlists four qualities of assessment that are helpful for dealing with student disengagement problem, which often results in poor learning experience: firstly, assessment has to be learner-oriented, it also has to be flexible, i.e., students should be involved into discussion regarding assessment criteria, then assessment has to suit individual learner’s needs, and, finally, assessment has to be open to and welcoming changes within certain educational background. Here, it is necessary to mention the fact that the very term *student engagement* is rather peculiar as it can be explained in different ways by emphasizing different features or by examining the term in different contexts. The topic of student engagement and its strategies is out of the scope of this dissertation; therefore, the engagement theories and strategies will not be examined any further. However, as student

engagement is important for facilitation and enhancement of learning experience in a TEL environment and it can be increased through implementation of LOA, it is important to discuss how certain assessment methods can help to involve students in teaching/learning and assessment.

To increase engagement through assessment in order to facilitate and enhance learning, it is necessary to critically re-evaluate assessment in terms of its purpose, methods, and techniques (Sambell, 2016). Researchers Trowler and Trowler (2010) have listed two types of engagement that are significant for assessment, including the following: engagement with learning material and engagement through active involvement and participation in teaching/learning assessment, which is one of the features of LOA. Even though the changing of assessment procedures can be especially complicated (Bloxham, 2016; Gibbs, 2006), a well-designed and thought through assessment strategy can facilitate and enhance learning as it forces students rethink their approach to learning, encourages them to study harder by focusing on learning objectives and outcomes over the entire period of their studies a new trend in assessment is being observed, as it becomes much more learner-oriented and aims at enhancing and facilitating learning.

One of the ways to make assessment more valuable for teaching/learning and to increase students' involvement and participation is to introduce authentic assessment tasks or learning tasks, as defined in the framework of LOA, which are often related to real-life situations or are designed to solve real-life problems, i.e., such tasks are practical, giving students an opportunity to understand the processes in much more explicit manner (Sambell, 2016). Kuh et al. (2011) notes that engagement in learning can be observed when students are actively participating in both learning and assessment tasks and take responsibility for their learning by showing high levels of devotion and interest. Students tend to think about authentic assessment, i.e., learning tasks, as more useful and significant because they can see the potential benefits of completing such tasks (Sambell, 2016; Carless, 2013a; 2013b). In addition, learning objectives and learning outcomes are aligned in the descriptions of such tasks; thus, students exactly know what is being expected from them (Sambell, 2016). Thus, authentic assessment, i.e., learning tasks, can be beneficial in two ways, e.g., students may develop some vital skills while solving with real-life problems as well as it can increase their motivation to study and engagement, which leads to facilitation and enhancement of teaching/learning and assessment, which is the main goal of LOA.

Additionally, the level of student engagement increases when students are convinced that the activities that they are performing have certain value and benefits (Sambell, McDowell & Montgomery, 2013). Additionally, the elements of transparency and objectivity in assessment are being highlighted. Rust, Price, and O'Donovan (2003) suggest that implementation of self-assessment or peer-assessment, as part of LOA strategy, can address the issues of assessment transparency and objectivity. Otherwise, if students do not trust the way the assessment is being

performed or believe that learning activities are invalid and do not challenge them, students start to demonstrate detached behavior by taking up a role of passive participants in assessment (Flint & Johnson, 2011). Thus, assessment should be valid and objective, while its tasks, should be engaging and relevant for students, i.e., learning tasks.

Also, students' engagement through assessment can be increased by introducing alternative assessment methods such as portfolios (Sambell, 2016). The implementation of alternative assessment methods is embedded within LOA strategy. Such assessment methods can be beneficial for students because students demonstrate their work and achievements throughout the entire learning period (Sambell, 2016). It also allows students to take more responsibility and gives more control over their learning as they can change focus of their learning easier. Thus, such alternative assessment methods may increase students' engagement into learning and facilitate and enhance learning.

In addition, ensuring reliability and validity of assessment is a required precondition to increase students' engagement (Flint & Johnson, 2011). Through implementation of LOA strategy, this can be easily achieved, as students are required to engage with assessment criteria, be pro-active in teaching/learning and assessment. Therefore, students can be easier persuaded that their actual knowledge, achievements, skills, and competences can be measured and acknowledged through the implemented assessment strategy. In fact, students have expressed great appreciation to a TEL environment where they can show their proficiencies and be fairly evaluated (Flint & Johnson, 2011). On the other hand, if students do not trust teaching/learning and assessment in a TEL environment, feel pressured, or dislike the approach to teaching/learning and assessment, they may start to disengage. As a result, it is highly significant to ensure validity and reliability of teaching and assessment. Finally, properly designed or chosen assessment strategy can facilitate student learning and allow deeper learning experience, in the meantime, it can prevent learners from demonstrating unethical academic behavior (Sambell, 2016). Therefore, assessment can play a major role in increasing students' engagement and improving their learning.

1.1.4. Teaching/Learning and Assessment Methods Supporting Learning-Oriented Assessment

Peer learning. Peer learning is highly important when talking about LOA. As Topping (2017) explains, peer learning is a “an arrangement for learners to consider and specify the level, value, or quality of a product or performance of other equal-status learners” (p. 1), where learners demonstrate a high level of engagement on voluntary basis, establish trust relation, maintain a non-hierarchical status, expressing mutual understanding and friendly relationship, and retaining

legitimacy (Keppell et al., 2006). To put in other words, learners do not engage in any power relationship, they do not have any control over the other, they are equal when it comes to their status or accountabilities. Besides, peer learning can be categorized by the context as it can take place in both formal and informal learning contexts (Keppell et al., 2006) and its purpose; thus, it can be formative, summative, or a combination of both, as a result, there is an indication to LOA (Topping, 2009). However, regardless the context or purpose of peer assessment, the main goal of peer assessment remains provision of feedback: “the overriding goal of peer assessment is to provide feedback to learners” (Topping, 2009, p. 22).

By engaging in peer assessment activities learners develop certain skills and competences such as critical thinking, metacognitive skills, evaluative competences, and writing skills that are vital for meaningful participation in teaching/learning and assessment (Ballantyne, Hughes & Mylonas, 2002; Topping et al., 2000). Moreover, involvement in peer assessment may have a positive effect on learning as well as it may increase student motivation (MacLellan, 2001). Finally, peer learning and assessment force learners to constantly reflect about learning (McMahon, 2010). Consequently, students develop metacognitive skills, which are vital for students to take part in LOA.

However, implementation of peer learning method may be demanding on both students and teachers (Boud et al., 2001). Teachers have to carefully think through curriculum, whether and how this method would support LOA, and evaluate the potential benefits and foresee possible hazards for the learners as well as to estimate students’ previous experiences with peer learning, to learn more about students as learners and find out their expectations and motivation to study. As a result, it is necessary to evaluate the background circumstances, learning objectives and outcomes, readiness of individual learners, and to establish connections between peer learning and assessment prior its implementation.

Self-Regulated Learning and Self-Assessment. Students, through engagement in self-assessment, are required to develop skills and competences, needed for self-regulated learning, which is essential for LOA. Self-assessment is “the involvement of learners in making judgments about their achievements and the outcomes of their learning” (Boud & Falchikov, 1989, p. 529) as well as it is concerned with “identifying standards and/or criteria to apply to their work and making judgments about the extent to which they have met these criteria and standards” (Boud, 1995, p. 4). According to that, self-assessment focuses on developing capacities for self-regulated learning, where learners have to be able to make informed decisions regarding their learning, to engage with feedback, to actively participate in assessment practices, and to use their metacognitive abilities to rethink their learning. Therefore, since self-assessment focuses on development of skills and competences needed rather than acquiring knowledge on subjects, it

may enable lifelong learning (Taras, 2010). Additionally, through self-assessment, it is aimed at indicating and critically evaluating learning objectives and outcomes, assessing learner's knowledge on the subject, and facilitating learner's self-development and realization as a learner as such (Wride, 2017). Students can only be successful at achieving learning objectives if they are fully aware of each learning objective and have developed a plan to reach them (Sadler, 1989). In fact, it is necessary to learn how to develop the capacity to look at teaching/learning and assessment with respect to learning objectives to develop self-assessment skills (Black, 2003). Thus, a shift in student roles from passive recipients of knowledge to active learners becomes inevitable, while the focus from teacher-dominant approach to teaching/learning and assessment moves towards learner-centered.

Also, with the transition to more learner-centered approach to teaching/learning and assessment, it becomes of crucial importance for students to be able to critically evaluate their own work by applying assessment criteria rather than passively wait on teachers to do so (Carless & Boud, 2018; Sambell, Brown & Race, 2019). When it comes to the development of assessment standards and criteria, it is best to have the learners do it on their own, and then polish those standards within group discourse (Sambell, Brown & Race, 2019). As a result, students are more likely to understand criteria and standards for assessment when they are engaging with them. Besides, self-assessment is based on the idea that participation in teaching/learning is voluntary whereas assessment puts everything in a cohesive whole (Wride, 2017). Thus, self-assessment not only contributes to student engagement, but also empowers learners by making students more actively involved in assessment, which is considered a required element for LOA strategy to be efficient.

However, there are several preconditions that need to be met to obtain efficiency in self-assessment. First, the importance of learners familiarizing with the concept of self-assessment is emphasized (Wride, 2017). Students should be aware of what self-assessment is and what the expectations are from such an exercise. Moreover, it is necessary to discuss the learning objectives, outcomes, and assessment criteria with students (Wride, 2017). This may be crucial to ensure success of the exercise because it makes assessment much more transparent and guides students in self-assessment process. Especially, this is significant because often students tend to have some previous experiences, biases, or expectations, regarding teaching, learning, and assessment. For instance, students often prefer to be passive recipients in teaching/learning and assessment thus, they may resist to the implementation of unconventional approaches and methods to teaching/learning and assessment, by thinking of that as learning experience which is dissatisfying, demotivating, and not fulfilling their needs and expectations. As a result, in order to make self-assessment smooth, efficient, and advantageous, prior implementation, it is important

to understand the entire process of self-assessment in terms of duties and required level of engagement, to re-evaluate the willingness, devotion, and determination of students to proceed with such approach, to clarify students expectations regarding learning, teaching and assessment, and finally, but most importantly to engage into in-depth discussion with students regarding criteria for assessment as well as learning objectives and outcomes.

As noted, self-assessment can be demanding on the learner because the learner has to take more responsibility. Nevertheless, the processes of self-regulated learning and/or self-assessment can be managed in more efficient way if they are implemented within innovative learning environments, e.g., TEL learning environments (Li, Dong & Huang, 2009; Blasco-Arcas, 2013; Zeng, et al., 2018). Indeed, teaching/learning and assessment in a TEL environment can contribute to development of the capacity for self-regulated learning, which is considered as one of crucial elements for sustainable development in the knowledge society because students need to be prepared to integrate into work market that does not exist yet (Zeng et al., 2018). As a result, it is recommended to look at education in a much more innovative way, where the main goal is to support learners and develop critical thinking skills as well as to foster the development of capacities for skills and competences that are not defined yet; therefore, the purpose of teaching/learning and assessment has gone further than traditional knowledge acquisition, and can now be described as developing the capacity in learners to learn how to learn.

Feedback. The provision of feedback is the most prevailing feature of LOA as well as assessment for learning and assessment as learning (Carless, 2006; Nicol & Macfarlane-Dick, 2006). In fact, feedback is considered to play one of the essential parts in teaching/learning and assessment (Black & William, 1998). Some scholars claim feedback to be as important as having a teacher in the classroom (Black & William, 1998). Neither formative nor summative assessment strategies cannot support the development of feedback-rich environment because assessment is performed in the following manner: teachers are the only assessors who ensure feedback provision for learners, if feedback is considered as relevant (Sambell, 2013; Race, 2019). Thus, such feedback from teachers to students can be unilateral. On contrary, LOA, promotes more learner-centered approach which indicates the significance of dialog between teachers and students for creating successful and comprehensive learning experience (Sambell, 2013). Moreover, some studies suggest that feedback that is force-fed to students by explicitly instructing them is usually insufficient and it can, in fact, have negative effect on student engagement and motivation (Carless, 2006; Winstone et al., 2017; Orsmond et al., 2013). As a result, a shift from traditional assessment and feedback practices becomes inevitable (Race, 2019). Only rigorous exchange and feedback in a form of dialog between teachers and students as well as students and peers are there

to aid learners in determining the worth of the evaluation of their works in such way enhancing teaching/learning and assessment (Sambell, Brown & Race, 2018; Merry et al., 2013).

As mentioned already, feedback plays one of the major roles in LOA. In fact, feedback is a key element to successful learner’s learning (Carless, 2006; Sambell, Brown & Race, 2018). Besides, there is a variety of different purposes of feedback such as it can be used for guidance for improvement of current or similar assignments in the future, it can serve as justification of the mark, or it can help teachers to demonstrate their level of expertise or, in some cases, to exercise their authority over students (Carless, 2006). However, the nature of feedback is changing. As researcher Carless (2007) points out, in LOA feedback is transforming into feed-forward, to illustrate, feedback, provided on past or current assignments, has a potential to reflect in students’ future work, to put it in other words, it can feed-forward.

Nonetheless, there may be a lot of challenges regarding feedback and its provision. Feedback may be harmful or have a negative effect on students’ learning if the feedback comments are ambiguous, leaving open space for interpretation. For example, feedback is focused on students’ personal features rather than learning activities, this may be hazardous at multiple levels and may disturb the teaching/learning and assessment (Dweck, 2006). For the learner, it becomes of crucial importance to identify this gap in order to benefit from feedback for learning improvement (Sadler, 1989). Feedback comments should only be associated only with effort put into accomplishing it, rather than individual traits or intellect. In such a way, feedback becomes more objective, and it may be easier to avoid any unwanted implications.

Besides, teaching/learning and assessment in feedback heavy settings provides students with opportunities to better understand criteria for assessment (Sambell, McDowell & Montgomery, 2013). However, students have to able to engage with feedback properly, i.e., to develop literacy in feedback to truly appreciate the importance and benefits of feedback, and to understand the level of responsibility that it brings (Carless & Boud, 2018; Winstone et al., 2017). There are four features that are relevant when describing feedback literacy (see Table 3):

Table 3. *Elements, Defining Feedback Literacy*

Elements	Explanation
Welcoming feedback	Understanding the value of feedback and its benefits to learning;
Drawing conclusions	Developing skills and competences for self-assessment; Being able to critically evaluate work prior submission;
Controlling emotions	Building emotional capacities to accept both positive as well as negative feedback;
Engagement	Engaging with feedback and seeding it to future work.

Source: compiled by the author based on Carless & Boud, 2018

As demonstrated in the Table 4, it is important to realize the potential benefits of feedback and what influence it may have on learning to develop feedback literacy. Then, it is necessary to develop capacities for self-assessment that are necessary to critically assess own work. Also, it is vital to be able to accept both negative and positive feedback, i.e., developing an understanding the feedback, especially negative, is just about the work, it is not personal and is not intended to hurt somebody's feelings or self-esteem. Finally, feedback literacy can be observed not only through the way learner reacts to it, but also what actions the learner will take after receiving feedback and how it will reflect in student's work in the future.

Feedback plays one of the key roles in maintaining students' engagement. Actually, it is recommended to view feedback as a cohesive, integral, and inseparable part of teaching/learning and assessment (Merry et al, 2013; Carless, 2013a, 2013b). In fact, some researchers suggest that feedback should be understood in a much extensive manner by referring to it as a dialog between students and teachers or students and peers (Askew & Lodge, 2000; Sambell, 2016). Such dialog can occur in both formal and informal learning setting and its primary purpose is to facilitate learning (Askew & Lodge, 2000). It is believed that engagement with feedback/dialog supports self-regulated learning (Sambell, 2016). Moreover, it closes the distance between the educator's observations on student's work and student's actual response to and interpretation of them (Sambell, 2016). Finally, feedback does not have any potential benefits if a student does not react to it appropriately (Boud & Molloy, 2013). Without students' engagement, feedback, to be more specific, the comments, received from teacher or peers, become worthless, i.e., "dangling data" (Boud & Molloy, 2013, p. 699). Thus, engagement with and through feedback is extremely important to facilitate and to enhance teaching/learning and assessment.

1.2. How can a Technology Enhanced Learning Environment Support Teachers in Designing Learning-Oriented Assessment for Learning Facilitation and Enhancement?

Even though, teaching/learning and assessment in a TEL environment is not a new area in the educational field (OECD, 2016), the increase of popularity of teaching/learning and assessment in a TEL environment has been observed amidst the COVID-19 pandemic, when HE institutions have been forced to rush the migrating of their practices into TEL environments (Greenhow, Graham & Koehler, 2022; Kurtz & Herold, 2020). However, such rapid transition from face-to-face classroom to teaching/learning and assessment in a TEL environment is often distinguished in scholarly literature as *remote emergency instruction* or *hybrid learning* (Hodges et al., 2020). During the pandemic and later in the post-pandemic period, blended

teaching/learning and assessment has often been confused with hybrid or emergency remote teaching/learning and assessment, however, these terms should not be treated as synonymous, as their characteristics are fundamentally different (Greenhow, Graham & Koehler, 2022). As it is much different from planned and methodologically well-implemented online or blended teaching/learning and assessment, the author of this dissertation acknowledges the influence and the consequences of the COVID-19 pandemic on teaching/learning and assessment, however, due to the specific purpose of this dissertation, the emergency remote and/or hybrid teaching/learning are not going to be investigated any further, only the already well-established modes of TEL, i.e., online, and blended teaching/learning and assessment, are of the key interest.

Concept. There are many ways to refer to assessment in a TEL environment. The most commonly terms associated with assessment in a TEL environment are include the following: *technology-enhanced assessment, technology-based assessment, digital assessment, technology-enabled assessment, e-assessment, technology-supported assessment, online assessment*. As the most used term in research literature to refer to assessment in a TEL environment is e-assessment, a brief explanation of the concept will be provided. However, all the afore-listed concepts share similar explanations and characteristics, thus, for purpose of this dissertation, these terms will be considered synonymous.

The term of e-assessment / technology enhanced assessment is depicted as the usage of learning technologies or various tools to enable assessment procedures, including designing, and implementation of the assessment strategy and its separate components, i.e., assessment and learning tasks, grading students' submissions (i.e., fully automated machine-grading or grading, performed by teachers, using various tools in a TEL environment), gathering and analyzing the information on student progress and achievements to make informed changes in pedagogy (Osuji, 2012). This definition is considered to provide an in-depth view of what the process is, and it covers several different layers. Therefore, it is considered to suit the purpose of this dissertation best.

Characteristics. Teaching/learning and assessment in a TEL environment can be differentiated by several dimensions, e.g., it can be either synchronous or asynchronous, formal, or informal, and it can be arranged in fully online or blended teaching/learning and assessment contexts (Greenhow, Graham & Koehler, 2022; Greenhalgh et al., 2020; Gleason & Greenhow, 2017; Greene, Copeland & Deekens, 2021; Hibbard, Sung & Wells, 2016; Ranga, 2017). Main characteristics and dimensions of teaching/learning and assessment in a TEL environment are provided in Table 4 below.

Table 4. *Dimensions of Teaching/Learning and Assessment in a TEL Environment*

Dimension	Distinction	Explanation
Teaching / Learning, Assessment and Communication Pattern	Synchronous	Teaching / learning, assessment and communication between students and teachers take place in real-life online sessions, using technological solutions to facilitate these processes.
	Asynchronous	Teaching / learning, assessment and communication between students and teachers, enabled by the technological or TEL environment solutions, take place on different timeframe.
Learning Context	Formal	Learning occurs in an established and officially recognized educational context, following the formally confirmed program or curriculum.
	Informal	Learning occurs outside the formal learning setting.
Delivery Mode	Online	Teaching/learning and assessment processes are fully implemented within a TEL environment.
	Blended	Teaching/learning and assessment are implemented within a TEL environment and face-to-face learning contexts. The distribution between online and in-person interaction depends on institutional regulations, teacher decisions, student needs, educational goals, etc.
Approach to teaching/learning and assessment	Static	Teaching/learning and assessment implies a standardized, equal to all the students learning experience.
	Adaptive	Teaching/learning and assessment refers to more dynamic and personalized approach, eventually increasing flexibility of teaching/learning and assessment.

Source: compiled by the author based on Greenhow, Graham & Koehler, 2022; Dhawan, 2020; Martin et al., 2012; Bernacki et al., 2021; Greene, Copeland & Deekens, 2021; Hibbard, Sung & Wells, 2016; Ranga, 2017

As demonstrated above, teaching/learning and assessment in a TEL environment alters communication patterns between stakeholders involved, as communication can be synchronous or asynchronous. Also, a TEL environment enables different delivery modes, e.g., blended and online. Moreover, teaching/learning and assessment in a TEL environment can occur in at any educational context, including formal and informal. Finally, technical capabilities of a TEL environment allow implementation of different approaches to teaching/learning and assessment, as these processes can be organized in more static or more flexible, i.e., adaptive manner. All these technologically supported and enabled elements significantly modify teaching/learning and assessment strategies, making them much different from face-to-face teaching/learning and assessment, thus, there is a need to take a closer look at main features of teaching/learning and assessment in a TEL environment.

As mentioned, a TEL environment enables design teaching/learning and assessment in blended or fully online mode. Blended teaching/learning and assessment is a different construct from online teaching/learning and assessment, as here both teachers and students are equipped with technological solutions and opportunities for in-person interaction and collaboration

(Greenhow, Graham & Koehler, 2022). By the definition, blended teaching/learning and assessment implies the balance between synchronous and asynchronous learning contexts and activities (Greenhow, Graham & Koehler, 2022). Nonetheless, the research on online learning and TEL has indicated that a TEL environment, and in more general terms, technology allows and supports a variety of teaching/learning and assessment options, which combine in-person and fully online activities and interactions with more self-paced asynchronous learning (Greenhow, Graham & Koehler, 2022; Dhawan, 2020). For instance, teachers can opt for more interactive teaching/learning and assessment experience for their students, when online synchronous and in-person teaching, learning and assessment scenarios are prevailing in contrast to asynchronous activities or they can opt for more student-centered and self-paced scenarios, where students are expected to participate in asynchronous teaching/learning and assessment activities in combination with moderate amount of synchronous learning sessions (Greenhow, Graham & Koehler, 2022; Dhawan, 2020).

Asynchronous learning increase flexibility and supports personalization and self-regulation in learning as it allows implementing teaching/learning and assessment activities at different timeframe to suit individual learner's needs, while all the interactions between teachers and students or students and their peers happen on demand, mostly communicating through TEL environment communication and collaboration tools or preferred external technological solutions (Greenhow, Graham & Koehler, 2022). In the meantime, synchronous learning, teaching, and assessment is similar to live face-to-face interaction and collaboration, as the involved parties participate in various exchanges at real time through the medium of technology (Gleason & Greenhow, 2017).

Even though, blended learning may sound as a flexible and democratic way to teaching/learning and assessment, as it allows for different communication channels and, eliminates physical boundaries, increases interactivity level, allows for increased personalization of teaching/learning and assessment, blended learning may be challenging as well (Pulham & Graham, 2018). Teaching/learning and assessment in blended learning contexts, requires both parties, i.e., teachers and students, to demonstrate excellent skills, knowledge, and competences to manage both settings efficiently, face-to-face classroom and TEL environment, and balance out their strengths and restraints to ensure meaningful learning experience (Pulham & Graham, 2018; Archibald et al., 2021; Greenhow, Graham & Koehler, 2022). Otherwise, the teaching/learning and assessment experience in blended learning contexts may be problematic and have a direct influence on the quality of studies.

Besides, the level of interactivity and interaction channels between all the parties involved have been a focal point in TEL research (Martin et al., 2012). A TEL environment enables

different levels of learner and content interactions. At the beginning, TEL environments have been seen as storage facilities as they only allowed student interaction with static content, however, as TEL environments get more advanced, learning in such environments is becoming vigorous, e.g., the contents can be modified based on the learner's needs and characteristics, the level and mode of preferred interactivity with learning materials can be adjusted accordingly (Martin et al., 2012; Greenhow, Graham & Koehler, 2022;). Indeed, learning in a TEL environment can be categorized as *static* or *adaptive* (Martin et al., 2012). To illustrate, static teaching/learning and assessment implies a standardized, equal to all the students learning experience, whereas adaptive learning refers to more dynamic and personalized approach, which is supported and enhanced by the technological solutions (Martin et al., 2012; Bernacki et al., 2021). This flexibility, on the other hand, introduce both teachers and students with not only prospects, but also with challenges.

Finally, teaching/learning and assessment in a TEL environment can take place in either formal or informal learning setting. A TEL environment allows for monitored and structured self-regulated learning within a formal curriculum (Greenhow, Graham & Koehler, 2022) as well as it facilitates informal learning outside the formally established learning objectives or course curriculum. Such unstructured and voluntary learning, which occurs outside any formal curricula is being referred as informal learning (Greene, Copeland & Deekens, 2021; Hibbard, Sung & Wells, 2016; Ranga, 2017). Teaching/learning and assessment in a TEL environment offers teachers and students the possibility to deepen learning experience by allowing students to pursue their educational interests and goals by moving beyond formal curriculum, and engaging into informal learning activities, facilitated using various social networks (Greenhow & Lewin, 2016; Greene, Copeland & Deekens, 2021; Rosenberg et al., 2020). However, due to the scope of this research, only formal teaching/learning and assessment in a TEL environment are examined.

1.2.1. Fundamental Modalities of Assessment in a Technology Enhanced Learning Environment

Assessment in a TEL environment is different in comparison to a traditional face-to-face setting and requires some pedagogic decisions to support efficient learning experience for students (Alavi et al., 2021). The difference occurs because of the specific nature of a TEL environment and its pedagogic requirements for learning design (e.g., implementation of learner-centered approach becomes mandatory) and assessment (Alavi et al., 2021). The analysis of scholarly work has demonstrated that elements, dictated by a TEL environment, should be taken into consideration while trying to design proper LOA in a TEL environment (see Table 5).

Table 5. Fundamental Modalities of Assessment in a Technology Enhanced Learning Environment

Element	Explanation	References
Pedagogic approach	A TEL environment dictates new demands for learning design by shifting the focus from teacher-centered to learner-centered approach to teaching / learning, and assessment.	Alavi et al., 2021; Robles & Braathen, 2002; Crisp, 2010; Crisp, Guardia & Hillier 2016; Reeves, 2000; Beaumont et al., 2011
Constructive Alignment	Constructive alignment is a required condition for learning design to be implemented within a TEL environment. Alignment is found when the expression amid learning objectives, learning design, teacher’s skills and competences, technological options, and assessment strategies.	Biggs and Tang, 2011; Reeves, 2000; Liang & Creasy, 2004; Fueller et al., 2022
Communication and Interactivity Mode	TEL environment changes the way teachers and students interact to each other as well as to the materials, as synchronous and asynchronous teaching / learning, and assessing modes are enabled.	Gikandi, Morrow & Davis, 2011; Poth, 2018; Mueller & Strohmeier, 2011
Duration and Frequency	Assessment in a TEL environment is normally integrated within learning design and can take place throughout the entire study period.	Dikli, 2003, Robles & Braathen, 2002
Role of a TEL environment	TEL environment cannot be treated as a storage facility for learning materials, instead it should be considered as a medium where teaching / learning, and assessment process is taking place.	van Dijk & Lazonder, 2016; Aleven et al., 2003; Naveh, Tubin & Pliskin, 2010
Assessment Format	Assessment in a TEL environment demands for systematic approach to teaching/learning and assessment as assessment practices cannot be copied from face-to-face classroom to online contexts. Moving beyond the traditional assessment formats in a TEL environment, as these methods do not address the current needs of both learners and teachers, cannot assess students’ higher-order skills and competences, and provide students with more authentic learning experience.	Liang & Creasy 2004; Robles & Braathen 2002; Crisp et al., 2016; Robles & Braathen 2002

Firstly, a TEL environment differs from a face-to-face classroom as it allows different kinds and levels of interaction between all stakeholders involved, e.g., teachers and students, students and their peers, students, and the content (Gikandi, Morrow & Davis, 2011; Mueller & Strohmeier, 2011). As noted, assessment in face-to-face learning contexts differs from assessment in a TEL in multiple ways, including overall organization of assessment procedures, different submission options, and interaction channels (e.g., discussions, messaging, synchronous and asynchronous communication (Gikandi, Morrow & Davis, 2011). Learning technologies have transformed the way students and teachers interact (Poth, 2018). Teachers and students can explore the advantages of synchronous and asynchronous interaction by using different

communication platforms in a TEL environment (Poth, 2018). The differences evolve further as it allows synchronous as well as asynchronous modes of learning (Mueller & Strohmeier, 2011). As a result, teachers are advised to re-visit and eventually to re-design assessment to achieve the desired outcomes, in the meantime, offering fruitful learning experience for the learners (Gikandi, Morrowa & Davis, 2011). A TEL environment significantly alters teaching, learning, communication, and collaboration processes; thus, assessment should be changed respectively (Gaytan & McEwen, 2007). Discussions centering on efficient assessment strategies in a TEL environment need to be constructed on the features of established and exemplary educational techniques, e.g., forcing students to reflect, creating motivation to enter the learning environment, showing a commitment to providing support and increased aid, and assigning different and consequential tasks (Gaytan & McEwen, 2007). Thus, teachers are obliged to adopt innovative teaching and assessing techniques.

Moreover, designing assessment in a TEL environment is more demanding as it requires a specific methodological approach (Robles & Braathen, 2002; Alavi et al., 2021). For instance, traditional face-to-face classroom assessments normally take place at a certain point of time after completion of a particular topic or series of lectures and tend to carry a more summative aspect, whereas assessment in a TEL environment is normally integrated within learning design and can take place throughout the entire study period (Dikli, 2003, Robles & Braathen, 2002). Besides, tools, integrated within a TEL environment, can help to monitor learning and assessment, and inform teachers about student progress.

Also, TEL environments, which have been established within a constructivism paradigm, will usually include the ability to produce learning objects, as well as linked materials, with the goal of granting learners an advantage or, at the very least, showing them data, which may be hard to discover through individual or group studying (van Dijk & Lazonder, 2016). These additional resources might augment the knowledge base; however, they are regularly overlooked or ineffective in execution (Aleven et al., 2003). Thus, TEL environment should no longer be viewed as a learning material storage facility (Naveh, Tubin & Pliskin, 2010). Teaching / learning, and assessment online is not about providing students with easily accessible content materials, but it is more about providing students guidance and support to better comprehend information and develop certain skills and competences.

Likewise, assessment in face-to-face environment, the main goal of e-assessment or technology enhanced assessment is to facilitate learning as well to provide certification of learning achievements (Clement & Cord, 2013; Crisp, Guardia & Hillier 2016). Again, the significance of e-assessment, which strongly relies on formative or learning-oriented assessment principles, is undeniable as students, engaging in such assessment practices, are forced to take control their own

learning process, actively engaged in a number of cognitive and metacognitive processes, thus, this allows for deeper and fruitful learning experience (Pachler et al., 2010; Beaumont et al., 2011). However, often teachers face great challenges trying to design and execute assessment practices online to reach the afore-mentioned assessment goals (Robles & Braathen, 2002; Clement & Cord, 2013; Crisp, Guardia & Hillier 2016). Researchers have divided into two opposing camps, as some of them believe that e-assessment should copy the currently existing assessment techniques that have been proven efficient and productive in face-to-face classroom setting (Marshall, 2003), while others argue by claiming that online assessment demands for more rigorous and systematic approach to learning / teaching and assessment; thus traditional assessment practices cannot be copied from face-to-face classroom to online contexts (Robles & Braathen, 2002; Crisp, 2010; Crisp, Guardia & Hillier 2016).

Also, as learning/teaching and assessment in a TEL environment adopts a more student-centered approach, traditional assessment strategies in a TEL environment cannot expose the intricacies of the effects of student-centered online learning which are dissimilar from the overriding, teacher-centered standard that is commonly observed in physical classroom context (Reeves, 2000). Also, as online teaching / learning puts new demands on students as well as forces teachers to reexamine pedagogies and adopt more student-centered approach, active student involvement into teaching/learning and assessment becomes a required precondition for efficient e-assessment / online assessment / technology-enhanced assessment (Beaumont et al., 2011). Naveh, Tubin, and Pliskin (2010) states that teachers can no longer rely on traditional teacher-oriented teaching and assessment practices in TEL environment, adopting innovative approaches becomes inevitable.

Learning technologies have dictated new demands for curriculum design and TEL environment supported assessment (Mora et al., 2012; Crisp, Guardia & Hillier 2016, Midoro, 2012). As learning online puts emphasis on implementation of learner-centered approach, assessment practices have to be adjusted accordingly (Mora et al., 2012; Midoro, 2012). In fact, the research suggests that there is dominant trend in e-assessment to move beyond the traditional assessment formats such as testing, e.g., tests with multiple choice, matching, filling-in the blanks, or true-false test items, in online environment, as these methods do not address the current needs of both learners and teachers as well such they cannot efficiently assess students' higher-order skills and competences (Liang & Creasy, 2004; Robles & Braathen, 2002; Crisp, Guardia & Hillier, 2016). Consequently, it is recommended to consider e-assessment methods and procedures that would provide students with more authentic and deep learning experiences (Liang & Creasy, 2004; Robles & Braathen 2002; Crisp, Guardia & Hillier, 2016).

Finally, in a TEL environment, alignment between assessment techniques and expected proficiencies is necessary for efficient student learning and assessment practices (Liang & Creasy, 2004). Regardless, whether they are individual or combined, any method for refining assessment in online learning has to pursue the best stages of alignment (Reeves, 2000). Alignment is found when the expression amid learning objectives, learning design, teacher’s skills and competences, technological options, and assessment strategies can be as well-defined as they can be. Numerous difficulties can present themselves anytime technology is brought into HE courses where alignment is missing (Reeves, 2000). Thus, aligning of major components is the most important pre-condition for a sufficient assessment in a TEL environment. Besides, this help to maintain the principle of transparency of assessment.

Technology enhanced assessment can open a lot of possibilities, however, it may bring significant risks that should be taken in consideration. Poorly designed and executed assessment in TEL environment may have detrimental effect on the quality of studies (Fueller et al., 2022). Fueller et al. (2022) warns that directly transferring classroom assessment procedures to a TEL environment may be detrimental, as this may have considerable consequences for the quality of teaching and learning, which may lead to deterioration of institutional image. When designing technology-enhanced assessment, it is highly recommended to ensure that there is constructive alignment between learning outcomes, contents, learning activities, and assessment practices (Biggs & Tang, 2011; Villarroel et al., 2019). According to constructivism paradigm (Vygotsky, 1978), teaching and learning are associated with accumulation of knowledge, skills, and competences i.e., construction of knowledge, skills, and competences, therefore, assessment should not be seen as fragmented practice (Fueller et al., 2022). A holistic approach to designing assessment in TEL environment is required to offer deep learning experience for learners. Therefore, the focus should not be on assessment methods or TEL environment tools for assessment, but, instead, more emphasis should be laid on implementing learning and assessment tasks in a TEL environment that are aligned with learning outcomes (Fueller et al., 2022).

The characteristics of technology enhanced assessment are summarized in Table 6.

Table 6. *Characteristics of Technology Enhanced Assessment*

Characteristic	Explanation
Focus on pedagogy rather than technology	The main emphasis should be laid on the pedagogical aspects, rather than focusing on technological issues. Technologies should not be the focus of assessment. Instead, technology should be seen as facilitator or enabler rather than key element for assessment in TEL environment.
Shift in pedagogy	As TEL environment demands for transition from teacher-centered to more student-centered approach, assessment in a TEL environment should be designed accordingly.

Characteristic	Explanation
Change in student role	Also, students should embrace their new role in technology enhanced assessment, which is becoming active participants rather than passive recipients.
Promoting personalization	Technology can ensure and facilitate authenticity and personalization of assessment.
Increasing feedback opportunities	Technology facilitates feedback provision, which is extremely important for continuous student learning. Technology enables feedback provision in a variety of modes, channels, and formats
Assessing of a broad spectrum of skills and competences	Assessment in TEL environment should be designed in such way that students higher order skills, e.g., critical skills, problem solving skills, etc., and competences could be assessed effectively. It is necessary to understand that technology itself does not limit what and how can be assessed.

Source: compiled by the author based on Fueller et al., 2022; Midoro, 2012

In short, a TEL environment produces a set of technical and pedagogic requirements for designing and implementing of LOA. Thus, LOA, designed for traditional classroom context, cannot be applied in online context without making some major modifications. Taking into consideration issues such as technical specifications of a TEL environment, changing interaction channels, adoption of learner-centered approach, and promotion of innovative teaching methods, LOA should be adjusted to fit within learning design and to efficiently use the potential of technologies to facilitate and enhance learning.

1.2.2. Learning-Oriented Assessment Methods and Tools for Assessment within a Technology Enhanced Learning Environment

Assessment Methods. There is a variety of different methods that can facilitate and support implementation of assessment strategy. By the required student involvement and participation level, assessment methods can be classified as teacher- or learner-centered (Assunção et al., 2015; Struyven, Dochy & Janssens, 2005; Almond, 2009; Sambell & McDowell, 1998). While traditional teacher-centered assessment methods are often associated with summative assessment and criticized for their effects on student's learning and emotional being, learner-centered assessment methods are valued as they offer students with deeper learning experience and foster development of skills and competences (Assunção et al., 2015; Struyven, Dochy & Janssens, 2005; Almond, 2009; Sambell & McDowell, 1998).

However, the studies show assessment is still dependent on the traditional assessment method such as written or oral exam (e.g., test, quiz, etc.), which is used to implement summative assessment strategy, as it allows labeling students in terms of their achievements, knowledge, and level of skills (Assunção et al., 2015). Written examinations (tests, quizzes, etc.) are highly

preferred by the educational institutions and the educational managerial level, as this assessment method offers high accountability and is relatively cheap to implement, however, it is not very useful for teachers and students, whose aim is to facilitate and enhance learning (Assunção et al., 2015). In fact, this assessment method is also criticized as it offers low validity for employers, seeking to learn more about students' / graduates' (potential employees') skills and competences (Price et al., 2011). Another criticism of this high-stake end-of-semester exam method, whether it is an online test with open questions or quiz with closed questions, is that exams encourage undesired behavior in students, e.g., learning only for the test rather than continuously engaging in learning process, and building upon knowledge and skills gained (Struyven, Dochy & Janssens, 2005).

Instead, learner-centered assessment methods such as e-portfolios, individual or group projects and papers, case studies are being promoted as these assessment methods are considered to provide deep learning experience, to foster development of students' autonomy and to force students to engage in self-reflection (Struyven, Dochy & Janssens, 2005; Almond, 2009; Sambell & McDowell, 1998). Also, other learner-centered assessment methods, including peer projects, presentations, enable collaboration between students, encourage students to involve in feedback provision; thus, students can develop certain skills (e.g., collaborative, communication skills) and literacies (e.g., feedback literacy, evaluative expertise) (Webber, 2012). Thus, learner-centered assessment methods support teaching/learning and assessment processes as well as create productive and motivating learning atmosphere.

Having discussed classification of assessment methods, it is necessary to examine different methods and their purpose. A list of learner-centered assessment methods, which facilitate implementation of LOA, is provided below (see Table 7).

Table 7. *Assessment Methods for Learning-Oriented Assessment*

Assessment Method	Purpose
Individual Project	A commonly used assessment method in HEI, when the teacher assigns an assignment for the students and students, working independently have to prepare the task and submit by arranged deadline (Daniel, 2021).
Group Project	A peer learning activity when students have to collaborate and work in teams of two or more to complete the assignment (Daniel, 2021).
Case study	It is a scenario-based task when students are obliged to apply their skills and content-knowledge in real-life situations. Usually, case studies are challenging as they require learners to demonstrate a broad spectrum of skills (including critical thinking, problem-solving, decision-making skills) and competences and a good understanding of theoretical nuances to solve real-world problems in a safe and controlled environment, without burdening the learners with real-world challenges (Bloomfield & Magney, 2009).

Assessment Method	Purpose
Discussion	Discussion method is a popular way of allowing students to express their thoughts, ideas and attitudes on certain issue or topic. Discussions can be synchronous as well as asynchronous. Also, this method can be both as teaching and assessment method. This method enables teachers to check student's knowledge on certain topic, gather their experience, while students benefit from discussions as it helps to develop and / or improve their argumentation, critical thinking, communication skills (Daniel, 2021).
Test (quiz)	This method is one of the most used assessment methods, as it is cheap, high-stake value, time-efficient, as most of the grading procedures can be automatized when using technologies, and it is suitable for assessing students' content knowledge. Finally, testing tools offer a wide range of options how to design test items, thus teachers can design tests to fit almost any educational scenario, including LOA (Daniel, 2021).
Paper (Research paper, report, essay, etc.)	An assessment method that can be used to assess different skills and competences in students, e.g., writing, critical thinking skills, attitudes, and values (Daniel, 2021).
Presentation	This assessment method is commonly used in synchronous learning sessions when students demonstrate their knowledge on the topic. The method is used to assess student's verbal and written skills as well as to check higher order skills and competences (Daniel, 2021).
E-Portfolio	E-portfolio is a method used to collect evidence of student's learning and reflections on learning if requested. This method not only assists in assessment process but also allow managing learning progress monitoring. Technologies save resource and allow storing achievements /learning evidence (Daniel, 2021).
Digital Badges	Digital badges are used to indicate and identify achievements attained via both formal and/or non-formal education or monitor knowledge, skills and competences which could possibly be concealed through academic processes (Dyjur & Lindstrom, 2017).
Feedback	Feedback can be considered as a tool for exchanging information on student's work which is supposed to be for the purpose of learning improvement. Feedback exchanges can happen between peer students or teachers and students (Carless, 2015).

All the above listed assessment methods contribute to facilitation and enhancement of student learning. Assessment methods such as group work, projects, and e-portfolios, etc., have been identified as useful in engaging online learners and can create effective means for authentic assessment, leading to facilitation and enhancement of learning (Fanfarelli & McDaniel, 2017). Besides, involving learners in the designing of assessment strategy as well as using a TEL environment tools for the structuring of the assessment and recognition processes can significantly contribute to ensuring the principle of transparency in assessment (Haldane & Wallace, 2009).

Tools for Assessment. With the increasing popularity of technology enhanced learning and its forms, the assessment tools in TEL environments have become extremely relevant,

therefore, it is important to take a closer look at the concept of *assessment tool* in a TEL environment. Generally, such assessment tool in a TEL environment is a technological component or a piece of software that is embedded in a particular TEL environment (or it can be external element, but it can be incorporated within or used outside a TEL environment) and is used to perform or support learning as well as assessment tasks (Atkinson, 2013). Or to put it in other words, assessment tools assist in assessing student learning and can provide different options to assess students.

Another term of an assessment tool in a TEL environment supports the previously expressed idea by claiming that such tools are any digital aids that enable and facilitate assessment of both student learning and learning outcomes. However, researcher McVey (2016) elaborates further by specifying the application areas of such technological aids, stating that TEL assessment tools can also be used to facilitate active student learning, to promote collaborative working, and to support peer learning, feedback, and assessment practices. Moreover, assessment tools in a TEL environment can also provide teachers with alternative assessment methods and enable monitoring and tracking of an individual student's learning progress at a given time (McVey, 2016). There are a lot of different tools that can be used for the purposes of assessment, but the most frequent examples include the following: quizzes and surveys, rubrics, online tests, reflective journals, e-portfolios, forums, etc.

Usually, an assessment tool in a TEL environment has a very specific function, can be employed to assess learner's content knowledge or skills, and collect data on student's learning and learning behavior (McVey, 2016). As discussed previously, the learning and teaching processes in TEL settings are rather different from face-to-face learning and teaching practices, as technology provides easy access to massive amounts of learning materials and stresses the autonomy of a learner, by shifting the focus from a teacher to a learner (Scheiter & Gerjets, 2007; Lawless & Brown, 1997). As TEL often relies on the principles of constructivism, i.e., putting the learner in the center, the ability to pick certain tools to suit learner's needs becomes extremely relevant.

Tools can be used to support different purposes of assessment; therefore, tools can be categorized by the intended purpose. To illustrate this, tools can be categorized in terms of what type of learning and assessment support they provide. For instance, tools can be used to provide different content materials or tools can be used to help students to monitor their own learning progress (i.e., support students in metacognitive activities), or tools can be used to support acquisition and assessment of higher order skills and competences (Hannafin, Land & Oliver, 1999; Jonassen, 1999). Finally, assessment tools can be used to support active student learning, facilitate team-building activities, and foster peer learning. They can offer alternative assessment

methods and can be used to check in on student learning in real time. Therefore, assessment tools in a TEL environment may be beneficial in facilitating assessment procedures.

TEL environments offer a huge selection of various tools for assessment. The assessment in a TEL environment usually includes situations where different assessment methods and TEL environment tools are combined to reach the intended assessment purpose. However, even though the advantages of TEL environment tools for assessment are undeniable, there are still some considerable disadvantages and challenges. For instance, one of the key challenges in online assessment is ensuring *authenticity*. To address this issue, it is recommended to develop an assessment strategy using a wide range of assessment methods and tools throughout the entire study period.

To better understand the technical possibilities in terms of the variety and functionality of different tools for assessment in a TEL environment, Moodle environment tools have been overviewed. To begin with, it is necessary to mention the fact that Moodle learning environment incorporates a variety of different tools to assess student learning outcomes as well as track student learning throughout the entire learning cycle (see Figure 2).

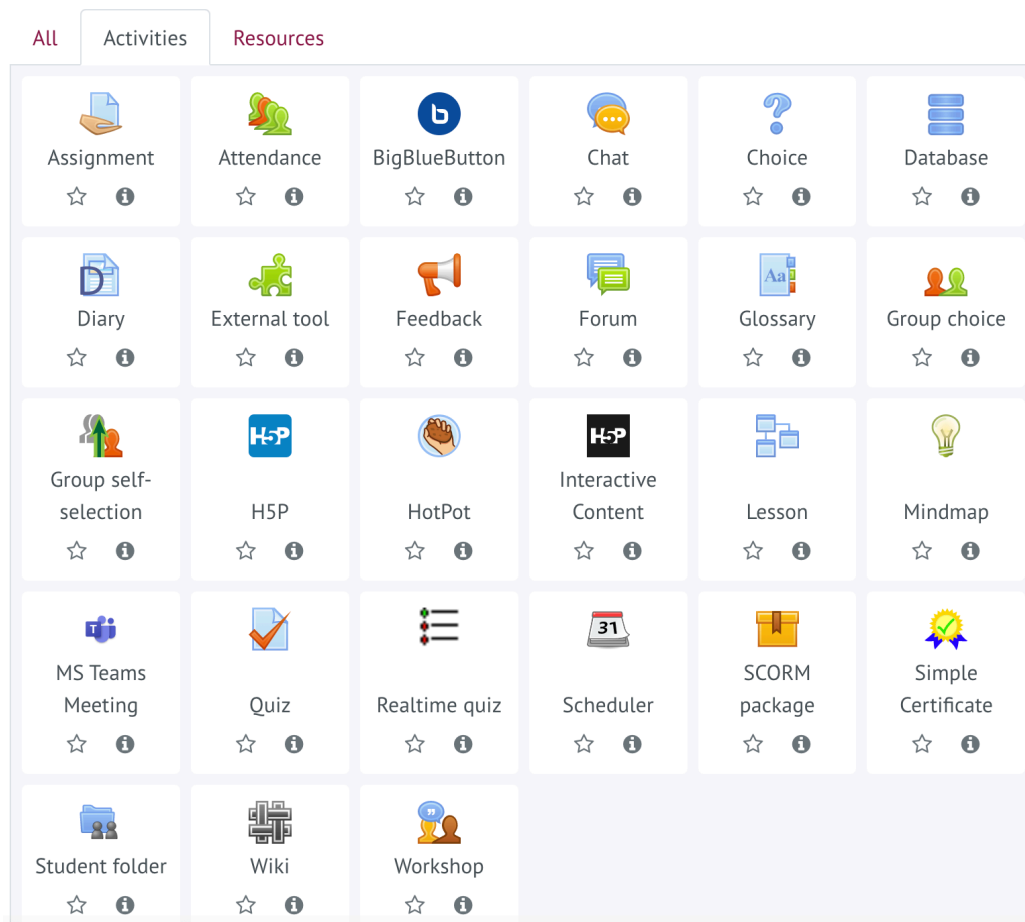


Figure 2. Tools in Moodle Learning Environment (VMU Moodle environment)

Teachers can choose from assignment submission option to more interactive assignments such as workshop, etc., that can be used to facilitate both learning-oriented and/or summative assessment. The key challenge here becomes selecting tools that best suit the goal of the assessment. For that reason, teachers should have a clear vision on how assessment should be implemented and be aware of the functionalities of different tools.

As mentioned, Moodle learning environment provides teachers with opportunities to perform assessments of the intended learning outcomes, e.g., teachers can create tests, quizzes, use interactive tools for assessment, (e.g., H5P tool (see Figure 3). However, these tools can be used as part of either a formative or summative assessment strategy, depending on what purpose the test is supposed to serve and at what point of study cycle it is offered to the students.

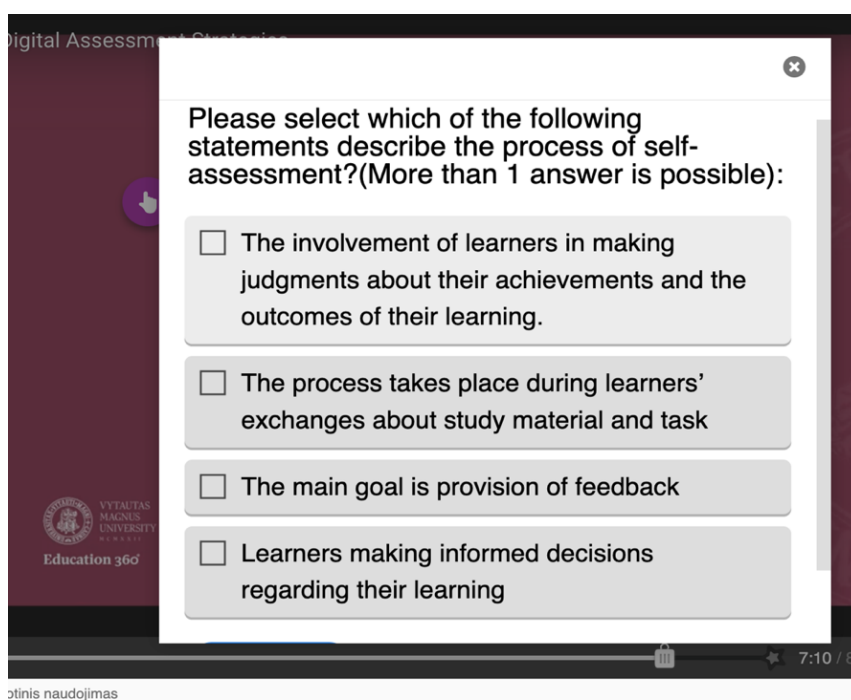


Figure 3. Test Segment, created using a H5P tool (VMU Moodle environment)

One of the advantages of using the H5P tool is that the students have an opportunity to listen to the recording of the lecture, see the lecture slides or any other related material or links for further information, and then perform a self-check test. In such way students can check how well they have understood the study materials and identify the current gaps in learning. Also, since this tool offers an increased interactivity level, this can positively affect student's engagement and motivation to study, especially this is extremely relevant in fully online learning settings, where one of the major struggles is low student involvement. Overall, this tool enables a more interactive approach to learning and assessment.

Also, teachers can explore the Moodle environment for designing different tests for their students. The Moodle environment offers a wide range of test items that can be used to assess a

student's content knowledge, skills, and competence. Teachers can design various tests by using multiple choice questions, true/false statements, fill in the blank questions, drag and drop matching items, etc. Again, the selection of the test item merely depends on what teacher intends to assess.

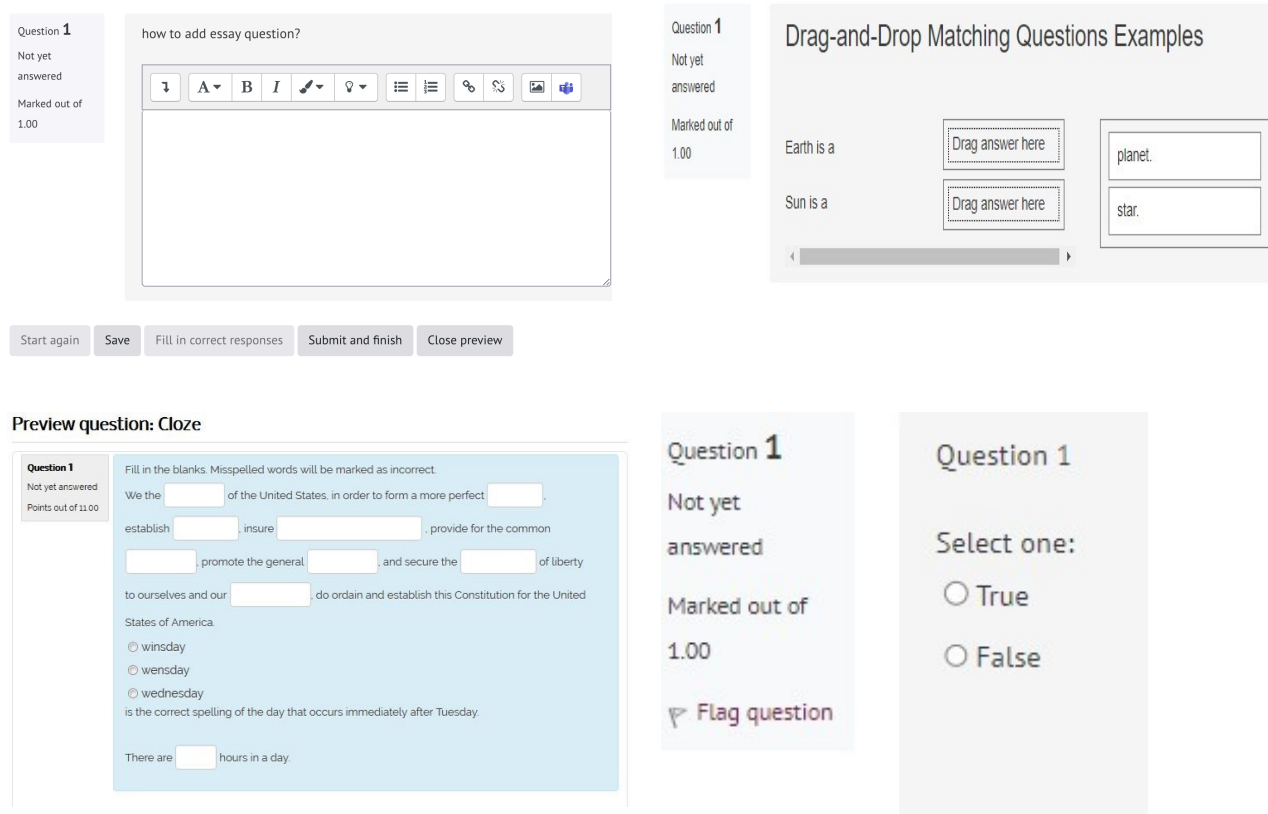


Figure 4. Examples of different Test Items (VMU Moodle environment)

Additionally, the grading of test items can be fully automated, thus it may save teacher's time and reduce their workload. Besides, if test is not a suitable format for assessing student's skills, knowledge and competence, the teacher has an option to assign tasks on Moodle and ask students to submit papers through the paper submission tool. In this way, teachers can assess more intrinsic skills such as writing and critical thinking skills in students. For example, by designing open, essay type questions teachers can assess a student's understanding of the topic as well as these higher-order skills. The teacher can provide a precise description of the assignment, give evaluation criteria, and set the due dates, using Moodle assignment submission tool. Once the student submits their work through the system, the teacher can grade and provide feedback on the paper in Moodle without any need to first download the submitted papers.

In short, teachers can use tools for assessment in a TEL environment to create tests to check students' knowledge on a certain topic, to evaluate whether the intended learning outcomes have been reached, and to monitor student's learning progress through implementation of several

incremental tasks, using both interactive and less interactive tools for assessment. Here, just a couple of different options have been described, however, there are a lot of different tools that can be used for both assessment of student learning as well as assessment of learning outcomes. Also, a fact should be considered that external tools can be compatible and integrated within the Moodle environment, thus, teachers have a wide selection of tools to implement the selected assessment strategy.

1.2.3. Possibilities and Challenges of a Technology Enhanced Learning Environment for Designing Learning-Oriented Assessment

Possibilities. Designing and implementing teaching/learning and assessment in a TEL environment can be advantageous, as a TEL environment offers numerous possibilities to enable various pedagogic solutions to enhance student learning. To begin with, one of the major advantages of teaching/learning and assessment in a TEL environment is the flexibility of learning as students have more control over their learning and technical capacities of a TEL environment allow making teaching/learning and assessment more learner centered (Joosten & Cusatis, 2020). As TEL environment enables teaching/learning and assessment in synchronous and asynchronous manner, students can easier cope with time, physical restrains as well as any other personal obligations such as family, work, etc. (Joosten & Cusatis, 2020). However, flexibility of teaching/learning and assessment, offered by a TEL environment, requires adequate preparation and a set of skills and competences, e.g., students need to digitally literate to be able to use a TEL environment and its tools to participate in teaching/learning and assessment activities as well as to engage in any collaborative learning practices and efficiently use technologies for both synchronous and asynchronous communications, finally, they are required to demonstrate good time-management and organizational skills (Joosten & Cusatis, 2020). Having insufficient level of the afore-mentioned skills, students are more likely to fail at handling the level of flexibility that a TEL environment brings to teaching/learning and assessment.

Another benefit of a TEL environment and its tools is that technologies allow teachers to constantly monitor and track student learning to support students, experiencing difficulties, and adjust the pedagogy to correspond with student needs (Fang et al., 2019; Chen et al., 2020). As a result, a note should be made that “teaching and learning processes need to be assessment-centered to provide learners with opportunities to demonstrate their development of skills and receive support to enhance their learning” (Gikandi, Morrowa & Davis, 2011, p. 2334). Well-designed assessment within a TEL environment, which puts a primary focus on student learning rather than

assessing content knowledge, becomes one of the key elements to facilitate and enhance student learning (Ferrão, 2010).

A TEL environment can indeed offer a variety of innovative, flexible, and personalized ways for the students to engage with learning materials, peers, and teachers (Hiltz & Goldman, 2004; Moore et al., 2021). For instance, there is evidence in a scholarly literature that the use of certain tools that can record student's spoken presentations, can be advantageous in facilitating student self-assessment (Murphy & Barry, 2016). A TEL environment changes the interaction channels by eliminating the spatial, physical and time boundaries, as it allows for both synchronous and asynchronous teaching/learning and assessment, interaction, and collaboration modes (Hiltz & Goldman, 2004; Moore et al., 2021; Jeong & Hmelo-Silver, 2016). Thus, offering countless opportunities for inclusion and personalization of teaching/learning and assessment (Hiltz & Goldman, 2004; Moore et al., 2021).

Another added benefit is that a TEL environment allows implementing so called a “multi-modal approach” (Crews & Wilkinson, 2010, p. 411), meaning that a TEL environment and its technical capacities allow combining various technological elements to facilitate, enhance assessment and feedback provision (Deeley, 2018). In other words, the same technological element or tool can be used for two different purposes, e.g., feedback provision and assessment, at the same time. In addition, varying interactivity levels of the technological tools, e.g., audio-visual tools, offer better options for personalization of feedback and assessment, as teachers can provide recorded feedback against the pre-determined assessment criteria in a timely fashion (Eckhouse & Carroll, 2013; Carruthers et al, 2015). This eventually contributes to the increase of student engagement levels and supports the idea of feedback as a dialog, which is important for LOA (Carless, 2006; 2013; Nicol, 2010; Murphy & Barry, 2016; Parkin et al., 2012).

Again, a TEL environment has the capacity to facilitate rich feedback provisions by reducing turn-around times in feedback provision and allowing for a variety of different feedback modes and channels, e.g., synchronous verbal feedback, asynchronous recorded oral feedback, written feedback, written comments against the given criteria, etc., thus, students can easier benefit from feedback provision (Jonsson, 2012). Again, this is highly advantageous, as feedback provision is inseparable part of efficient LOA implementation to facilitate and to enhance student learning.

Finally, one of the main goals of implementation of learning technologies for teaching/learning and assessment is to enhance and to metamorphose currently existing traditional practices in higher education (Schneckenberg, 2009). Indeed, a TEL environment not only has enabled but also innovated teaching/learning and assessment through the use of technology supported and enabled pedagogical decisions as well as it has facilitated interaction and

collaboration between the stakeholders involved (Greenhow, Graham & Koehler, 2022). In fact, the research suggests that e-assessment is one of the key elements, driving HE transformation as it forces teachers to rethink currently existing pedagogic practices and to adapt measures to fully embrace the potential of teaching/learning and assessment in a TEL environment and to provide learners with rich learning experience (Whitelock, 2009). Thus, migrating teaching/learning and assessment to a TEL environment can be advantageous as technologies offer a variety of options for collaboration, interaction, mobility, increase flexibility, accessibility, as well as transparency, allow for personalization of learning and assessing, and, finally, is cost-efficient (Ozkan & Koseler, 2009).

Challenges. A TEL environment indeed has the potential to facilitate and enhance teaching/learning and assessment, providing high quality education (Dhawan, 2020), however, the barriers may occur when HE institutions, teachers and students are not ready to embrace the digitalization. With the technology brought innovations, benefits and possibilities, teaching/learning and assessment in a TEL environment has introduced a number of challenges for teachers, students, and HE institutions (Greenhow, Graham & Koehler, 2022). Certain institutional decisions, insufficient institutional support mechanisms, insufficient level of digital skills and competences may result in deterioration of the quality of teaching/learning and assessment in a TEL environment. There are many factors that influence the quality of teaching/learning and assessment in a TEL environment. These factors can be divided into institutional level issues and learning design problems. For instance, certain institutional decisions regarding the use of technologies in educational processes, undeveloped or poor technological infrastructure within education provider, lack of financial support may cause obstacles for successful implementation of teaching/learning and assessment in a TEL environment (Muilenburg & Berge, 2005).

In addition to these external and institutional level obstacles, the quality of teaching/learning and assessment in a TEL environment may be affected by poor learning design solutions (Maer, 2002). Poorly constructed teaching/learning and assessment in a TEL environment shares the following features: lacking or limited levels of interaction in both synchronous and asynchronous manner (Thomas & Thorpe, 2019; Kennedy, 2013), poorly designed and implemented assessment strategy which mainly focus on summative aspect of assessment, reliance on limited number of technological solutions for assessments, different in complexity scale, poor online learning design and its implementation, limited collaboration and self-regulation opportunities, missing constructive alignment, and, finally, emphasis on teacher-led instruction (Greenhow, Graham & Koehler, 2022). Furthermore, teaching/learning and assessment in a TEL environment are always associated with low student participation and

engagement because both teachers and learners have not been properly prepared to fully embrace new demands for pedagogy, dictated by the technology (Martin, Sun & Westine, 2020). Poor learning design and assessment in a TEL environment, e.g., when learning contents are purely theoretical, and assessment is designed to only assess student's knowledge on the topic, without giving students any opportunities to get more hands-on approach on the topic, (Dhawan, 2020), leads to reduced student engagement and dissatisfaction of learning in a TEL environment.

In addition, the common belief that copying lecturing and assessment methods from face-to-face classroom to a TEL environment is quick, yet productive way to provide students with high-quality teaching/learning and assessment experience has been proven wrong (Serhan, 2020). Using video-conferencing tools to deliver lectures for students, without further exploring a TEL environment opportunities and solutions for teaching/learning and assessment leads to failure, as students begin feeling disconnected and disengaged, eventually losing interest and motivation to connect (Serhan, 2020). As a rule, currently existing pedagogies that work well in face-to-face classroom are not compatible with the intricacies of a TEL environment (Thomas & Thorpe, 2019). Thus, the pedagogy requires to overgo major revisions before the transition to a TEL environment, consequently, this allow better accommodate learners' needs and facilitate and enhance their learning. Often, teachers find themselves struggling with this task as it requires them to step out of their comfort zone and embrace unfamiliar (Harasim, 2017). However, adapting currently existing pedagogical strategies and techniques is not enough as teaching/learning and assessment in a TEL environment "requires changes in perceptions of educator, not merely learning new techniques" (Teräs, 2016, p. 258). Teachers are still in the process of refiguring their new roles in teaching/learning and assessment in a TEL environment (Tsai, 2016).

In teaching/learning and assessment in a TEL environment, it is commonly accepted that teacher presence is minor when comparing to in-person classroom contexts, however, due to specific nature of a TEL environment and pedagogical specifications for online learning design, a lack of teacher presence has no direct effect on student learning and performance (Rosenthal & Walker, 2020; Cutsinger, Wall & Tapps, 2018). Nonetheless, the studies suggest that students often seek for higher teacher involvement, as their engagement levels in courses with increased rate of teacher presence are considerably higher (Wilson et al., 2018; Greenhow, Graham & Koehler, 2022; Rosenthal & Walker, 2020). However, both students and teachers have to acknowledge and embrace their changing roles in online learning. Teachers can no longer be trainers, actively leading students through knowledge acquisition processes, instead, teacher's presence should be seen through the lens of mentoring (Steffens, 2008). In teaching/ learning and assessment in a TEL environment, teacher's main function becomes supporting students in their learning, whereas students are expected to take on more active role, i.e., to become proactive and

self-directed knowledge constructors (Steffens, 2008). The embracing of changing roles is often considered as one of the key challenges for efficient teaching/learning and assessment in a TEL environment.

Another interesting fact is that asynchronous discussions in a TEL environment are most used method to engage students in collaborative learning (Greenhow, Graham & Koehler, 2022;). Discussions are used to increase interaction between students, enable communication about study topics and facilitate peer learning and feedback provision (Park et al., 2015; Woods & Bliss, 2016). Teachers can choose whether participation in discussions is obligatory or not, or whether it is incorporated within the assessment strategy (Thomas & Thorpe, 2019). Even though, discussion in a TEL environment can be an advantageous tool or be integral element of assessment strategy, the issues often related to organization and facilitation of the discussions are prevailing (Thomas & Thorpe, 2019; Greenhow, Graham & Koehler, 2022;). However, in the study by Thomas and Thorpe (2019), the teacher's involvement in asynchronous discussions is again being questioned, as the trend has been observed that the higher the teacher involvement, the less students will participate in such discussions. The discussion threads tend to get shorter, with student entries at a minimum and at a basic cognitive level (Thomas & Thorpe, 2019). In the meantime, students have happened to be pro-active in student-led asynchronous discussions (Thomas & Thorpe, 2019).

Indeed, student facilitation of asynchronous discussions in a TEL environment can directly influence the level of student engagement and the quality of discussion contents, however, teacher-led asynchronous discussions have forced students to engage into reflective and metacognitive practices (Szabo, 2015; Baran & Correia, 2009; Thomas & Thorpe, 2019), as teachers are “able to keep discussions on topic and ensure equity, and are better at guiding learning” (Phirangee, Demmans Epp & Hewitt, 2016, p. 149). Thus, a common recommendation for asynchronous discussions in TEL environments to be efficient in supporting assessment and enhancing student learning is that changing teacher and student roles should be acknowledged, as students are required to take a pro-active role, while teachers should step aside, monitoring the discussions and making interventions, based on demands (Szabo, 2015; Thomas & Thorpe, 2019). Consequently, a change in attitudes and a set of digital skills and competences is required as both students and teachers need to be able to manage the intricacies of a TEL environment and other tools that are implemented within the course, otherwise, this will have a direct influence on the academic performance and quality of teaching/learning and assessment.

Finally, a TEL environment introduces challenges related to absence of a learning community and limited and sporadic interactions between involved parties, technical issues, and difficulties in realizing learning goals (Song et al., 2004), which can lead to poor performance and

disengagement and even confrontation (Parkes, Stein & Reading, 2014). To illustrate, implementation of teaching/learning and assessment in TEL environments has also received student confrontation (Deeley & Bovill, 2017), as their preferred educational practices that are more common in face-to-face educational contexts, while expressing distrust and skepticism towards innovative technologically enhanced teaching/learning and assessment practices. Indeed, a transition to teaching/learning and assessment in a TEL environment have forced students to take on more responsibilities and step out of their comfort zone, which often appeared to be unwelcome experience (Deeley & Bovill, 2017, Deeley, 2018). The opposition students have shown to making use of technology has been expressed through levels ranging from minor to extreme. Opposition, however slight, is seen as students' nervously approach new procedures which implement technology (Deeley, 2018). Thus, the need for clarifying the how and why of the response and assessment procedures to a class at the start of instruction. (Deeley, 2018). What the study showed, unsurprisingly, is that opposition was more likely at the times when the technology effectively stopped working. Yet, distinctions could be made to differentiate the students' almost instantaneous opposition and opposition which formed slowly, over time, when the use of the technology was seen as undependable or problematic (Deeley, 2018). For some learners, these technological issues caused frustration and, accordingly, led to disengagement.

2. RESEARCH METHODOLOGY

Considering the aim and the research questions and objectives, the entire study relies on qualitative approach to the research. The empirical part of this research consists of two parts. The first study has been done by implementing qualitative approach, by conducting semi-structured interviews with the experts in the field of technology enhanced learning and assessment, whereas, the second part of the empirical research implemented a case study method, which consisted of database analysis and qualitative research through semi-structured interviews with HE teachers at the selected HEI. As already mentioned, the entire research is aimed at a university level, and it mainly relies on qualitative approach. The research process and its duration are explained in Table 8 below.

Table 8. Stages in the Research Process

Stage	Process	Time Period
I. Theoretical Analysis	Analysis of scholarly literature	2019 October - 2023 January
Two-stage Empirical Research		
II. Defining LOA in a TEL Environment (Expert Interviews)	Qualitative research through semi- structured interviews with experts	2021 February - May
III. Case Study	(I) Designing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Teacher Interviews)	2021 June - December
	(II) Implementing Learning-Oriented Assessment in a TEL environment (Database. Analysis of Courses on Moodle)	2021 June - December

As demonstrated above, scholarly literary analysis is being performed to examine the main concepts and their characteristics. As a result, the concept of LOA has been explained, and its main characteristics have been revealed. Having performed the initial stage of literary analysis, several interviews with TEL and assessment experts have been performed to evaluate the contribution of a TEL environment for LOA to facilitate and to enhance student's learning.

Once literary analysis and interviews with experts have been completed, the next step was to implement a case study method to find out how LOA is applied in online and blended study courses in a TEL environment. It was planned to interview teachers who have designed and taught courses in Moodle environment and then to observe approximately 30 study courses. This helped to learn about the implementation of LOA, assessment methods, and TEL environment tools that teachers have been using to facilitate and enhance student's learning as well as to find out how exactly the learning process can be enriched.

The research design scheme (see Figure 5) and the case study research design scheme (see Figure 6) are provided below.

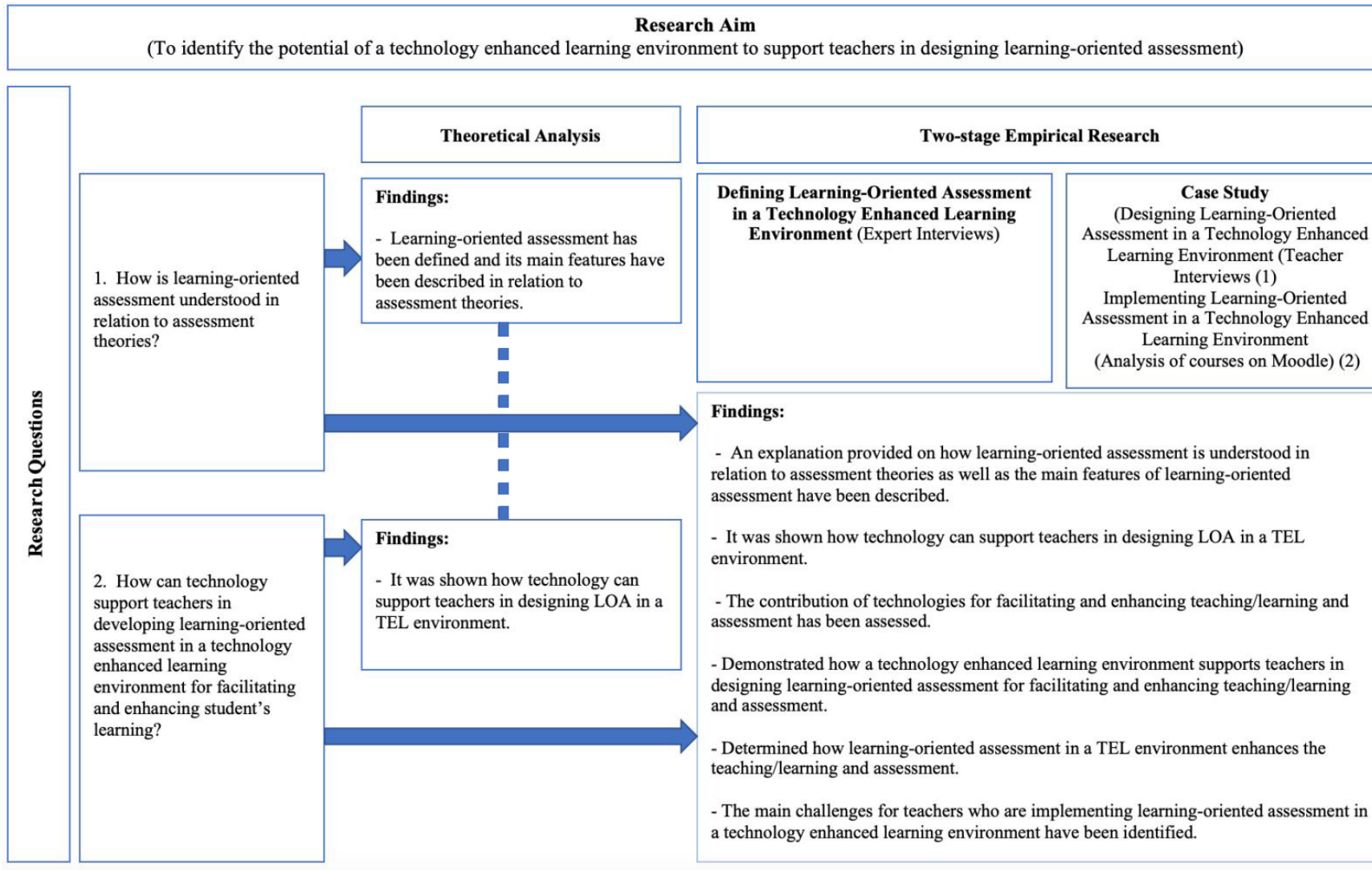


Figure 5. Research Design Scheme

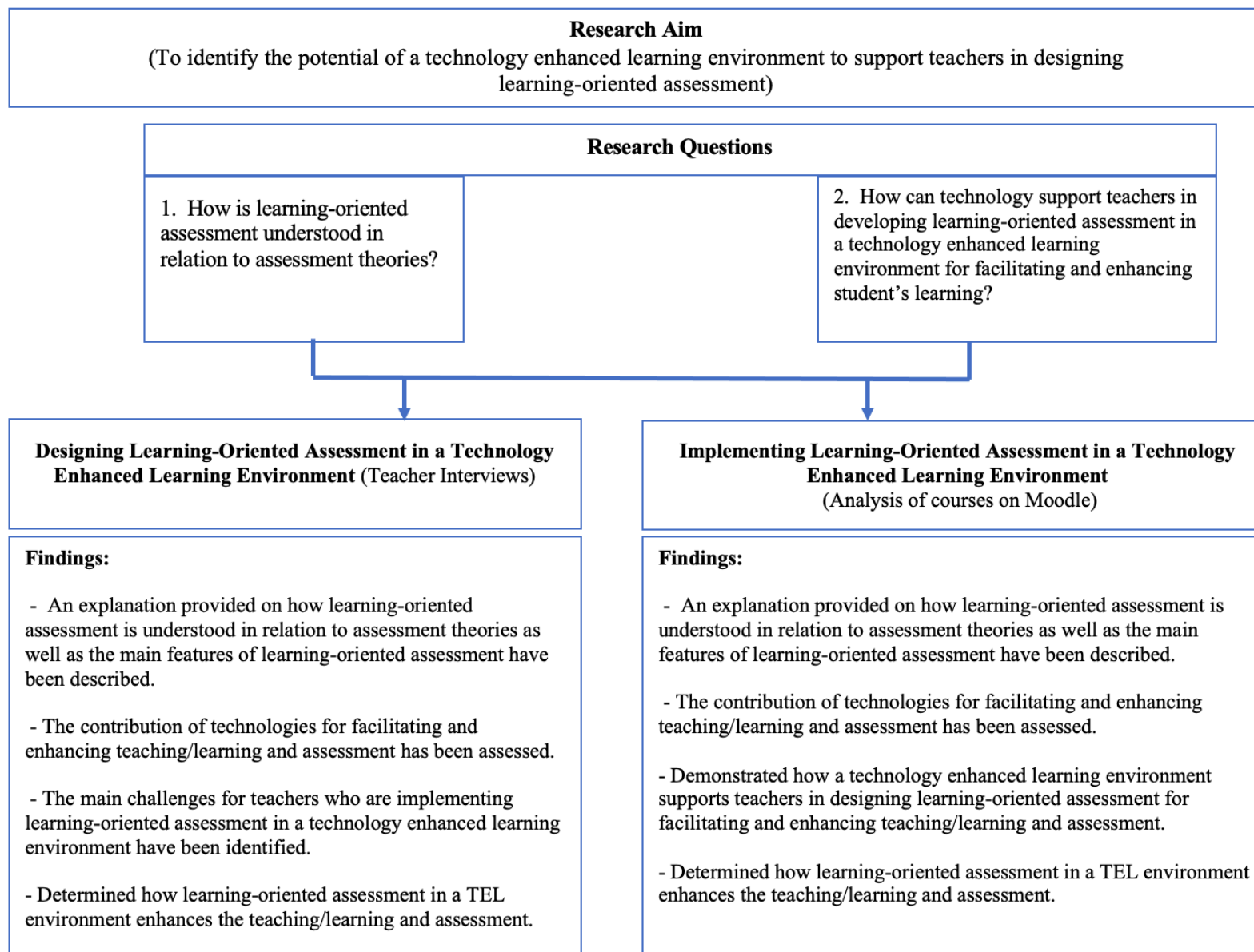


Figure 6. The Case Study Research Design Scheme

2.1. Defining Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Expert Interviews)

Qualitative Inquiry. In this initial stage of the empirical research, a qualitative approach has been implemented. A qualitative inquiry has been found to be essential when a comprehensive explanation of the unexplored phenomenon is needed (Creswell, 2007). Besides, qualitative inquiry is employed when quantitative inquiry and statistical data analyses methods are inadequate or incompatible with the research aim and objectives (Creswell, 2007). Since the LOA in a TEL environment has not been thoroughly analyzed (Lunt & Curran, 2010), there is a gap in research which could reveal the potential of a TEL environment to support teachers in the development of LOA to facilitate and enhance student learning.

Purpose. The goal of this part of the research is to learn more about how LOA in a TEL environment. The experts are considered to be a primary source of information, as there is a gap in the research literature addressing this issue. Through this research, it was aimed at defining LOA in a TEL environment, by highlighting the main features of the phenomenon and determining its relation to the assessment theories. Also, it allowed determining the potential of technologies as well as assessing the potential of LOA in a TEL environment to facilitate and enhance teaching/learning and assessment. Finally, this research has helped to identify the potential challenges that teachers, designing LOA in a TEL environment, may face.

On the basis of the findings of this part of the empirical research (Expert Interviews) and theoretical analysis, further steps in the empirical research (e.g., the Case study) has been developed.

Data Collection. The data collection process includes the following: selecting of research participants, receiving their agreement to take part in the research, and conducting interviews to collect data (Creswell, 2012). As a data collection method, semi-structured interviews with open-ended questions, the focus and latitude of which had been provided to the subject beforehand, has been used. Based on the characteristics of LOA and research questions, interview questions have been designed mainly addressing the following investigation: a) which characteristics and the potential of LOA should be highlighted and supported by technology enhanced learning environment solutions? b) how a TEL environment may support LOA implementation and which challenges may occur? However, often the specifics changed based on individual replies and contexts, which is a common feature of a semi structured interview (Cohen, Manion & Morrison, 2018).

As a data collection method, semi-structured interviews with open-ended questions have been used. The questions for the experts are presented in the table below.

Table 9. Interview Questions for the Experts

Research Parameter	Interview Question	Function
How is learning-oriented assessment in a TEL environment understood in assessment strategies?	Within the context of technology-enhanced learning, how do you define learning-oriented assessment?	To provide understanding of the phenomenon
How can a TEL environment support teachers in developing learning-oriented assessment for monitoring a student's learning progress?	How can teachers, who are designing LOA in TEL environment for tracking student's learning progress, benefit from learning technologies? (Examples?)	To identify the benefits of LOA for teachers
To define learning-oriented assessment in the framework of existing assessment theories	How do you define learning-oriented assessment? Why?	To provide understanding of the phenomenon
To evaluate the contribution of technology for monitoring the learning process	What value do learning technologies have for the monitoring of a student's performance throughout the entire learning period?	To determine impact
To determine how a TEL environment can assist teachers in designing LOA for facilitating student's learning	How would you develop LOA in a TEL environment?	To learn more about designing of LOA
To evaluate how LOA in a TEL environment enhances the learning process.	How should LOA be applied in a TEL environment to enhance student learning? Can you please give any examples?	To learn more about designing of LOA
	How can implementation of LOA in a TEL environment contribute to enhancing student learning?	To determine benefits of LOA for students
	Why should teachers implement LOA in a TEL environment?	To identify benefits of LOA for teachers

Research Participants. The key to discovering the material needed is to speak with an appropriate coterie until data saturation is reached (Kvale, 1996; Cohen, Manion & Morrison, 2018). To meet the criterion of data saturation, nine interviews with key informants, i.e., the experts, researching in the fields of assessment in HE, LOA, and TEL, have been conducted. The analysis of the expert interviews has helped to evaluate the contribution of LOA strategy in a TEL environment for facilitating and enhancing student learning.

A purposeful sampling (Patton, 2002), to be specific, criterion sampling, has been applied to determine potential research participants. Purposeful sampling is beneficial as it allows to identify and choose research participants who are well-informed and skilled in the area of interest (Patton, 2002; Creswell & Plano Clark, 2011). For this research, the criteria for the selection of research participants included the following:

1. A respondent had to be researching in the fields of assessment in HE, LOA, and TEL for at least 10 years.
2. A respondent had to have prepared at least 20 publications in indexed databases on topics including: assessment in HE, LOA, and TEL.
3. A respondent is internationally recognized expert in the fields of assessment in HE, LOA, and TEL.

The characteristics of the research participants are provided in the Table 10 below:

Table 10. *Characteristics of Research Participants*

Respondent No.	Area of Expertise	Years of Experience	Number of Publications in Indexed Databases	Country
R1	Assessment in a TEL environment, Personalized Learning, Vocational Training	40+	187	Australia
R2	Assessment, LOA	20+	121	China
R3	Assessment, TEL	40+	46	Canada
R4	Assessment in a TEL environment, E-portfolios	10+	26	Ireland
R5	Assessment, Feedback	40+	203	Australia
R6	Assessment, TEL	30+	53	Lithuania
R7	TEL, Self-Regulated Learning	20+	42	Lithuania
R8	TEL	20+	29	Finland
R9	Assessment, Learning Analytics, Personalized Learning	30+	109	United Kingdom

Once the potential research respondents have been identified, invitation emails, which also included a Plain Language Statement (see Appendix 1), were sent out. The email addresses of the potential research participants have been found on various social platforms, e.g., Research Gate, LinkedIn, and university website pages with contact information. A total of 27 emails to various potential respondents were sent out, however, only 9 responses have been received with positive answer. Then time for the interviews were arranged. On the request, the research participants were given interview questions in advance. In the context of the COVID-19 pandemic and due to physical limitations because most of the interviewees are residing in different countries, the interviews have been conducted in a virtual setting on an online communication platform, e.g.,

Zoom. All the interviews were done in English, then transcribed in a word-by-word manner. Each interview lasted approximately an hour.

Data Analysis Method. An inductive qualitative content analysis (Miles & Huberman, 1994) has been used to analyze the transcripts. First, an initial examination of the transcripts has been performed, which allowed using keywords to highlight the dominant themes. Then, an in-depth analysis of the data has been done in the following manner: the collected data was coded in a sentence-by-sentence manner, which allowed emphasizing the importance of dominant themes, by enabling establishment of a system of the categories and subcategories in a very systematic manner. In the final stage, relationships between categories and subcategories have been determined as well as reliability and rationality behind them ensured.

2.2. The Case Study

Purpose and Background. A case study method is used when there is a need to carry out a detailed examination of a specific phenomenon in a contemporary context to highlight its distinctiveness. Yin (2018) emphasizes the importance of the context of a case by suggesting that a case and its context should not be treated as separate things. As a result, one of the distinct features of a case study method is vibrant depictions of a case and its context (Yin, 2009). An exploratory and explanatory nature of a case study enables depiction of real-life situations at a given point of time by highlighting causality relations and the influence of the investigated phenomenon (Cohen, Manion & Morrison, 2018; Yin, 2014).

Another significant thing is that a case study affords a distinctive illustration as to how and why actual users respond in actual conditions, allowing readers to grasp the concepts with greater clarity rather than by merely exhibiting conceptual ideas or beliefs (Yin, 2009). Moreover, a case study can allow people to comprehend precisely how models and theoretical concepts can be joined into a coherent, working model (Yin, 2009). Thus, a case study method is applied when the main goal is creation of new knowledge. Finally, a case study approach strongly is based on constructivism ideas (Yin, 1984; 2009; 2014, 2018). Since this dissertation relies on constructivism ideas, a case study method is considered adequate and appropriate.

Considering the nature and the purpose of a case study method and the aim and the research questions of this dissertation, a decision to implement a case study approach for the stage of the empirical research has appeared to be reasonable. Through this case study research, it is planned to provide answers to both research questions.

Unit of the Case Study. Case studies are universal as they focus on a specific phenomenon, program, event, activity, process, or one or more individuals (Creswell, 2009; Yin

1984; Hitchcock & Hughes, 1995; Cohen, Manion & Morrison, 2018). According to that, an object of the case study can be anything, thus, it is important to define it beforehand. A case study method is implemented when there is a need to provide an in-depth analysis of a rather small sample (Yin, 1984). Besides, case studies are demarcated by specific limitations in several categories, including time, space/location, and environment (Cohen, Manion & Morrison, 2018; Hitchcock & Hughes, 1995). Thus, case studies can be limited as the research sample is relatively small, consequently, it does not provide sufficient evidence to make any generalizations about the phenomenon of interest and the research findings are usually context-bound (Yin, 1984). Nonetheless, case studies are extensive and complicated as the researcher must be able to handle an excessive quantity of data and documentation in a very systematic manner (Yin, 1984). Thus, to alleviate sophisticated data handling procedures and maintain systematic approach to data collection and analysis, it was necessary to set criteria for data collection and analysis and to develop a structured system as well as a research plan beforehand.

Taking that into consideration, a decision has been made that for the purpose of this research, a unit of the case study is a HE institution, i.e., a state-funded university at a Baltic state, the analyzed blended or fully online courses on Moodle learning environment, and teachers who designed these courses and implemented assessment strategy within the course on Moodle.

A total of 28 blended or fully online study courses on Moodle learning environment that are offered in the selected HEI. The courses are active and have been offered for students either spring or fall semester of 2021. The selection criteria for the Moodle study courses are listed below and include the following:

- The course is offered at undergraduate or graduate levels.
- You use at least one of the following Moodle tools: progress bar, calendar, discussion forum, digital badges, to facilitate and improve assessment and student learning.
- You can interpret and use learning analytics and/or log data to inform teaching and to prevent undesired learning behavior.
- In your course, you use technologies to give feedback for students (e.g., audio, video feedback, AI generated feedback, and other Moodle options to provide feedback).
- In your course, you have implemented at least one of the following: student self-assessment, peer feedback, peer learning, teamwork, student self-reflection, discussion forum.
- The course is active and offered for students either spring or fall semester of 2021.

Type of a Case Study. Yin (2018) differentiates between holistic case studies, where the case is considered as a complete unit, and embedded case studies, where a number of incidents of

examination are presented within a case. Since a unit of the case study in this dissertation is a HE institution, i.e., a state-funded university at a Baltic state, the analyzed blended or fully online courses on Moodle learning environment, and teachers who designed these courses and implemented assessment strategy within the course on Moodle, a statement can be made that this dissertation implements a holistic case study method.

According to Yin (2013), case studies are classified as *descriptive*, *exploratory* and *explanatory*. If the need arises to investigate the connecting associations which are found to be overly complicated for surveys or experimental strategies, an explanatory case study should, in most circumstance, be employed (Yin, 2013). Exploratory case studies, on the other hand, delve into circumstances wherein the example (i.e., intervention) being appraised has no obvious or unique conclusions (Yin, 2013). According to Yin (2013), a descriptive case looks to portray the occurrence as part of the situation in which it happened. Considering that, for the purpose of this dissertation, an exploratory case study method has been applied.

Information on the Context. Prior discussing data collection methods in more detailed manner, some context information should be provided. The research is addressed at a HE level and takes place at Eastern European HE institution which offers face-to-face classroom, blended, and online learning. The selected institution has more than 10 years of experience in TEL. The selected HE institution uses Moodle as their main TEL environment. Also, it provides teacher support and training for academic staff to facilitate smoother integration of learning technologies in learning and teaching processes.

The selected university is a state-funded higher education institution, which offers a great number of study programs in all study fields, including humanities, social sciences, economics, natural sciences, arts, agricultural science, and computer sciences. Additionally, the university offers courses that are taught in various types of instruction such as face-to-face classrooms, hybrid, blended, and online learning. The selected HEI is constantly working on improving their services, by fostering innovative teaching and learning methods, integrating learning technologies to improve learning experience for students and quality of studies as well as to increase accessibility of education.

The selected HEI has introduced blended and online teaching and learning in 2009 by integrating a technology enhanced learning environment (i.e., Moodle) and it has been using it from that time on. The university has had to overcome some challenges as teachers refused to use Moodle, however, as teachers started exploring new and innovative ways of instruction, more and more of them have chosen to move their courses into Moodle. In fact, to accelerate the migration of study courses to Moodle, institutional guidelines have been published which, in fact, explained the requirements for the teachers how to adapt or create study courses for the TEL environment.

These guidelines have included organizational, structural criteria and content requirements for blended and online learning. As a result, a statement can be made that the integration of blended and online learning approaches has been promoted at administrative level and implemented by exploiting the bottom-down approach.

Furthermore, at the selected HEI, there are three institutionally established and promoted levels of study course preparation for a TEL environment (see Table 11).

Table 11. A Study Course Preparation Levels for the Technology Enhanced Learning Environment in a Selected Higher Education Institution

Criteria	1st Level	2nd Level (Blended studies)	3rd Level (Online Studies)
Course Status in terms of Certification	Course has to be certified for the 1 st Level (and awarded with a badge)	Course has to be certified for the 2 nd Level (and awarded with a badge)	Course has to be certified for the 3 rd Level (and awarded with a badge)
Curriculum Preparedness for a TEL environment	Only learning resources are provided in Moodle	Learning resources and activities are designed in such manner which not always require face-to-face interaction	Learning resources and activities have to be designed for fully online instruction
Amount of Course Curriculum in Moodle (%)	20-49%	50-90%	91-100%
Delivery Mode	Learning and teaching happen face-to-face, using TEL environment in the classroom	Combination of face-to-face and online synchronous and asynchronous learning and teaching	Fully online synchronous and asynchronous learning and teaching

On the evidence of the table above, to be eligible for the first level, a study course needs to be registered on a Moodle environment and less than half of the study content has to be uploaded. Then, if a study course is designed in such way that not all the interactions and activities require physical contact, and up to 90% of the study materials are uploaded in Moodle, the course can be upgraded to a second level. The second level defines the requirements for blended learning in the selected HE institution. Finally, there is a third level of a study course preparation, which outlines the main characteristics of online learning. According to the regulations, a study course can be taught at fully online mode if more than 90 % of the study content is uploaded, and the entire instruction and assessment can be carried completely remotely, using Moodle tools and/or other technological solutions.

Boundaries of a Case Study. The case study is bounded by several context-related components, including institution, course, and teachers. The case study has been conducted in a specific HE institution, which uses a TEL environment, e.g., Moodle, to manage blended or online

studies. Moreover, only those courses, which have implemented LOA strategy have been analyzed. Therefore, the number of courses that were eligible for the analysis has been reduced significantly. Also, only teachers, who were willing to participate in the interviews and share their experiences on designing and implementing LOA in a TEL environment, were invited.

Even though students are inseparable part of teaching/learning and assessment, and their pro-active involvement is required for an efficient implementation of LOA in a TEL environment, in the context of this research, the student agency was not the center of the discussion. The key here was to depict LOA designing in a TEL environment from teacher's point-of-view and determine how technology supports teachers in development of LOA strategy for facilitation of learning.

Finally, even though LOA is closely related to learning design and its development, this research does not focus on the issues directly related to the learning design, as it is beyond the scope of the dissertation.

Data Collection. From a Yinian perspective, case study research should rest upon multiple sources of evidence, with data needing to converge in a triangulating fashion, and benefit from prior development of theoretical propositions to guide data analysis and collection, thus, allowing for a combination and integration of several different data collection and analysis methods, e.g., qualitative, quantitative methods, experimental research, and action research, etc. (Cohen, Manion, and Morrison, 2018; Creswell, 2007; Yin, 2009). Combination of various research methods and approaches can provide rich depictions, clarifications, and examples of the studied phenomenon (Yin, 2009), to put it in other words, collecting a chain of evidence. Therefore, for the purpose of this dissertation, two different data collection methods have been applied, including:

- (1) the qualitative research through semi-structured *interviews with HE teachers* who have designed and teach courses have been performed,
- (2) followed by *database analysis* of the selected study courses on a TEL environment (i.e., Moodle learning environment).

The detailed explanations of the data collection methods are provided below.

(1) Designing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Teacher Interviews)

Data Collection Method. A semi-structured interview method has been chosen as a data collection method for the research with HE teachers. Below, ten main interview questions are presented and explained by highlighting their function. The questions for the interview are based

on the findings of theoretical analysis of scholarly work as well as the empirical findings of expert interview analysis. In Table 12, a list of ten main interview questions is provided and their function is indicated.

Table 12. Interview Questions for Research Participants (Teachers at the selected higher education institution)

Question	Function
How your assessment strategy implemented within Moodle support learning-oriented assessment?	To determine how chosen assessment strategies comply with ideas of LOA
Could you please describe the assessment strategies that you use in your Moodle course? What tools are you using to implement them?	To learn about practical implementation of assessment strategy in a TEL environment, using its tools
How does the assessment strategy that you implemented in your Moodle course help to facilitate student learning? Can you give examples?	To learn about how applied assessment strategy facilitates student learning
Which tools did you find most useful when designing and implementing assessment strategy in your Moodle course? Why? Please give examples.	To discover most efficient Moodle tools for student assessment
Did you find any tools that did not work with the assessment strategy you've chosen? Why do you think that happened?	To list inefficient Moodle tools for student assessment
How does learning-oriented assessment strategy that you use in your course in Moodle help you to track students' learning progress? Please give examples.	To find out how assessment strategy can be applied to monitor student learning progress; To list Moodle tools used for tracking
What difficulties/challenges did you face while designing and implementing learning-oriented assessment in Moodle? How did you deal with them?	To identify main challenges for teachers who develop and implement LOA in Moodle
What poses challenges for you as teachers to design LOA in a TEL environment? What kind of support did you receive while designing assessment in Moodle?	To indicate main obstacles for efficient development and implementation of LOA in Moodle
Now that you have experience in designing learning-oriented assessment in Moodle, is there anything that you'd change on regular basis in the strategy and why? What would you change? Why?	To find out what works and what does not work in assessment strategy and to learn more how assessment strategy can be improved
What advice would you give for fellow teachers who design learning-oriented assessment in Moodle for the first time?	To get some suggestions how to develop LOA in Moodle

As seen in the table, research participants have been asked to provide answers to at least ten main questions and several additional questions that vary based on situations and answers provided. All these questions were supposed to help to better understand the peculiarities of development and practical application of LOA in a TEL environment to facilitate and enhance learning.

Research Participants. In this dissertation, willing to select appropriate research participants, a purposeful sampling, more precisely, a criterion sampling (Creswell & Plano Clark, 2011), has been applied. The selection criteria for research participants are provided below:

Table 13. Selection Criteria for Research Participants

Criteria	Explanation
Experience	You are expected to have at least 5 years of experience (in teaching, assessing, and designing courses online).
Level	You are teaching at undergraduate or graduate level
Assessment Competences	You are using technologies to facilitate assessment process. Also, you can interpret and use digital evidence (e.g., learning analytics) on student progress to facilitate learning process. Finally, you use technologies to provide timely feedback for students.
Mode of Teaching	Your course(s) are accredited for blended or online mode.
Language	You speak English.

The selection criteria for research participants have been provided and explained to the potential research participants in the Plain Language Statement (see Appendix 3).

The search of potential research participants has appeared to be a struggling endeavor. To begin with, a short survey, developed using Google Form (see Appendix 7) to academic staff of the selected academic units have been sent. The main goal of the survey has been to gather contact information of staff members who would be interested in taking part in the research. Very few teachers have taken their time to fill out this short inquiry. Nonetheless, during this stage, several potential research participants have been identified. Next step has been to send out massive invitational emails for university academic staff, using internal HEI's emailing system. This method has not been very productive. In the first round of massive invitational emailing, almost no responses have been received. The second round of invitational emails after two weeks has produced even worse results, as the author of this dissertation has received multiple complaints from university IT personnel, teachers, and authority due to unwanted correspondence. Therefore, finally a decision has been made to contact teachers directly who have recently passed accreditations of their course preparation for blended or online learning. This strategy has produced the desired results, as a considerable number of research participants has been identified.

Once the research participants have been chosen, the interview dates have been confirmed. The main characteristics of research participants are represented in Table 14.

Table 14. Characteristics of Research Participants

Research Participant Number	Study Field	Teaching at Study Levels (e.g., undergraduate, graduate)	Years of Experience in Teaching Blended and/or Online Courses	Years of Experience in Assessing Students in a TEL Environment
P1	Political Science	undergraduate, graduate	5 years (Online and Blended Courses)	3 years
P2	Education Science	graduate	5 years (Online and Blended Courses)	2 years
P3	Humanities	undergraduate	20 years (Online and Blended Courses)	15 years
P4	Political Science	undergraduate, graduate, doctoral	10 years (Blended courses)	5 years
P5	Political Science	undergraduate, graduate	3 years (Online and Blended Courses)	5 years
P6	Education Science	undergraduate, graduate, doctoral	10 (Online and Blended Courses)	5 years
P7	Humanities	undergraduate, graduate	5 years (Blended Courses)	5 years
P8	Humanities	undergraduate, graduate	20 years (Online and Blended Courses)	5 years
P9	Education Science	undergraduate, graduate, doctoral	15+ years (Online and Blended Courses)	5 years
P10	Education Science	undergraduate, graduate	10 years (Online and Blended Courses)	10 years
P11	Humanities	undergraduate, graduate	15 years (Online and Blended Courses)	10 years
P12	Economics	undergraduate, graduate	11 years (Online and Blended Courses)	11 years
P13	Agriculture	undergraduate, graduate	7 years (Online and Blended Courses)	3 years
P14	Economics	undergraduate, graduate	5 years (Online and Blended Courses)	5 years
P15	Agriculture	undergraduate, graduate	6 years (Blended courses)	1 year
P16	Agriculture	undergraduate, graduate	10 years (Blended courses)	5 years
P17	Economics	undergraduate, graduate	7 years (Online and Blended Courses)	7 years

As demonstrated, there are 17 research participants and all of them have varying level of experience in teaching and assessing online. Most of the research participants come from Education Science or Humanities background. Many of the research participants teach at undergraduate and graduate levels in full-time degree awarding study programs.

Data Analysis Method. To analyze the transcripts with the HE teachers' interviews, an inductive qualitative content analysis has been applied. The analysis has been performed in several steps. At first, an initial analysis of the transcripts has been conducted, which resulted in highlighting of the prevailing themes, followed by an in-depth analysis of the transcripts, which

resulted establishment of a system of the categories and subcategories in a very systematic manner. The analysis has been done in a sentence-by-sentence manner. Consequently, three main categories and the subcategories have been established. In the final stage, relationships between categories and subcategories have been determined as well as reliability and rationality behind them ensured.

(2) Implementing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Analysis of Courses on Moodle)

Database. Once semi-structured interviews with the teachers who designed and teach courses have been completed, the database analysis was conducted. During the interviews, all the research participants have been asked to give permission to analyze their courses on Moodle. The research participants have been asked to decide whether they want to volunteer their designed courses for the analysis and which ones. Some of the research participants have not expressed a willingness to participate in database analysis, in the meantime, others were eager and volunteered several of their courses. After the interview, once the oral permission to analyze courses has been granted, and trying to avoid any misinterpretations, the author of this dissertation has sent out the template (see Appendix 5) where the research participants have had to once again indicate their decision to participate in the database research in writing and enlist the codes of the courses volunteered.

Instrument. To reach the aim of this dissertation and to provide an answer to the research questions, it has been necessary to examine practical implementation of LOA in a TEL environment, using its tools. This template has been developed as a data collection and analysis instrument for the purpose of analyzing online and/or blended study courses on a TEL environment, to be specific, the Moodle environment, which is used at the selected HEI. The findings of the analysis of courses on Moodle has explained how technologies support teachers in developing learning-oriented assessment in a TEL environment for facilitating student's learning?

The template consists of two major parts: general data, including characteristics of the course and some background information on the teacher who is teaching the course, followed by the criteria for a detailed course analysis that looks at practical implementation and application of the main components of LOA in a TEL environment, highlighted through the theoretical analysis of scholarly work (see Chapter 1) as well as through the findings of analysis of expert interviews (see Section 3.1). The template has been used to analyze 28 study courses on Moodle.

A Template for Moodle Course Analysis

General Information. To begin with, it is important to present some relevant information on the courses selected for analysis. This information should help to develop a general understanding of the course goals, however, none of the specific details provided would allow identification of the selected course. In Table 15, the main characteristics of the selected Moodle course are described.

Table 15. *Characteristics of a Selected Course on Moodle*

Characteristics	Description
Study Field	The courses have been taught in the following study fields: education science, social sciences, political sciences, economics, agricultural sciences, and humanities.
Study Level (e.g., undergraduate or graduate)	The course has been offered either at undergraduate or graduate level
Volume in ECTS ¹ Credits	The number of credits of the analyzed course
Mode of Delivery (e.g., Blended or Online)	According to the selected HEI's institutional guidelines on course preparation for Moodle, the courses had to be accredited for second (blended) or third (online) level
Assessment Strategies (e.g., Formative, Summative, LOA) with Value Indicators in Percentage Format	The course has integrated formative, summative or LOA assessment strategies. The assessment in courses is based on cumulative grade system.
Course Outline:	The course structure has been relevant to the research in terms of assessment activities.
- Course Objectives and Learning Outcomes; Criteria for Assessment (if listed)	The analysis has been looking at how assessment criteria are communicated out to students. Where can students find learning objectives, learning outcomes, and assessment criteria?
- Number of Assignments	How many assignments students needed to complete throughout the semester? What was the frequency of the assignments or assessing activities?
- Type of Assignments (e.g., essays, tests, projects, etc.)	What kind of assignments or assessing activities students had to take?
Language	In what language the course is taught?

28 blended or fully online courses have been selected for the analysis. The summary of the selected courses is provided below, where all the relevant information, e.g., study field, level, volume in ECTS, language of the course, delivery mode, and the time-framework, when the course was available for the students, is provided below.

Table 16. *Characteristics of the Analyzed Courses*

Research Item ID Code	Study Field	Volume in ECTS	Study Level	Language	Mode of Delivery	Course Offered for Students
RI_1	Humanities	6	Undergraduate	Lithuanian	Blended	Fall Semester 2021
RI_2	Economics and Management	6	Undergraduate	Lithuanian	Blended	Fall Semester 2021
RI_3	Education Science	4	Undergraduate	Lithuanian	Blended	Fall Semester 2021

¹ European Credit Transfer and Accumulation System

Research Item ID Code	Study Field	Volume in ECTS	Study Level	Language	Mode of Delivery	Course Offered for Students
RI_4	Political Science	6	Graduate	Lithuanian	Blended	Spring Semester 2021
RI_5	Political Science	6	Graduate	English	Blended	Spring Semester 2021
RI_6	Humanities	6	Graduate	English	Blended	Fall Semester 2021
RI_7	Humanities	6	Undergraduate	English	Blended	Fall Semester 2021
RI_8	Economics and Management	6	Undergraduate	Lithuanian	Blended	Spring Semester 2021
RI_9	Education Science	6	Graduate	English	Blended	Fall Semester 2021
RI_10	Education Science	6	Graduate	English	Blended	Spring Semester 2021
RI_11	Education Science	6	Graduate	English	Online	Spring Semester 2021
RI_12	Education Science	6	Undergraduate	Lithuanian	Online	Fall Semester 2021
RI_13	Humanities	6	Undergraduate	Lithuanian	Online	Fall Semester 2021
RI_14	Economics and Management	6	Graduate	Lithuanian	Online	Spring Semester 2021
RI_15	Economics and Management	7.5	Graduate	English	Online	Fall Semester 2021
RI_16	Education Science	6	Undergraduate	Lithuanian	Online	Fall Semester 2021
RI_17	Education Science	6	Undergraduate	Lithuanian	Online	Fall Semester 2021
RI_18	Education Science	6	Undergraduate	Lithuanian	Online	Fall Semester 2021
RI_19	Education Science	4	Undergraduate	Lithuanian	Online	Spring Semester 2021
RI_20	Education Science	3	Graduate	Lithuanian	Online	Fall Semester 2021
RI_21	Humanities	6	Undergraduate	English	Online	Fall Semester 2021
RI_22	Humanities	5	Undergraduate	English	Online	Spring Semester 2021
RI_23	Humanities	5	Undergraduate	English	Fully online	Spring Semester 2022

Research Item ID Code	Study Field	Volume in ECTS	Study Level	Language	Mode of Delivery	Course Offered for Students
RI_24	Economics and Management	6	Graduate	Lithuanian	Fully online	Fall Semester 2021
RI_25	Humanities	6	Undergraduate	English	Fully online	Fall Semester 2021
RI_26	Humanities	6	Undergraduate	English	Fully online	Fall Semester 2021
RI_27	Agricultural Science	6	Graduate	Lithuanian	Fully online	Fall Semester 2021
RI_28	Agricultural Science	6	Graduate	Lithuanian	Fully online	Spring Semester 2021

As the participation in the empirical research is based on volunteers, i.e., teachers have decided to allow analysis of their courses, the research has not included courses that would represent all the different study fields that exist within the selected HE institution. In fact, only courses in fields such as education, humanities, political science, agricultural science, and economics have been analyzed (see Figure 7).

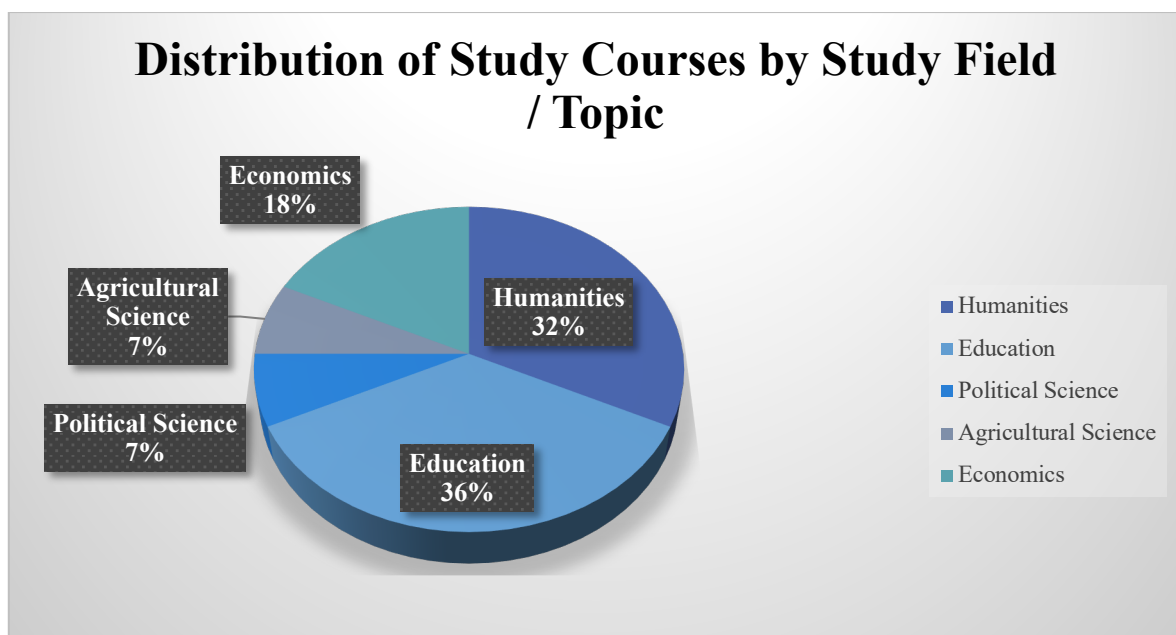


Figure 7. Distribution of Study Courses by Study Field

As shown, most of the analyzed courses (10 courses: 36%) are in the field of education. Then, courses in humanities make up the second set, by size, of analyzed courses (9 courses: 32%). Five courses (18%) are in subjects related to economics. Two courses each (7% each) belong to the fields of political science and agricultural science respectively.

When looking at the course distribution by study level, the majority of the analyzed courses are offered at the undergraduate level (16 courses: 57%), while the rest of the analyzed courses are available at the graduate level (12 courses: 43%) (see Figure 8). A similar distribution of courses is observed when analyzing the language in which the courses are being taught (see Figure 9). Most of the analyzed courses (16 courses: 57%) are offered in national, e.g., Lithuanian language, whereas 12 courses (43%) are taught in English.

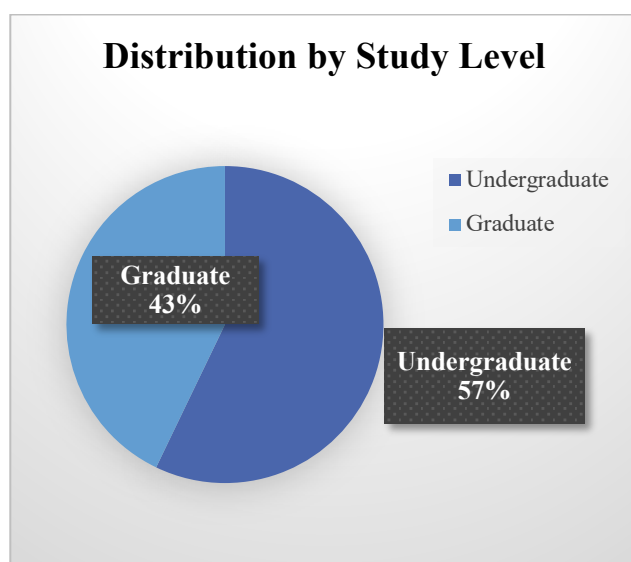


Figure 8. *Distribution of Courses by Study Level*

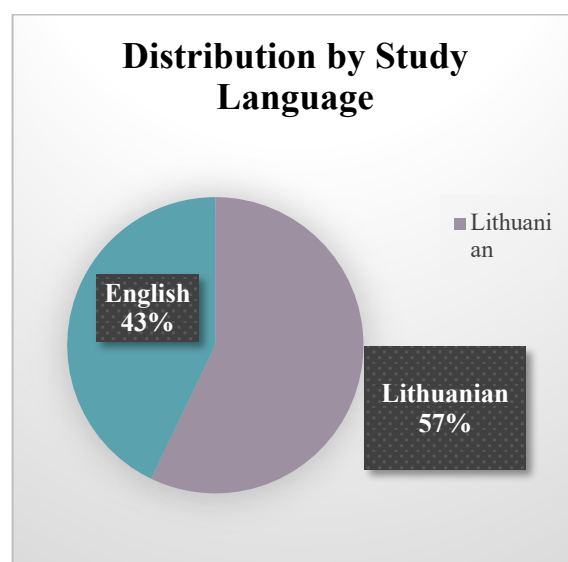


Figure 9. *Distribution of Courses by Study Language*

Finally, an observation should be made that there is a correlation between the study level and the language of the course. To illustrate this, most of the courses in English are graduate level courses, while undergraduate level courses are more often taught in Lithuanian.

Then, at the initial stages of the analysis, it was necessary to look at the distribution of the courses in terms of their volume in ECTS credits. The selected university promotes the principle of *Artes Liberales*, which allows students to manage their studies in terms of when and which courses to take. However, students who are studying in a concrete study program are obliged to complete the main subjects in addition to elective classes in order to finish the degree. When looking at the distribution of courses by their volume in ECTS credits, the majority of the analyzed courses (22 courses: 78%) has the value of 6 ECTS credits and are considered to belong to the group of core courses, i.e., courses obligatory to pass in order to complete the study program. A total of two courses carries the values of 5 ECTS and 7.5 ECTS credits respectively and they are both considered to be core subjects. In addition, two of the analyzed courses (7%), carrying the value of 4 ECTS credits also belong to the core courses. The last of the analyzed courses (one course: 4%), which carries the volume of 3 ECTS credits, is described as elective, meaning

students are not obliged to take it, but they can choose the elective courses that are most interesting to them or suit their educational goals (see Figure 10).

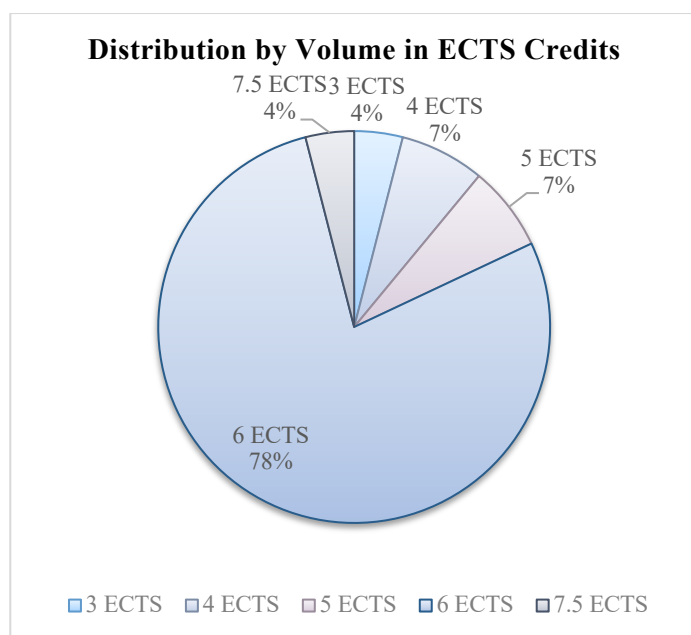


Figure 10. Distribution of Courses by Volume in ECTS Credits

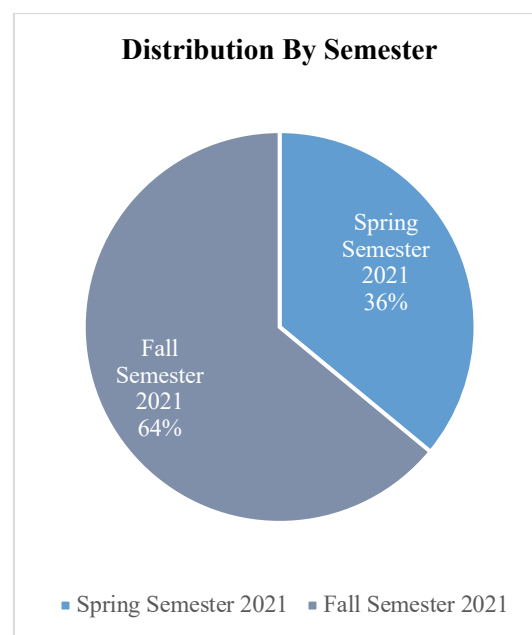


Figure 11. Distribution of Courses by Semester

Another fact about the way studies is organized at the selected university is that an academic year consists of two semesters, e.g., fall and spring semesters. Consequently, the courses are only available for the students at a certain time in the academic year. For example, some courses are only offered in the fall semester, while others are taught in the spring semester. For this analysis, most of the courses (18 courses: 64%) have been offered for the students in the 2021 fall semester, while 36% (10 courses) of the analyzed courses have been taught during the 2021 spring semester (see Figure 11).

When looking at the distribution of the analyzed courses by the delivery mode (see Figure 12), the research has shown that most of the courses (18 courses: 64%) have been prepared for the third level of study course preparation for online studies as described by the university regulations. To put that in other words, the course is delivered in a fully online learning mode. The remaining 10 courses (36%) have been approved for the second level of study course preparation for online studies, i.e., the courses are taught in a blended learning mode.

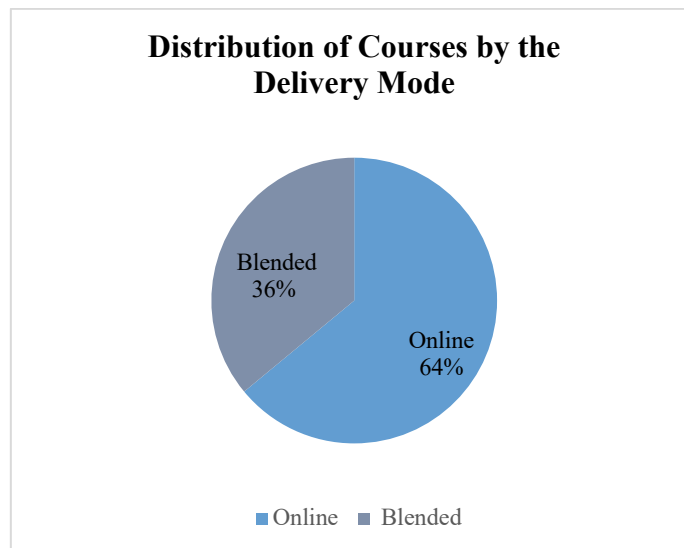


Figure 12. Distribution of Courses by Delivery Mode

As already mentioned, the selected university allows for different course delivery modes, e.g., face-to-face, blended, and/or fully online teaching/learning and assessment, however, for the purpose of the research, only online and blended courses have been analyzed.

Analysis of Courses on Moodle in terms of Practical Implementation of LOA. Here, the selected course on Moodle will be analyzed in accordance to below listed criteria. Following the research ethical protocol and ensuring the anonymity, only summarized information and the main tendencies will be highlighted, neither screen shots nor any content material from the selected courses will be provided. The criteria for the Moodle course analysis are based on the findings of theoretical scholarly work analysis as well as empirical findings of the key informants' interview analysis.

The criteria for analysis of a Moodle course include the following:

- Student Self-Assessment Activities (e.g., self-reflective practices, self-assessing practices, Moodle tools used)
- Peer Learning Activities (e.g., peer assessment, peer feedback, discussions, Moodle tools used)
- Learning Progress Measurement: Usage of Moodle Tools for Student Learning Progress Measurement (e.g., calendar, progress bar, log data, learning analytics, etc.)
- Feedback Provision:
 - Mode (e.g., audio, video, written comments, discussion forum entries, etc.)
 - Type (e.g., teacher-to-student feedback, peer-to-peer student feedback, combination of both)
 - Frequency (How often do students get any type of feedback?)

- Moodle Tools Used for Feedback Provision (List of the tools used for feedback provision on Moodle)
- Other Relevant Elements for LOA in a TEL environment (e.g., Micro-credentials, digital badges, e-portfolios).

In short, the template for analysis of Moodle study course consists of two major parts. In the first part of the template, some basic information that could be classified as general characteristics is presented. It is necessary to retrieve this information to learn more about the context of the case. Another part of the template is devoted to an in-depth analysis of the content, in terms of the assessment strategy, its design and outline, and implementation in a TEL environment as well as the assessment/learning activities. Again, the criteria for the course analysis on Moodle are developed in response to the findings of theoretical analysis as well as interviews with key informants.

Challenges and Limitations. There are several limitations to this research. One of the major challenges has been to find research participants who would be willing to share their experience and expertise as well as give permission to analyze the study course they have designed. This challenge has been relevant through both stages of empirical research, i.e., when collecting key informant interviews as well as interviews with teachers. For instance, a lot of university teachers have not shown any interest in participating. Thus, several sampling techniques have been applied to find the participants for this research, as insufficient number of research participants could have had negative effect on the validity and reliability of the research findings. As later, the potential participants have indicated they have felt uncomfortable with some of the requirements for the research participants. As there was a requirement for the interviewees to speak English, a language barrier played a key role in deciding whether to take part in the research.

Another challenge is related to epidemiological situation and geographical restrictions that have determined the means and medium interviews had to be conducted. All the interviews were done online, using an online communication platform, e.g., Zoom. The author of this dissertation had to handle the scheduling as well as setting up of the interviews. Since some of the respondents are residing in different continents and time zones, the author of this dissertation had to manage that, accommodating the respondents as much as possible.

Another limitation is related to the database analysis. As the empirical research has been bound to the course boundaries within a TEL environment, e.g., Moodle learning environment, it has been impossible to check whether certain elements exist and how they are implemented. A common example includes situations as follows: when in the course or study guide, it is indicated

that students can receive oral feedback during synchronous online learning sessions or students can request for individual feedback via external tool such as email. In these cases, there has been no evidence found on Moodle environment, but the fact whether the activity has been implemented in practice has been confirmed during the interviews with teachers, who design and teach these courses.

Besides, the data for the database analysis has been collected amidst the pandemic. This may have had some influence on the findings of the research, as teachers have been forced to quickly switch to fully online teaching/learning and assessment. This may have had an influence on the implementation of specific pedagogic choices that in earlier times and under normal circumstances may have been considered neither suitable nor adequate. However, due to general moods during the pandemic period, as well as limited time given for teachers to switch to fully online teaching/learning and assessment, and the teachers' varying levels of experience in using a TEL environment and its tools, those certain pedagogic solutions might have been justifiable.

Moreover, this research only focuses on teacher agency. The importance of student agency to teaching/learning and assessment is acknowledged, however, students' perspective towards and experience with LOA in a TEL environment is out of scope of this dissertation.

Finally, acknowledging that technology brings with it certain cultural resonance (McLuhan, 1964), it is easy to see that TEL can be influenced by outside factors, including financial resources, student body make-up, and teacher education within the HE institution. Since this case study explores a small and limited sample, the research presented in this dissertation is institution and location specific. Thus, the findings may not be versatile or applicable to all HE contexts or relevant to all the stakeholders involved. However, as noted above, the boundaries of this particular study do not include these factors, although the possibility for further research is significant.

Data Reliability and Validation. All the collected data is credible and reliable. Data collected during database analysis phase has been retrieved from a TEL environment, i.e., Moodle. In the meantime, the data collected through the interviews with key informants and HE teachers is also considered to be trustworthy as the interviews have been conducted in English language to avoid misinterpretations or loss of meaning due to linguistic limitations while translating. The interviews have been transcribed in a word-for-word manner. The respondents have ensured that the information they have provided is reliable and factually correct. And the analysis of the collected data was conducted strictly following methodological requirements and procedures.

Research Ethics. In this part of the dissertation, issues regarding research ethics will be explained. The permission to conduct research has been granted by the University's Research Ethics Committee. The document No. SA-EK-21-02. The research has been organized and carried

out, following the research ethics' guidelines and procedures that has been established by the Research Ethics Committee.

To begin with, the participation in the empirical research (qualitative research through semi-structured interviews with the experts in the field and case study) was on a voluntarily basis. All the respondents have had a right to leave the study at any point without any explanation. The main parameters of the dissertation, including research aim, and research questions have been introduced to the research respondents by providing them the Plain Language Statement (see Appendix 1 and 3). All the details, regarding data collection, storage, and treatment, have been described in the Plain Language Statement that has been sent to the research participants prior to their agreement to take part in the research. The interview questions have been sent to the research respondents on the request. The research participants, taking part in the second part of the empirical study had to sign a written consent form, where they have granted an access to the Moodle study courses to conduct the analysis. The data collected through this research is going to be saved for five years.

Finally, during this research, the privacy and anonymity of the research participants and data protection have been ensured. The research participants have been treated with respect. The author of this dissertation has tried to accommodate research participants so that they would not experience any inconveniences. All the procedures have been explained in advance. All the respondents are obliged to ensure that all the information they have provided is correct and reliable.

3. FINDINGS

3.1. Defining Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Expert Interviews)

The qualitative content analysis of the key informant interview transcripts has identified the relevant categories and their sub-categories (see Table 17) that have helped to provide the answer to the research question by explaining the potential of a TEL environment to facilitation and improvement of LOA as well as it identified the main barriers for successful implementation of LOA in a TEL environment. The main findings are presented below:

Table 17. Contribution of a Technology Enhanced Learning Environment to Designing Learning-Oriented Assessment

Category	Sub-Category
A TEL Environment may Facilitate and Improve Learning Process	Technology enables progress measurement
	Technology enhances peer feedback
	Technology enhances peer learning
	Technology facilitates development of student understanding
	Technology fosters autonomous and self-regulated learning
	Technology implements a learner-centered approach
A TEL Environment may Innovate and Facilitate Implementation of Proper Assessment	Technology enables tracking and timely interactions
	Technology introduces new and more efficient ways of feedback provision
	Technology facilitates assessment process and saves time and resources
	Technology improves transparency through digital tracing
	Technology enables performance prediction through learning analytics
	A TEL environment requires constructive alignment between assessment strategy and learning outcomes
	Technology enhances self and peer assessment
A TEL Environment may pose Challenges for Teachers	Teachers lack digital competences
	Teachers hold conservative attitude to teaching and learning innovations
	Limited technical capabilities of a TEL environment pose challenges for teachers
	Preparation for assessment in a TEL environment takes a lot of time
	Teachers lack good practice examples and institutional support when solving ethical problems of LOA in a TEL environment

The detailed descriptions with quotes from the interviews with experts to support the arguments will be provided in this part of the dissertation. Due to the length limitations, only a few quotations will be provided to illustrate each of the subcategory.

A TEL Environment may Facilitate and Improve Learning Process

The experts suggest a TEL environment may improve learning and assessment, while the contribution of a TEL environment can be observed through a facilitation of continuous progress monitoring:

R3: Learning-oriented assessment is continuous and dynamic. <...> I would assess the student, not so much on their end point, but how they got from where they started to the end point. <...> One is I can track growth and development, and, secondly, with using the technology, it is much easier for me to track.

R8: Learning-oriented assessment in a TEL environment is all about tracking learner's progress over a period of time.

Here, the aspect of continuity of learning and assessment in a TEL environment is emphasized. In fact, experts agree that LOA is associated with continuous measurement of student learning throughout the learning period, while a TEL environment or technology is seen as facilitator that enables that learning monitoring and tracking. Experts suggest that learning progress monitoring in a TEL environment is a very organic process as teachers can easily employ various technological solutions to monitor every student's step without having to implement specific pedagogic interventions.

Also, experts indicate a TEL environment has the potential of facilitating peer learning and feedback:

R2: The students need to be active in generating feedback. For me, rather than the teacher giving video feedback, it might be better as peer-to-peer video feedback or teacher video feedback in response to a student feedback request. Or teacher video feedback followed by some kind of student response or student action.

R7: They could learn from each other, and they could learn both from the teacher, and from each other. So, they posted the drafts on the platform <...> could give feedback, not only expecting feedback from the teacher, but could expect feedback from their colleagues, which was very useful. It was interactive feedback. And it was interactive way of learning [in] the virtual learning platform.

In fact, assessment should be designed so that its primary goal becomes supporting student learning. A TEL environment and other internal or external, yet compatible tools can be used to support or/ and enable peer learning. A TEL environment may be used to manage peer learning at both organizational and communication levels.

Besides, LOA in a TEL environment may help to develop student's understanding, which may then lead to increased engagement with learning and assessment:

R4: I would typically be using those formative type of assessments, perhaps ungraded. <...> you get better engagements. <...> it's a better way to facilitate learning, from a philosophical point of view, than a traditional exam, because that only captures student learning at one particular time. But this captures student development overtime, and if your goal is, to support your students to learn, <...> that's the best benefit of all. Better learning experience for the students

R5: [Tests] should enable understanding how the student knows how to interpret the information, particularly in terms of where to next?

Experts agree that LOA relies on student autonomy, thus, assessment should be designed and implemented accordingly, while a TEL environment is seen as facilitator. Assessment strategy should be designed to support and foster development of student autonomy, while a TEL environment and its tools should be used to support the implementation of adequate assessment methods that would help students become independent learners.

Besides, the research illustrates a TEL environment may alleviate implementation of a learner-centered approach, vital for LOA and facilitate development of student autonomy and self-regulation:

R2: If you are building capacities in self-assessment, you're using peer feedback effectively, you're building on student autonomy. <...> Once you have the skills to absorb the material on the platform, evaluate it and use it in your own way. It's building capacities in the learners to learn for themselves. <...> A forward-looking agenda is teaching them how to learn for themselves and showing how we learn for ourselves.

R7: It has to be really shifting from teacher-centered learning towards student-centered learning so that the students really learn, and teaching should be aligned to learning so to make students more and more self-regulated, more and more autonomous. <...> And technology allows that alignment. <...> The more autonomous students are, the more technological tools can be provided. Because the technological tool can be both, a challenge, and an obstacle, and a huge possibility.

As a result, a TEL environment requires pro-active student involvement into learning and LOA, whereas teachers are required to take a passive role of moderators. The experts believe that the shift in teacher's role in teaching/learning and assessment is inevitable as teachers should be stepping aside, allowing students to take more control and responsibilities of their own learning. A TEL environment enables teachers to monitor student learning, while remaining in the shadow, providing students with an impression that they are in charge.

A TEL Environment may Innovate and Facilitate LOA

The research has revealed a TEL environment may offer innovations to facilitate LOA. For instance, a TEL environment could enable tracking and timely interactions:

R1: And you can track. For example, if the students are working online, you can tell from the management system. <...> There are traces within learning management systems.

R3: You can spot when students aren't doing any work very quickly where that's really hard to do in an in-person class <...> technology does allow that to happen.

R4: Learning analytics to monitor, <...> to track student's, maybe, disengaging, dropping out, not submitting assessments, not logging into the platform.

According to that, a TEL environment can provide teachers with opportunities to monitor teaching/learning and assessment. As all procedures related with teaching/learning and assessment are arranged in an online mode, teachers have a possibility to constantly monitor student's learning progress, even without students knowing about it. Finally, experts agree that learning analytics data may be useful when making decisions regarding certain pedagogic interventions based on students' learning behaviors.

Also, learners in a TEL environment often require more reinforcement and attention to keep them motivated and engaged throughout the learning process. The analysis has shown integration of technology addresses this issue by introducing new ways of feedback provision:

R1: Technology enables us to give audio feedback and video feedback more easily than writing comments on text. <...> And all you need to do video feedback is a webcam <...> And a call record function. You record what you're saying. You speak to the screen. You talked to the students as if they're sitting in front of you <...> and you have a [pretend] conversation with them <...> Technology enables us to give better quality feedback to students in large classes.

R4: They're also giving students very immediate feedback through those mechanisms <...> Instead of annotating the documents to make a short video of you talking through the document and pointing out the things <...> that need improvement. Giving your feedback that way. <...> little podcast of your thoughts on the assignments.

In fact, experts claim a TEL environment may create opportunities for personalized audio and/or video feedback provision. Audio or video feedback can be appealing for both teachers and learners as it saves time and accommodates the desire of human interaction online. Besides, the turn-around times are much shorter, thus learners can benefit from feedback in a much timely manner. Also, the experts claimed the usage of a TEL environment tools or external communication technologies for feedback provision may significantly contribute to facilitation and enhancement of student learning. Nonetheless, the key here is whether and how students engage with the received feedback, as TEL environment tools can only accommodate and facilitate feedback provision, by offering timely and interactive ways to exchange feedback between all parties involved.

Moreover, a TEL environment may save time and resources, and reduce teachers' excessive workload:

R1: Using technology to offload bits of responsibility onto machines and leave human beings to do the things that only they can do well.

R4: Online quiz is very powerful way of assessing students and then also very good from a point of your workload because you can automate it. You may spend a lot of time creating a good quiz. But then if you design it in a way that marks itself, you're saving a huge amount of time at the other end.

Implementation of technology may reduce a teacher's workload and save their time, allowing teachers to re-focus on issues that are relevant for students at a given time. The experts praise technology as it enables automatization of a lot of procedures, thus, teachers may have more time perform assessment at more complex level such as quality of thinking, while assessment at more simplistic level, e.g., content knowledge level, can be performed by the computerized algorithms, as a result, saving teacher's time and reducing their workload. The same applies for feedback provisions, as experts noted feedback can also be automated, thus students can receive quality feedback in a relatively short amount of time.

Additionally, the research has suggested a TEL environment may improve transparency through digital tracing:

R3: We were able to go through the learning management system and what the trace of the students working there and that really helped us to decide whether the assessment had been fair or not because we had a record of much more detailed record of the students work <...> What I think that technology does allow you to do is to track it better because students leave a digital trace when they're working online <...> you've got ways of tracking students thinking and their work, which is much easier to do through the tech. <...> Only management system can automate this and make that very easy so you can then go in and look at a glance.

R6: [Technologies] can make assessment more transparent, more responsible assessment.

In fact, experts explain that transparency of assessment procedures is a required condition to establish trustworthy teaching/learning and assessing culture.

Furthermore, the experts suggest technology could be useful for predicting learner's behavior through learning analytics:

R1: The simplest example is the one success of learning analytics. <...> that success is in predicting schemes that are vulnerable, students of risk of failure.

R4: Learning analytics to monitor, I mean our platform has some baseline analytics. <...> to track student's, maybe, disengaging, dropping out, not submitting assessments, not logging into the platform.

This is considered advantageous as being able to predict students' learning, teachers are empowered to take action to prevent undesired learning behaviors or outcomes, leading to facilitation of learning process. The technology can signal teachers early on in the learning process

that students are struggling with certain things, therefore allowing teachers to prepare and take particular interventions to help students with their learning.

Besides, the experts say that with the help of a TEL environment self- and peer assessment may be enhanced:

R7: Self-assessment and peer assessment are very effective tools to help them to learn. And technology really helps to design and implement these activities. Technology makes it work.

R8: A combination of self-assessment and peer assessment is a powerful tool to develop skills for learning. <...> Technologies enable students to take part in those processes.

Such practices may enhance student learning and foster development of collaborative learning, critical thinking skills, and evaluative competencies. Also, this may result in increased learners' engagement level in and facilitation of teaching/learning and assessment.

However, the research has indicated a TEL environment requires constructive alignment between assessment strategy and learning outcomes for LOA to be efficient in facilitating learning. Experts emphasize the necessity to see teaching/learning and assessment as an indivisible whole. There is a need to ensure and maintain constructive alignment between assessment and learning outcomes prior selection of technological elements to support implementation of the preferred teaching/learning and assessment strategy. To put that in other words, the strategy comes first, then there is a selection of tools to support the strategy.

R2: Constructive alignment and the idea that there should be harmony or alignment between the objectives for a particular class. <...> we want a digital form of assessment that can support and enable the students to reach the intended learning outcomes.

R6: It goes together with the learning designing process, together with the methods, together with the selection of proper tools.

Here, the alignment between learning design and assessment strategy is depicted as a necessity for proper LOA in a TEL environment to perform its primary function, e.g., to facilitate and enhance learning. Such alignment may influence the decisions on certain technological solutions. Thus, assessment should be treated as an integral and inseparable part of learning design.

Even though technologies may open endless opportunities for designing LOA, a TEL environment, as a TEL environment and its tools may offer a number of solutions to enable, facilitate and/or automate certain procedures, e.g., feedback provision, monitoring of learning progress, peer learning and feedback, etc., however, it should still be considered as an auxiliary element, while the main emphasis should lay on a pedagogic approach, and learning design and assessment that should complement one another.

A TEL Environment may pose Challenges for Teachers

A TEL environment may introduce some undeniable challenges for teachers, and in such way making teaching/learning and assessment challenging. The analysis has illustrated a TEL environment may pose a few challenges for teachers. First, implementation of learning technologies for LOA may be problematic as teachers may lack digital assessment competencies for designing courses online, monitoring learning, and performing assessment in a TEL environment. This has moved to the center of attention in the context of the pandemic, when a lot of courses had to be switched online:

R1: The problem is not the technology. The problem is the design of the course. <...> Our existing courses are badly constructed. Technology is not going to solve this problem for it for us. We've got to fix this problem before technology can help. It's overall the problem of their learning curriculum. We haven't organized our assessment so that we can assure that learning outcomes have been met. Technology can do wonderful things, except it can't do them right now because we're so badly constructed.

R7: Knowing the purposes, understanding how the tool works. So, you have to know not only how the tool works, you have to have knowledge about those tools, but you have to have the practical skills of implementing those tools and then checking how they work <...> Today's situation showed that everything depends on how much experience the teacher had before completely switching onto online teaching and online learning. So, the more experience you had, the better you were when you had completely switched from face-to-face teaching and learning situations.

Teachers are expected to demonstrate a certain skillset to manage learning and assessing in a TEL environment. Experts claim that teachers should know the tools and their functionality to be able to use them efficiently in teaching and assessment. Even if the teachers know the tools, not being able to set them up, teachers will not benefit from the technologies. Consequently, teachers' incapability to develop and implement assessment online may have a detrimental effect on student learning.

Besides, experts indicate teachers should hold certain attitudes towards technological and pedagogical innovations. If the teacher holds more conservative views to learning/teaching and assessment, they may face challenges in switching to innovative pedagogic approaches. Teachers should become innovators and leaders who inspire their students to study in a TEL environment:

R1: We need to think more radically about our practice. And not let the technology freaks kind of decide what we should be doing. <...> if we continue in the way that we've traditionally continued, it won't be a reason for students to come.

R2: You should be coaching them, and you should be modelling for them.

The experts suggest teachers should realize the potential of technologies for learning/teaching and assessment and be willing to adopt them to facilitate learning. Experts claim that teachers should resist current trends, which are coming from the learning technology developers, and focus instead

on pedagogical approaches, and then consider the appropriate technological solutions to support their chosen strategies, in such a way demonstrating their leadership as educators to manage teaching/learning and assessment and not trying to follow every new emerging technological trend.

In the meantime, a TEL environment may cause some problems for teachers, as its limited technical capabilities may restrict teachers in developing learning design, implementing assessment strategy, and monitoring the learning process:

R1: Unfortunately, most [learning management system] are not really easily set up for this.

R8: Sometimes you can feel limited when you can't create a test in a certain way. But it's not teacher's responsibility or fault. It's not that teacher is not capable to do that, it's the technology that's limiting. Sometimes tools aren't as good, as developed as we'd like them to be.

Indeed, experts expressed the concern that sometimes a TEL environment cannot accommodate preferred pedagogical solutions as its technical parameters are undeveloped. Experts agree that difficulties in setting-up or adapting a TEL environment for learning/teaching and assessment may evolve into further problems, related to time-management and financial resources.

The research has also suggested that preparation for assessment in a TEL environment may be time-consuming:

R7: 50% of the materials had to be adapted to online teaching so that it is possible to be effectively used by the students. This took a lot of time and taking into consideration the fact that classes do not stop, they go on and you have to do that fast, so that was time pressure.

R8: Setting up the learning environment can take a considerable amount of time, especially if teacher is less experienced or the course is new. <...> It takes a lot of time and resources.

However, the experts note that time investment into preparation for assessment in a TEL environment may not be significant when looking at it from a long-term perspective, because once a teacher designs the assessment online, they can adapt it later to suit current needs without having to re-do everything.

Finally, experts express a concern that teachers may lack good practice examples and institutional support, especially when it comes to solving ethical problems of LOA in a TEL environment:

R3: Assessing students <...> at home, lot of instructors have wanted to use technology like proctoring systems with cameras to observe what the student are doing in their own home, and I think there are big ethical issues with that.

R4: I have my concerns about the ethical dimensions to learning outlooks as well. <...> Sometimes the impact of the technology can be hidden like for example proctoring <...> it's based on surveillance and creating an atmosphere of distrust.

R8: Learning management systems collect information about students and their behaviors which from ethical point of view may be problematic.

Experts emphasize the threats related to the process of collecting students and their learning behaviors in a TEL environment. Some ethical issues may occur when students are misinformed, or the collected data are used inappropriately. Also, some experts believe that a TEL environment enabled proctoring is unethical because it is associated with intruding student's privacy. Proctoring may have a negative effect on teaching/learning and assessment, students' engagement, and motivation as it creates a distrustful environment and causes unwelcome tensions.

3.2. Designing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Teacher Interviews)

The key findings of the qualitative content analysis of the interviews with HE teachers are provided in the Table 18. The analysis allowed enlisting the advantages the learning technologies offer for designing LOA, showing how LOA in a TEL environment can facilitate and enhance learning as well as identifying the common challenges for teachers to design and implement LOA in a TEL environment.

Table 18. Categories and Subcategories from Analysis of Interviews with Higher Education Teachers

Category	Sub-category
Advantages of technology for online Learning-oriented Assessment	Technology allows monitoring student's learning progress
	Technology facilitates feedback provision
	Technology offers flexibility in assessment
	Technology facilitates grading and makes it time efficient
	Technology serves as a database for storing learning material
	Technology ensures transparency of assessment by allowing teachers to indicate assessment criteria
	Technology makes it harder for students to cheat
	Technology facilitates submission of assignments
	Technology offers different methods for assessment
	Technology facilitates peer assessment
	Digital badges motivate students to learn
Challenges for teachers to implement Learning-Oriented Assessment in a TEL environment	Insufficient teacher's digital skills and competences
	Implementing online LOA increases already excessive teacher's workload
	Learning different tools can be overwhelming
	Insufficient institutional support to implement LOA online
	Restricting institutional policy regarding assessment procedures
	Limited technical interface and capacities of Moodle
	Financial challenges as teachers are underpaid

The quotes from the interviews with HE teachers are provided in this part of the dissertation. Again, considering the length limitations, only a few quotes are provided to illustrate every subcategory.

Advantages of Technology for Online Learning-Oriented Assessment

The respondents have indicated several considerable benefits that the technologies and/or a TEL environment offer to facilitate teaching/learning and assessment. To begin with, many interviewees have noted that the technology enables monitoring of student's learning progress. Technological solutions embedded within a TEL environment not only allows tracking of students' performance in a systematic manner throughout the entire study cycle but also informs teachers about any inconsistencies in student learning, consequently, giving teacher an opportunity to identify any unwanted or inappropriate learning behavior early and take measures accordingly to eliminate it. Besides, as interviewees note, learning progress can be tracked and monitored by using certain pedagogic methods, which are facilitated by a TEL environment.

P1: I do use logs before and after the test, especially if there's some issues with student's grade. <...> Also, I use logs to check how they [students] do in general. And sometimes I see they connected to Moodle only once, during the first lecture, and that's it, so I send them email, asking what's going on? Sometimes it's just enough to spot them and send them an email to remind about their responsibilities as students, but in other cases you actually need to make some serious decisions, but that depends on individual student's case.

P3: I typically go to statistics or logs where I check how they're doing. <...> They must mark their assignments as completed in the calendar. <...> In face-to-face classes, I didn't have any chance to track how they learn. Especially if I have 50 or more students, it's not possible to do that.

Teachers discussed the advantages of Moodle progress bar for monitoring and tracking student learning. They note that progress bar allows them to check where students are in the process of learning and whether they connect to Moodle on regular basis. Also, discussion forums can be used for the same purpose, however, here the emphasis is on the content of the discussion entries. Teachers agree that participation in discussions can be used to monitor whether students engage in teaching/learning and assessment, however, this method is more suitable for small student groups, where it is possible to follow the content of the discussion threads by monitoring the development of students thinking. Nevertheless, teachers do not often rely on the discussion forums for learning progress monitoring, as engagement in such activities is rather low as most of the students tend to remain silent. Moreover, teachers claimed that TEL environment tools enable them to perform small incremental tasks throughout the entire study period and in such way monitor how students are doing in their learning. Thus, a TEL environment facilitates student

learning monitoring and facilitates implementation of pedagogic methods that also assist teachers in learning progress monitoring.

Another important thing, indicated by most of the interviewees, is that a TEL environment enables easier feedback provision. As indicated (see Section 1.1, Sub-sections 1.1.1 and 1.1.4), LOA strongly relies on feedback provisions as means for continuous learning and improvement, thus, it is important that both students and teachers have as many opportunities as possible to exchange ideas, give and receive comments on how to proceed and/or improve their work. Regardless the chosen tool, mode or medium, the advantages of technology for feedback provisions are undeniable. Teachers have explored the possibilities of a TEL environment and its tools for feedback provision during synchronous online learning sessions. However, by giving oral feedback during synchronous online learning sessions, teachers seem to imitate traditional face-to-face learning experience, without further exploring the alternative technology enabled and enhanced feedback provision channels:

P1: I give [students] as much feedback as possible. I prefer doing this during our lectures online.

P3: Padlet is a great system because it allows also for oral feedback.

P5: I used to do that on Moodle, just kind of sending a Moodle message to the student, but now I prefer Teams. I think it's more interactive. And I don't really like the messaging functionality on Moodle.

In the meantime, other teachers have examined Moodle learning environment and other external tools for feedback provision. Besides, written, or recorded feedback can be documented easier, thus, the entire teaching/learning and assessment can become more transparent.

P3: We do an argumentation practice where they must record their voice. And then I respond also to a recorded voice. There is definitely recorded feedback.

P5: I always give feedback on assignments. <...> I always try to I give as much feedback as possible. Realistically, in many cases, particularly for the better ones that's more like one or two sentences. For the worst ones, it can be a paragraph, just kind of explaining why the grade is not necessarily as they expected. <...> I prefer written feedback because of several rather problematic experiences that I've had in the past, where students that were given oral feedback would either misrepresent that feedback to, department head or denied that they had received any feedback and then they would say, I have no idea why the grade is like this. So, I always prefer to have everything in writing just to make sure that everything is accounted for.

Also, teachers explained that Moodle learning environment tools facilitate peer feedback provision as well:

P15: They see [peer student] feedback and this feedback I'm writing in Moodle.

Moreover, teachers praised Moodle learning environment tools because they allow organizing the way feedback is given and giving an opportunity for the teachers to comment on certain areas in the student papers, highlighting the problematic areas. As a result, students can see the corrections as well as the arguments, supporting these corrections. Thus, students can use these corrections with comments for their work further improvements.

Also, teachers have highly appreciated the capacity of technologies to give students feedback on demand. Teachers explained that students can send them requests with specific queries, while teachers can provide personalized responses in the convenient time.

P10: I provide feedback for them based on each criterion for assessing the assignment on. <...> I usually indicate assessment criteria and usually present them before-hand and based on them I provide [students] with feedback, with comments in Moodle. <...> And when you provide them feedback, you can comment on each criterion, if this was fulfilled and to write the points that were assigned already before for each criterion. If it is two out of two points. Or if it's three out of three points. <...> Feedback is written comments on Moodle. <...> While grading the tasks, I usually provide individual feedback for individual students.

P12: Very often I give them feedback on Moodle in a couple of sentences. How it was done. What they could do better next time, some recommendations. <...> But as well I always use some open questions. <...> I always provide my feedback for open questions for each student.

In fact, a TEL environment and other tools alleviate feedback exchanges between all the parties involved, i.e., student-to-student, teacher-to-student. Also, tools enable both oral and written feedback provision. Teachers praised technologies for possibility to provide feedback in personalized and timely manner. Teachers can choose whether to give feedback synchronously, e.g., during online learning session or asynchronously, e.g., recorded comments, written comments. The choice on a tool depends on a preferred level of interaction. Moreover, as teachers indicate technology, i.e., Moodle environment offers opportunity to grade papers and in the meantime to provide students with feedback. Such feedback can be based on assessment criteria or be personalized statements that give directions how to improve. This, of course, not only supports and facilitates learning, but also, increases the transparency of assessment.

The interviewees have pointed out another advantage of a TEL environment for LOA, by claiming that technologies increase flexibility in assessment. Indeed, teachers can approach assessment procedures with increased flexibility, accommodating individual student's needs. To illustrate that, if students get sick or could not complete the assignment on the initial deadline, teachers could easily adjust the deadline by changing the parameters and the Moodle environment would automatically and instantaneous inform students about any changes.

P2: When the exam is online, it's much easier. Because you can arrange different time or expand the deadline when student must submit his paper.

P14: Students work in groups. They can do consultations with me, but then at the end they upload the report and then must present, report, and defend it which could happen again, either online or face-to-face, depending on situation with pandemic and sometimes my schedule, because if I have to leave for some trips or conferences. So, I just easily switch online.

The ability to adapt to constantly changing situation and accommodate individual students has become extremely relevant during the COVID-19 pandemic. However, flexibility, offered by a TEL environment and various tools, can also be useful for teachers in the post-pandemic period as well, especially when talking about teacher's mobility during the semester. In fact, teachers prefer having assessments online because it not only increases flexibility in terms of submission or completion deadlines, but also offers flexibility in grading process as a lot of grading can be automated.

Besides, the analysis of the interviews with teachers has revealed the fact that a TEL environment can facilitate grading procedures and, in that way, save teacher's time and reduce workload. Again, automatization of grading is a highly preferable option by many interviewed teachers. In Moodle, teachers can set up quizzes with different type of test items, including closed, short, multiple choice, drag and drop test items, etc., which can be graded by the system itself. This is relevant in larger classrooms:

P6: Moodle tests are a great for assessing knowledge on certain topic and skills. The evaluation is performed by the system. The system checks the answers.

P8: Most of the questions usually are those closed questions. I mean they have multiple choice answers. So, the system can do the marking for me. <...> I used Moodle for assessment, and I liked it quite a lot. Because then you don't need two sets of times, you don't need to grade so many paper exams and midterms, so I'd like it.

Also, teachers explained that since tests can be designed to assess both content knowledge and higher order skills and competences, automated grading of tests becomes rather advantageous. The tools can easily perform grading of tests that contain closed-, short-answer questions, multiple-choice test items, while teachers can dedicate their time for grading student's abilities, skills and competences at a more sophisticated level or engage in feedback provision. However, teachers have noted that initially it takes a lot of time to set up Moodle for testing and grading, this can be time-consuming and complicated for those teachers whose digital skills are at novice level or who have very little experience in using Moodle environment, but looking from a long-time perspective, it is worthwhile.

Finally, Moodle environment facilitates assignment submission and allows teachers to do grading and commenting on the submissions directly, without having to download every individual submission. This, again, saves time, thus, is highly appreciated by the teachers:

P11: I used to send them evaluations by email, and it took so much time because you have to send that and then to upload. You have to do all those technicalities, but when I started evaluating them directly in Moodle, everything went quicker.

P17: What I noticed, it's more difficult to prepare the quiz using Moodle than the quiz that I prepare face-to-face. So, it takes longer to do that, but then I see that it's actually easier and quicker to check it. <...> In Moodle, I form groups of four or five people and they do tasks in groups, and they must also upload the task to Moodle and then I give them feedback to the whole group.

As a result, teachers can efficiently organize and work, which is not directly related to teaching and assessment, such as solving technical and organizational issues regarding assignment submission.

Furthermore, the analysis has shown that the technology, in this case a TEL environment, i.e., Moodle, serves as a database for storing teaching/learning material. All the teaching/learning interactions can be fully performed synchronously or asynchronously on Moodle, while its technical capacities allow teachers to upload learning materials (in almost any format) and organize it in a very structured fashion.

P4: We do use very basic tools <...> namely these are study material posted for students on Moodle. Both in reading format and in video format.

P8: I'm using the [Moodle] platform for sharing documents with my students.

P9: It's the easiest way to upload and store material in Moodle.

P14: I like Moodle that I can get a structured information in a user-friendly way. For example, in my courses, I give the main topics within the topics.

As a result, learning material becomes easily accessible and available for students at any given point in time, enabling students to engage into self-regulated learning. Indeed, Moodle learning environment allows teachers to arrange their courses and display teaching/learning materials in a very structured manner. However, TEL environment capacities are not used to its full potential, as teachers only see it as means to store and share materials.

The analysis has revealed yet another advantage of the use of a TEL environment and its tools for assessment. The interviewees have pointed out that the introduction of a technological element in assessment ensures the principle of transparency by allowing teachers to enlist assessment criteria and perform grading against them. This is also useful for peer assessment as well. Teachers can either upload the assessment criteria, using Moodle environment as storage facility or go further and describe assessment criteria within every assignment, using adequate Moodle tools. Indeed, as rooted in LOA (see Chapter 1, Section 1.1.1), students must engage with

assessment criteria as this informs what is expected from them, eventually offering them fruitful and deep learning experience. Teachers understand the necessity to provide as much information about assessment as possible to make teaching/learning and assessment in a TEL environment transparent. In order to achieve that, teachers developed grading scales and uploaded them to Moodle. Also, they tend to attach grading scales to every assignment, trying to remind the students how they are going to be assessed and what criteria their work has to fulfill:

P11: I created a scale for the for the task and then looked at the criteria and then evaluated. And it's obvious for students, it's on Moodle by every assignment. <...> Everything is written down. Everything is uploaded to Moodle.

P7: If it's a presentation, we discuss certain points, certain criteria all together. <...> They can also find the criteria in study guide on Moodle.

Teachers agree that the repetition of grading scales and assessment criteria throughout the course in online learning contexts, where interaction level is limited, is necessary to facilitate and enhance students' learning. Being familiarized with the assessment criteria or grading scales, students know exactly what grade they receive and why and what to do to improve the work. Since teachers prefer to store materials on Moodle, many of the interviewees claimed that they can also simply upload a document to Moodle, such as student guide, where they can enlist assessment criteria. This is a preferred option, as teachers do not have to have a high level of digital skills, yet efficiently provide the desired information for the students:

P7: They can find the criteria in study guide on Moodle.

Thus, Moodle learning environment can accommodate teachers with varying level of experience, in the meantime, providing teachers with different options for sharing assessment-related information with their students. Finally, Moodle learning environment allows teachers to set specific deadlines for the assignments and their submission, thus students are better informed and can plan their time accordingly. This is relevant for self-regulated learning.

Also, teachers have praised a TEL environment and its tools for making it nearly impossible for students to demonstrate dishonest behavior during the assessment procedure. The use of technology for assessment increases the transparency because it can be used to trace student's steps and even prevent them from looking up information during the examination as well as it can be used to check for plagiarism.

P1: Technologies can show who's trying to cheat on their exams. I caught so many cheaters since I started using online testing tool. I can see when they connected, how long they've been online, which questions they looked at, check their IP address if the answers are the same, especially the wrong ones. Recently I moved my tests to Moodle system, it also has some ways to prevent cheating on exam.

Additionally, teachers agree that cheating on Moodle tests can be complicated, as Moodle allow for mixing the order of test items for each student individually, providing teachers with numerous variations of the same test. Also, safe browser option can be activated, therefore, students cannot look up the desired information during the test attempt.

Additionally, if there are any suspicions regarding the assessment outcomes or performance during assessments, teachers can always take into consideration learning analytics and/or log data to inform how students have been doing throughout the learning period, e.g., whether they have been participating in teaching/learning and assessment or whether they try to cheat by attempting to re-take test without having an adequate reason:

P9: For example, it was a situation maybe two years ago, one student said it was technical problems when I've started my test and it was problems with Internet connection and I lost it and I failed my test. But actually, when I took a look at that case, it turned out that he was connected a day before to check the questions. And of course, the system didn't let him to repeat the attempt. And that helped me to prove that. <...> In Moodle, I can check and compare [students'] answers. <...> I have a lot of examples of cheating, in some cases this strange mistake occurs, and you can recognize the same mistake in several works or so it's direct proof of cheating.

P17: Yes, sometimes I check log data and especially during the midterms and exams. If there are any problems, student can say there was a problem with my exam, I did not finish it because my Internet broke down and so on. A standard excuse these days. So, I just double-check if students are actually telling the truth because they have huge imagination. From log data, I can check this information to see where and when student went and at what point the exam broke down.

Therefore, the use of a TEL environment solutions for assessment can significantly contribute to preventing students from cheating and making assessment procedures more transparent.

Also, the interviewees note that a TEL environment has made handling of submissions much more efficient. For instance, Moodle tools facilitate submission of the tasks by allowing teachers to indicate deadlines, enlist the assessment criteria, set the parameters for submissions, accept group submissions, etc. Besides, teachers can connect these task submission tools with other progress tracking tools, e.g., calendar, progress bar, so that the students can manage their learning easier as they are constantly being reminded about the upcoming deadlines.

P5: I use Moodle for weekly quizzes that are based on the readings for that week. <...> I also use Moodle for uploading assessments in the first place. <...> Students only submit assignments for this class via Moodle.

P6: Teachers can use Moodle for tests or homework submission. <...> Students submit their certain work, according to the scheduled time in the Moodle system.

P12: It depends on the assignment. If we talk about midterm exam, so I provide different tasks on Moodle. And they must upload their work to Moodle.

In fact, Moodle facilitates submission of both individual and group assignments. Teachers stress the advantage of Moodle tools for peer or group work. Students do not feel pressure to find their teammates, as the system itself can perform this action and group the students for the tasks. Teachers praised this technical capability as working online students often do not know their peers, so for many of them it can be problematic to reach out for stranger to cooperate on tasks. Besides, group submissions are handles easier, using Moodle tools. Teachers do not receive multiple submissions of the same group work, as Moodle tools allow single submission per established peer group:

P17: In Moodle, I form groups of four or five people and they do tasks in groups, and they have to also upload the task to Moodle.

Also, logistically submitting assignments using Moodle is beneficial, as neither teachers nor students are bound by any specific physical location to deliver, submit, and present their work, instead, other limitations such as due date, length of the paper, content-specific elements, etc., take precedence. Once the assignment is submitted, teachers can proceed with further actions, e.g., grading, feedback provision, peer review, etc., directly in the learning environment without ever having to download the files, consequently, saving lot of time. In addition to providing a very time-efficient way of handling with submissions, this can also be an environmentally cautious choice as submission via online tools does not require any naturally produced resources such as paper.

Another advantage of the use of a TEL environment and its tools for assessment is that it offers teachers with a huge selection of different assessment methods. As teachers indicated, Moodle, has many different tools that can be used for assessment, for instance, grouping tools, tests with different test item options, interactive tests (HP5 tool), task submission tools for more complex paper-based assessments, etc.

P2: Now regarding tools, they're quite rich, they offer a lot. And you can always choose a different tool. In this regard, I wouldn't see any bigger challenge. It's not because of limited technological possibilities or low availability of tools.

Besides, the research has showed teachers prefer using Moodle grouping tools to manage peer learning:

P4: Group work, a function which is available on Moodle is great. Assigning students into groups there is very easy.

P8: I use Moodle tool for grouping them. <...> In this a level course for bachelors, they have the group homework. They form a group of three and four students. I use Moodle tool for grouping them.

Indeed, Moodle can facilitate and enhance peer learning experience, as tools for peer learning can do even more than simply assigning students into pairs or groups. These tools facilitate peer feedback and grading as well. Furthermore, teachers can use Moodle tools for feedback provisions and discussion, which can be incorporated within the overall course assessment strategy.

Moreover, the research has demonstrated that teachers often opt for tests as assessment methods in a TEL environment. The common reasons for the popularity of testing method are that online tests are relatively easy to design, in many cases the system can perform grading, consequently, reducing teacher's workload, and tests can be used to assess knowledge, skills and competences. Besides, teachers liked the flexibility, as online tests could have been done at convenient and flexible time, yet fair and controlled teaching/learning context.

P12: I'm using tests. All my assignments are ready in Moodle so [students] can upload them or do them online. They are ready to be implemented online, so if it's midterm exams, they are using close-ended questions, correct or incorrect, and drag and drop, or other options. If it's a control paperwork, so there are some calculations on templates, or they can provide the calculations for homework.

In fact, not only Moodle assessment tools allow teachers to design and develop assessment activities that could assess knowledge, skills, and competences in students, but also support teachers by offering creative, time- and resource-efficient ways to assess students throughout or at the end of the study cycle.

Moreover, the analysis has indicated that a TEL environment can facilitate peer learning and assessment. As one of the prevailing features of peer learning and assessment is feedback provision, learning technologies both integrated within Moodle and tools outside the learning environment can be used to manage how students provide feedback to their peers and receive commentary on their submissions.

P5: And I'm using Moodle to encourage peer grading of submissions. Usually, it's kind of a formative to primarily so, it's not for final assessment, but it's supposed to encourage mutual feedback.

P10: Students need to fill Google forms where they say was it useful for other colleagues. <...> They mark if it is interesting. If it was useful, how useful in this scale, if they learn something new.

P11: Peer evaluation is also shift. <...> I use Google forms. And they upload those anonymous evaluations for every student. It is much easier that way.

The analysis has demonstrated that implementation of peer assessment through learning technologies is becoming a common practice within HE context. As pointed out, teachers are starting to experiment with new teaching/ learning and assessment methods that support active student learning and increase engagement, as teachers become aware of their added value for

student learning. Moreover, the research has suggested that a TEL environment supports and alleviates peer assessment procedures, providing feedback online (especially if it is anonymous written feedback and evaluations) can be empowering for the students, as it gives them more confidence and anonymity when comparing to feedback provision in person.

Finally, the content analysis of interviews with HE teachers has shown that certain tools and digitally supported innovations within a TEL environment can be used as means for increasing student motivation. In fact, teachers noticed that the usage of badges in online courses increase students' engagement in teaching/learning and assessment. Teachers also see digital badges to enrich student learning experience by providing playful and gamified approach to teaching/learning and assessment. Finally, digital badges can be very useful when it comes to formative assessment or LOA, because they can be used to encourage students and acknowledge their effort without having to give actual grades.

P1: Badges are fun. It's kind of gamification of learning. And students like them. It's fun to get some kind of approval. And badges are just great for this purpose.

P3: I use some of these Moodle tools that are encouraging students to study. They get badges. <...> If students can see they're going to get something, they get excited – oh my God! I got a badge! Yay! It is fun and this is exciting, and it is such a simple thing. So why not? Why not to use badges? It doesn't take a lot to set it up and the effect on student's eagerness to study to get them is obvious. <...> It really helps to motivate students.

In short, this learning innovation addresses a fairly common problem in online learning context, which is related to low engagement. By integrating digital badges in their courses, teachers have boosted student's interest, at the same time, providing a desired approval for demonstrated efforts in learning.

Challenges for Teachers to Implement Learning-Oriented Assessment in a Technology Enhanced Learning Environment

Implementation of LOA in a TEL environment can introduce considerable challenges for teachers. These challenges could be categorized into *personal* (e.g., insufficient levels of digital assessment skills and competences), *institutional* (e.g., lack of support at institutional level), and *technological* (e.g., limitations of technologies). In this part of the dissertation, the findings from teacher interviews will be presented to illustrate the common challenges faced by the HE teachers when designing and implementing LOA in a TEL environment.

To begin with, the analysis has demonstrated that insufficient level of teacher's digital skills and competences is one of the most prevailing challenges to implement LOA in an online setting. If teachers do not know how to use Moodle or certain tools, they cannot efficiently

construct and implement the preferred assessment strategy. As teaching/learning and assessment in an online setting require different approach (for more information see Section 1.2, Sub-section 1.2.1), teachers have to adjust their pedagogy, adopt more learner-oriented teaching/learning methods, and equip themselves with skills and competences needed:

P2: For me and I'm sure for my other colleagues, this holistic approach to assessment in the online format, not so much in quantitative, summative assessment, is still a challenge. How to do this online?

P10: Most of the teachers now at university do usually just passive lectures, lecture presentations. They need to know and to engage in more active learning methods. It would be useful for the teachers and students. Teachers should try to introduce them when they do assessment online. <...> Sometimes they just simply don't have the capacities and skills for that.

Besides, figuring out how functionality of different tools is often perceived as burden. The research has demonstrated that teachers do not want to invest additional time and effort in learning new tools, thus, they often limit their assessment design and implementation choices. Teachers prefer using only a limited number, yet well-known tools to perform certain actions:

P1: It gets hard to learn new tool and how to set it up to do what you want it to do. <...> It took me some time to develop tests because you really need to know how to use Moodle.

P4: We only use very basic tools which we feel comfortable with.

P10: Without the tools, you won't be successful in online learning. So, you need to know the tools.

Besides, the research has showed that teachers do not want to spend a lot of time on figuring out the technology. Constantly emerging new tools or improved versions of already existing tools introduce even more challenges for the teachers, as they have invested more time and energy to keep up to stay up to date:

P7: Well, of course, we as a teachers must learn <...> teachers must learn to keep up with technologies.

P4: I think there are quite many tools I haven't explored, and that's again something else. And it needs a special time and energy to learn all these tools.

The research has also demonstrated that teachers often struggle with acceptance of learning technologies, i.e., if teachers do not see the technology or specific tool worthwhile or their usefulness is not immediately obvious, teachers tend to abandon such tools. For example, the research has showed that teachers expressed their disappointment regarding Moodle tests, as they have struggled to learn how to set up the quiz online. Teachers complained that some of Moodle tools are not user-friendly, and it sometimes gets impossible to figure out how to use them without technical staff support. This has caused frustration among teachers and hostile attitudes

towards the use of technologies for teaching/learning and assessment. Moreover, the research has suggested that teachers often perceive technologies as some kind of benchmarks to measure and rank, i.e., if teacher knows how to use tools for teaching/learning and assessment, they are pictured as competent professionals, however, if teachers face difficulties and need to consult about the use of technologies for teaching/learning and assessment, this implies that they are incompetent. As a result, many teachers noted that they and their colleagues, especially older teachers, are struggle with implementation of technologies for teaching/learning and assessment and often are afraid to ask for help which would help them to overcome such challenges.

Even more, teachers need to know enough about licensing and other copyrights related issues when designing and implementing teaching/learning and assessment in a TEL environment. The research has indicated that technologies offered unlimited teaching/learning and assessment sources, however, this opportunity also introduced new demands for teacher's professional expertise, skills, and competences.

P9: Now it's plenty of different materials, especially regarding mathematics. This means you can just google and find a lot of resources, but you should be careful to selecting them. Also, with pictures or photos. It also was a kind of a challenge, and you should understand what sources and what materials you can use and what not. <...> When you upload material to Moodle, you must follow owner's policy and you also should be honest not to put all materials, because you can violate copyrights.

As demonstrated above, teachers struggle with implementation of LOA in the Moodle environment for a number of different reasons. The issues occur when teachers are not aware which tools to select and how to use them to achieve certain educational goals or to design assessments that could assess students' content knowledge, and more complex skills and competences, e.g., critical thinking skills. Teachers have to know the tools well and how to set them up in a TEL environment. Unfortunately, many teachers are not willing to seek for help and support, therefore, making this issue worse. Thus, continuous training, development and upskilling is a required precondition for teachers to be successful in teaching/learning and assessment in a TEL environment.

The analysis has indicated yet another challenge that teachers face while designing and implementing LOA in a TEL environment. Designing and implementing proper LOA requires a lot of time and effort, which increases already excessive teacher's workload:

P5: As a rule, formative assessments require more work and energy. Online formative assessments are no exception. <...> For lecturers, it's extra work. You need to guide the students, you need to assess many assignments, monitor their learning, be available to answer their questions, give feedback. And if you have a large class so that can easily become several hundreds of responses. Even if you're working in small groups, the same

groups of five, giving feedback to each other that could be quite a lot of work. We're very tightly pressed in terms of workload for the money that we get.

Indeed, setting up Moodle can take a lot of time even for those teachers who already have experience how to use the learning environment. For those who have very little or no prior experience of working on Moodle, this becomes even more challenging because they also need to spend additional time trying to learn the platform and its tools.

P1: I remember when I had to set up Moodle for the first time, it took me forever. I had to structure the course so it's clear for students, had to upload the materials and then of course set up the tasks.

P7: Time was the biggest challenges. <...> To learn how to make a test. To make test in Moodle. To grade it and write feedback. All of that takes up so much time. <...> You know you can always do better. You can always add. You can always change something and if we consider the workload that we had when the pandemic started, it was huge.

P15: We, professors, have to a lot of duties and we don't have this luxury to sit and just put everything to Moodle from the beginning.

Additionally, teachers have pointed out that online communication and online feedback provision, which is vital for productive learning experience and proper LOA, requires a lot of time. In fact, online communication with students during the pandemic has been seen as most demanding and time-consuming part of teaching/learning and assessment in a TEL environment, however, teachers have acknowledged the importance and necessity of such interactions:

P1: I receive so many emails from students daily. It takes a lot of my time and energy to just deal with that.

P2: When you are working online, you receive a lot of inquiries from students.

P6: Having interactions with students really helps, but it's a challenge when you need to do that online. <...> it's a lot of extra work.

Also, teachers have pointed out that LOA takes much more time, as a result, teachers avoid additional tasks, such as learning new tools that would help them to easier arrange or implement teaching/learning and assessment in a TEL environment. Besides, the research has showed that personalized feedback provision has increased their workload immeasurably:

P3: When you have 100 students, giving everyone personalized feedback is unrealistic. <...> For me as a teacher, it adds so much unnecessary work.

P9: I prefer giving feedback during online class meetings. Writing comments for every student takes too much time and energy.

Consequently, the research has revealed that teachers are forced to prioritize when implementing LOA in a TEL environment, which requires good time management skills, thus, can cause additional challenges for the teachers. Additionally, the research has demonstrated that teachers have to be creative to properly employ TEL environment solutions in designing and implementing

LOA in a TEL environment, as this can contribute to reducing heavy workloads. All in all, teachers are constrained when it comes to time-management during the semester. Teaching/learning and assessment in a TEL environment, including feedback provision and communication with students via online channels, add extra work and can be challenging for teachers.

Furthermore, teachers have pointed out that learning how to set up and use different tools for assessment is challenging. Moodle offers a huge selection of different tools that serve different purposes. Teachers need to know their functionality so that they could select the ones that best fit their educational goals and strategies. However, this seems overwhelming when combined with other obligations that teachers have during the semester. Besides, those teachers who have insufficient levels of digital skills and competences, describe figuring out how to use different tools within Moodle learning environment as a detrimental task.

P7: I had to learn to work using Teams and Big Blue Button and Adobe Connect and other tools. And they're different and it gets really confusing for me.

P10: I needed technical support because each tool changes and even having experience, sometimes it can get too overwhelming. <...> There are lots of tools on Moodle. A lot of functionality, but it is difficult for you as a teacher to know each option. They provide a lot of functionality and too many functions for you as a teacher to choose. <...> And it's not only for the assessment. This is also about organizing activities in Moodle. Mind-map is totally nonsense. Wiki is very overcrowded. Other tools for presenting materials are more difficult to learn to use.

As the research has shown, teachers had to learn how to use internal Moodle tools that are used for setting up course and assessment activities as well as the external ones that are compatible with the learning environment, e.g., these tools usually include online video conferencing tools such as *BigBlueButton*, *MS Teams* or *Zoom*. Teachers described that as very overwhelming, confusing, and time-demanding experience.

Moreover, the research has revealed that teachers face many challenges at the institutional level while designing and implementing LOA in a TEL environment. In fact, many teachers complained that they have not received any proper support at the institutional level. As the analysis has shown, teachers received a lot of support that has been described as very technical, e.g., how to set up a tool, what to click on Moodle that one or other function would be activated.

P2: If I have some questions, I can always address the technical staff. They are quite helpful and explain or offer the solution how to deal with the emerging problems. But that's only technical side.

P3: I think if I go to trainings here at university, most of the time they are at such a superficial level that they don't usually cover any needs that I have. Moodle training here is very basic. <...> I sometimes don't get the answers that I looked for.

Teachers have missed a more complex support from the institution. As teaching/learning and assessment in a TEL environment is different from a face-to-face context, teachers have expressed the need for support at the pedagogical level in addition to technical support:

P3: In addition to those technical consultations about technical issues, some consultation from experts with education, for instance, in Education Academy, specialists that would consult on how to do assessment would be great.

P4: We have the Institute at our university that helps. But they mostly support with technical questions. And that's not enough. <...> Sometimes you have more deeper questions, I guess, issues at didactic level, and then you're left alone to deal with that. And it can get really hard. For instance, assessment or teaching and learning in the online environment, we all are struggling as teachers. We are struggling with interaction, which is always a problem in online studies. I think we would need this kind a more systemic approach from university to support teachers in what they're doing.

P10: Face-to-face teaching is different than online or blended courses. <...> teachers usually need this kind of didactical support, but we can only get technical support, where to click, how to set up things, etc. There are a lot of questions from educational point of view, like how to define or how to describe those assessment criteria?

Nevertheless, teachers who have been forced to switch to fully online mode have encountered different issues at more pedagogical level, that have not been properly addressed by the institutional support staff for online studies. Even though the institution has provided technical support which has been highly welcomed and appreciated by the teachers, it has appeared to be insufficient, as the consultations have been at the basic level and not answering questions or providing any guidance for teachers on how to design and develop a course in a TEL environment.

The analysis has revealed that many interviewees face yet another challenge which is described as that a restricting institutional policy regarding assessment procedures. Even though the university has implemented a cumulative grade system, where the final grade is determined by adding up a percentage of grades made up of a combination of homework and midterm for 50% and a final exam which counts for 50% on its own, HE teachers claim that such regulations prevent them from designing and implementing LOA in TEL environment because the regulations strongly promote summative assessment practices and formative assessment, or LOA is considered to be irrelevant.

P1: If it was up to me, I would change the way the final grade is calculated. <...> university policy says that 50% of the final grade is exam, so it means that students can still pass the class if they manage to get 10 on their final and can skip all the classwork. <...> And then there's this chaos. <...> each department and each institute have their own rules and their own interpretations of how the final grades are calculated.

P4: The faculty only cares about final grades <...> This continuous assessment is not interesting for [the faculty].

P5: Formative assessments that certainly not something that comes down from the faculty. The information that we're getting from the faculty is only to how carry summative assessments? How to prepare summative assignments for the students? <...> A change in

university policy where there is a clear explanation once students start their studies that that is part of what you need to do as a student.

Based on that, teachers are obliged to follow university regulations which mainly support summative assessment, whereas assessment that supports learning, e.g., formative assessment or LOA, is not required, thus, the decision whether to implement LOA in the course or not is left up to the teacher. The university requires teachers to arrange the assessment in such manner that there would be three summative aspect carrying assessments such as midterm, homework, and final examination. Considering heavy workloads, and other obligations, teachers honestly admitted that they tend to just enough work to comply with the university's regulations and to pass the formal accreditation procedures, while implementation of LOA in a TEL environment mostly rely on teacher's personal beliefs about teaching/learning and assessment, and devotion to work.

Besides, the analysis has demonstrated that the implementation of LOA in a TEL environment has been challenging for the teachers as Moodle has very limited technical interface and functionalities. Teachers described Moodle as neither intuitive, nor user-friendly. Many teachers complained that it is complicated to set up Moodle for teaching/learning and assessment because they need to know exactly what functions to enable, where to find the necessary dialog windows or how to set the parameters. In other words, there are so many steps required to perform to set up each tool. This has been enlisted as a challenge even by the teachers, who already have experience working in Moodle, while for less experienced teachers, this has seemed even more overwhelming. In addition, Moodle keeps being updated occasionally, which results into more confusion, as teachers have to keep up with system updates:

P3: Moodle gets to be updated every year and I find it to be quite annoying. <...> It's annoying because everything depends on these tiny clicks. For example, sometimes even with the badges, there are problems because I set them in such a way that if the students completed five assignments, somewhere in the mid-semester they get a badge which says good work, keep going. However, if you want to change Moodle test, you want to change one question the next semester, all of a sudden this becomes like a new test, which is not going to be calculated. <...> I don't think Moodle is a user-friendly system. <...> I tried peer work tool. It's like a workshop function. It was such a disaster. <...> I forgot to click on something, that means now the students couldn't submit, they couldn't open, they couldn't find stuff.

Also, teachers complained that Moodle does not have the necessary tools or capabilities to perform certain actions, therefore, teachers cannot use the learning environment to its full potential. Also, teachers expressed doubts about the value and reliability of Moodle learning progress monitoring tools:

P1: I'm not sure if Moodle tracking tools are very reliable. They can only provide information if students clicked one something, opened something. But they don't show if

they actually studied the material. <...> I think there are better ways to track their learning than using these tools.

P8: I cannot trust it, because if [student] downloaded the paper, it doesn't automatically mean that they read it. Or if they open a document, again, I can't tell if they actually read it. System can be useful for tracking to some extent and even then, I can't trust it because it's easy to cheat the system.

P17: I actually ditched that tool [progress bar]. <...> They finished the second task; they tick it and so on. But otherwise, it's artificial, students can easily manipulate it and you can't trust it for progress monitoring.

The research has showed that teachers have suspicions whether these tools provide accurate information on student learning. In fact, many teachers have suggested Moodle progress monitoring tools can be easily manipulated or cheated by the students. For instance, students can click on or open the materials, and the system automatically marks it as *complete*, however, there is no way to measure whether the student has familiarized with the contents. Thus, many teachers prefer non-technological learning progress monitoring ways.

Additionally, the research has revealed that Moodle messaging functionality does not fulfill teachers' expectations. Consequently, teachers prefer using external tools or services such as emails, Outlook or Google, or even social media, e.g., Facebook, to communicate with students or to provide feedback.

P5: I don't really like the messaging functionality on Moodle, it just takes more clicks to access everything. With Moodle, you get a notification to your e-mail, and you can't immediately reply.

P9: Trying to communicate in Moodle is too problematic. Sometimes students don't see or don't get notifications, they need to log in and all that stuff.

According to that, Moodle tools does not have the full capacity to enable and facilitate timely and efficient communication between teachers and students. Since teacher-student and student-student interactions and feedback provisions are important for efficient LOA design and implementation in a TEL environment to facilitate and enhance student learning, this technical shortcoming of the Moodle environment can be challenging.

Besides, teachers have agreed that Moodle learning environment has limited technical capacities to support certain pedagogical interventions.

P7: Last semester, even last year, when we wanted our students to record their voices, their answers, it was more problematic and more difficult to do that <...> I couldn't do because the system didn't allow that.

P9:<...> For example, we have tests, where students must write formulas and calculations. And they can't do that in Moodle. Moodle doesn't have the symbols for formulas. <...> That's definitely one of things that must be fixed.

P14: Simply fill in those templates, but that doesn't work in Moodle because I didn't find a way how to prepare a table. It limits my possibilities to give them questions. So that's why then I cannot use Moodle tools. <...> Moodle tools are not working. So, that's the

most challenging thing especially for me and some other people in finance area where mathematical solutions are required.

As a result, many interviewed teachers have demonstrated their own preferences regarding technologies or tools for designing and implementing teaching/learning and assessment in a TEL environment. However, most of these external tools, which, according to the interviewees, are user-friendly, are commercial tools, such as Google classroom, and often are not available for the institution to use without additional charges, thus, the implementation of these tools or services is not even considered by the institution administrative bodies. In short, as demonstrated by the research, the Moodle environment has some considerable technical flaws that need to be addressed to provide better experience for its users and support teachers in designing and implementing teaching/learning and assessment strategies.

Finally, teachers have indicated insufficient financial support as one of the key challenges to implement LOA in a TEL environment. Teachers complained that their salaries are relatively low, and workload is already heavy, thus, most of them feel discouraged to do more. LOA, as a rule, requires higher student and teacher involvement, constant monitoring, feedback provisions and regular communication between the involved parties, and this is challenging on its own, therefore, nobody wants to take up more work, needed to efficiently design and implement LOA in a TEL environment.

P3: And my salary is probably 5 cents an hour and I don't want to include more because if I include more, I will be working for one cent per hour.

P5: We're very tightly pressed in terms of workload for the money that we get.

P8: Your time is worth more than they pay you.

P15: We, professors, have to a lot of duties and we don't have this luxury to sit and just put everything to Moodle from the beginning. It's additional work, which I'm not getting paid for.

According to this, designing and implementing LOA in a TEL environment is a challenging work that demands time and effort from the teachers, however, these efforts are not accounted for, and teachers are not getting the desired encouragement in a financial form, thus, they are simply choosing not to do extra work.

3.3. Implementing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Analysis of Courses on Moodle)

In this part of the dissertation, the findings of the database analysis will be presented, which is arranged in accordance with the outline of the analysis template (see Appendix 6). Here, information on learning outcomes, assessment criteria and strategy, and assignments within the

analyzed courses will be provided, followed by more specific information on how LOA is designed and implemented within the analyzed courses. This will include information on student self-assessment, peer learning, learning progress monitoring, and feedback provisions. Finally, some findings on other relevant issues for LOA in a TEL environment, such as digital badges, will be discussed.

Assessment Strategy and Assessment Criteria. To begin with, it was important to examine whether and how learning outcomes are indicated in the analyzed courses. It was necessary to check where students can become familiarized with the learning outcomes.

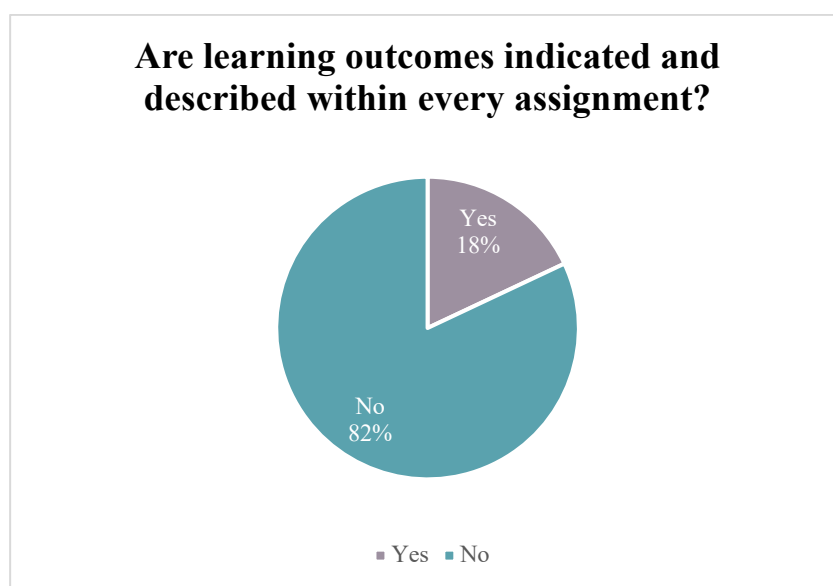


Figure 13. Are Learning Outcomes Indicated and Described within Every Assignment?

As demonstrated above, there is no description of learning outcomes in most courses (23 courses: 82%). In these courses, students can only find out about the course objectives and outcomes, which are often provided in a general format, in the course description. In the meantime, the analysis has indicated that 5 courses (18%) have indeed listed the learning outcomes of every single assignment in addition to the generic course outcomes. A note should be made that the learning outcomes are indicated within every assignment, usually in the assignment description, using task submission tools on Moodle.

Another important part of the analysis has been trying to determine whether students are aware and well-acquainted with the assessment strategy within the analyzed courses. In order to do that, multiple things have been taken into consideration, including the following aspects: how learning objectives and/or learning outcomes have been presented, whether and how and where assessment criteria are provided, whether any information regarding assessment procedures are explained in the study guide, and whether there is a presentation with all the information on assessment within the course. However, a note should be made that screening of the above listed

elements cannot fully give an understanding to what extent students are aware of the assessment strategy. As observed during the analysis, teachers can indeed include and provide all the information regarding the assessment in the course on Moodle, however, it is still up to the individual student whether they interact with and comprehend it. As a result, the analysis only aimed at searching for the indicators, i.e., assessment criteria, learning objectives, organization of assessments, etc., that would develop an understanding of whether students have had enough opportunities to learn about the assessment strategy (see Figure 16).

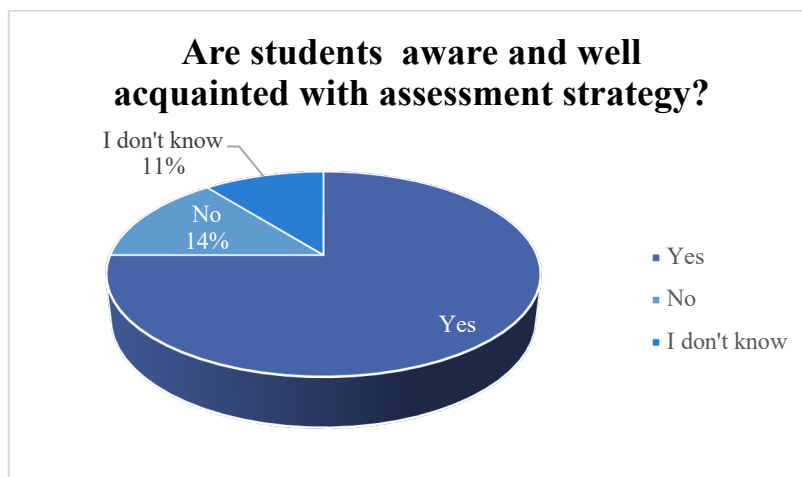


Figure 14. *Are students aware and well acquainted with assessment strategy?*

As shown, in most courses (21 courses: 75%), all the necessary measures are taken so that students know the assessment strategy well. To illustrate, the analysis has shown that the information regarding assessment is provided in a student guide or course description. It could as well be found in the first lecture slides. In some courses, the information regarding assessment in the study guide was detailed, as it included assessment criteria, points and value indicators. As a result, the assumption can be made that students should be able to easily find information about what assessment procedures they will need to take to complete the course.

However, the analysis has pointed out that in 7 courses (25%), students have not been introduced to the assessment strategy properly (see Figure 16). For instance, in 4 courses (14%) no assessment criteria could be found anywhere, i.e., assessment criteria were provided neither in the course description, study guide, or by individual assignments. Even worse, in one of the courses analyzed, the information regarding assessment differed as information in the study guide and the course description disagreed. An assumption can be made that the teacher has not updated the files; however, this may be problematic for students.

Determining the level of student involvement and contribution to the development of assessment criteria is considered as another important aspect for developing proper LOA in a TEL environment. In fact, the student engagement and involvement in development of assessment

criteria are fundamental components of LOA as engagement with assessment criteria allow students to better understand how they are going to be assessed and what is expected from them, consequently, it plays a crucial role in increasing and maintaining the transparency of assessment. Unfortunately, the analysis has shown that students are often excluded from the development stage of assessment criteria. To illustrate, in most of the analyzed courses (27 courses: 96%), there are no indicators, i.e., activities, discussion entries, collaborative documents, etc., that would demonstrate student involvement in the creation of assessment criteria. Some evidence of student involvement has been observed in only one analyzed course (4%) (see Figure 15 below).

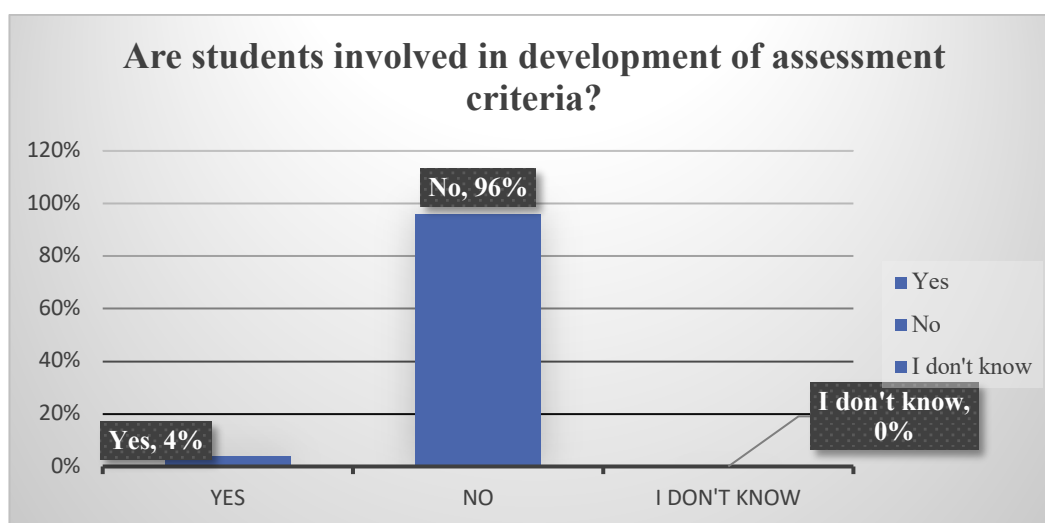


Figure 15. *Are students involved in the development of assessment criteria?*

As the analysis mainly relies on the evidence found in the course page on Moodle, there is no way to determine whether the teachers have discussed assessment criteria development with their students during synchronous learning sessions, as there have not been recordings of the learning sessions provided.

Even though, that students are not directly involved in assessment criteria development, the analysis has demonstrated that students are well-acquainted with assessment criteria (20 courses: 71%) (see Figure 16). However, in some of the analyzed courses (8 courses: 29%), no assessment criteria have been presented to the students, only vague descriptions of how the assessment strategy will be implemented can be found in the formal course description (e.g., to pass the course, students need to pass the exam (50%), midterm (30% or 20%) and homework (20% or 30%, the volume in percentage depends on how much weight the midterm has in the evaluation).

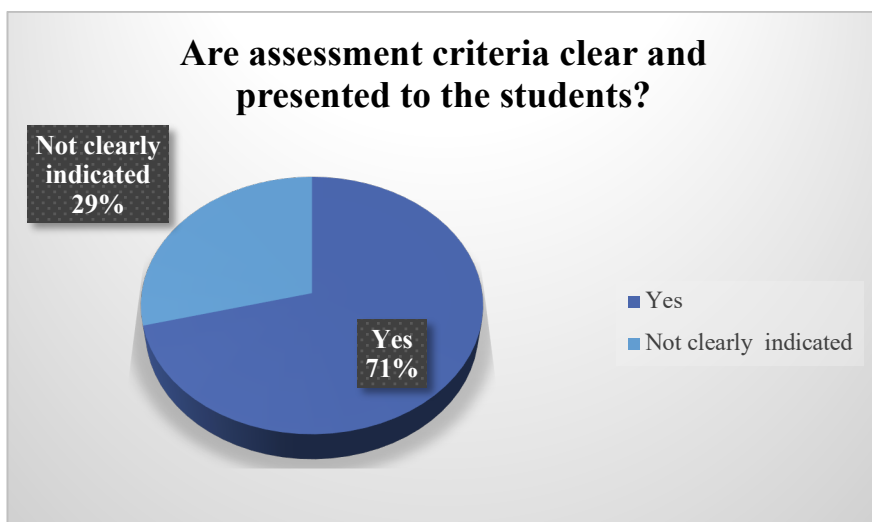


Figure 16. Are assessment criteria clear and presented to the students?

In fact, according to the university regulations, teachers are supposed to present students with assessment criteria, otherwise the course cannot pass the formal evaluation procedures, which are used for assessing whether course preparation is sufficient for either fully online or blended delivery mode. Nonetheless, the findings reveal that teachers still do not always obey this regulation.

Once it was determined whether the assessment criteria have been indicated or not, the next step was to look at where exactly in the course students can find them (see Figure 17). The Moodle environment allows teachers to indicate assessment criteria in multiple places. For instance, teachers can prepare and upload a document, such as a study guide, where all the detailed explanations of the course work and assessment is provided. They can also exploit the task submission tool, where they can describe the task and the assessment criteria, as well as set up grading tool with a possibility to grade against pre-determined assessment criteria and provide feedback accordingly.

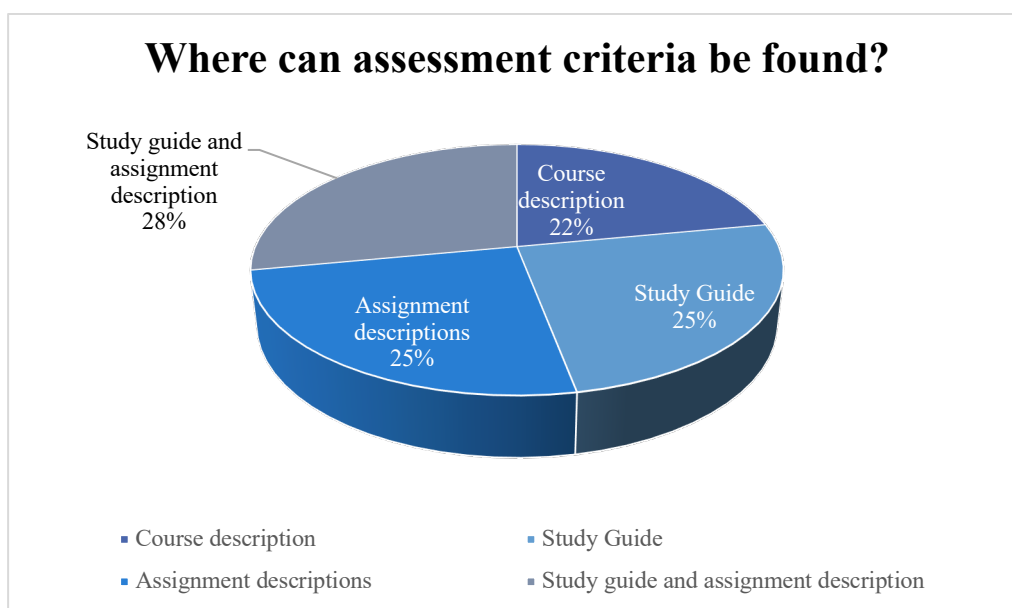


Figure 17. Where can assessment criteria be found?

The analysis has shown that in a majority of analyzed cases (8 courses: 28%), teachers have indicated assessment criteria in multiple places, such as study guides and assignment descriptions. In this way, students are constantly reminded of what is expected from them and how they are going to be assessed. In some courses, teachers have opted for presenting assessment criteria in either a study guide (7 courses: 25%) or task descriptions (7 courses: 25%). This is challenging for students as they constantly need to consult either the student guide or examine task descriptions carefully to learn how they will be assessed. Additionally, in the courses where assessment criteria have been presented in the task descriptions, there was no consistency because some tasks had detailed explanations with assessment criteria listed while other tasks lacked detailed descriptions and assessment criteria were formulated in an obscure manner. Finally, the analysis has revealed that assessment criteria have also been presented in course descriptions (6 courses: 22%). However, assessment criteria presented in course description were abstract, focused on the assessment of skills and competences that students acquire upon the completion of the entire course, rather than providing detailed guidance for the students in day-to-day learning and assessment activities.

The analysis has also shown that Moodle tools are used to provide assessment criteria (see Figure 18). The common practice, observed through the analyzed courses, was that teachers would explain assessment criteria when they provided the task description, using the Moodle activity tools. In 15 courses (53%), assessment criteria have been provided as part of the task description and the task itself was designed and implemented using different Moodle activity tools, whereas, in the rest of the analyzed courses (13 courses: 46%), assessment criteria have been indicated either in the study guide, which, as a rule, was always in the Word document format and uploaded as a resource to the learning environment, or not indicated at all.

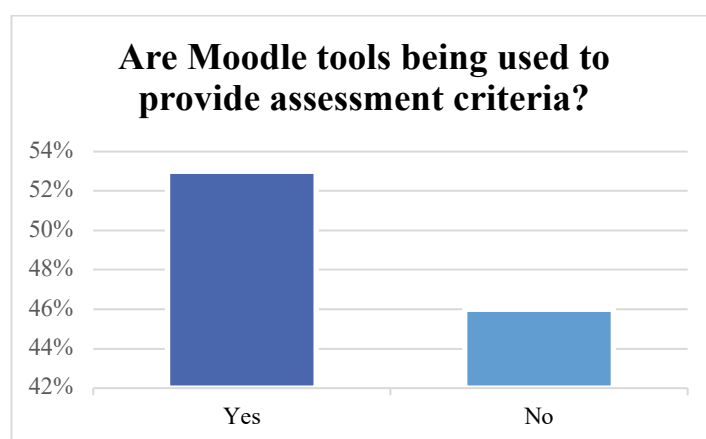


Figure 18. *Are Moodle tools being used to provide assessment criteria?*

Thus, a note should be made that Moodle activity tools are often exploited for more than just setting up an assignment for the students; they are useful for providing assessment criteria as well.

The university offers guidelines for how teachers should manage assessment procedures in their courses; however, slight deviations are allowed when it comes to distributing the value of these assessments. For example, teachers can decide what weight the final examination, midterm, and homework carry in the final grade calculation as well as any additional components, such as participation. The findings have shown that, in the majority of courses (64%) emphasis is on final exams as they carried the highest weight in the cumulative grade calculation (see Figure 19 below). Therefore, a statement is made that the summative aspect of assessment is prevailing.

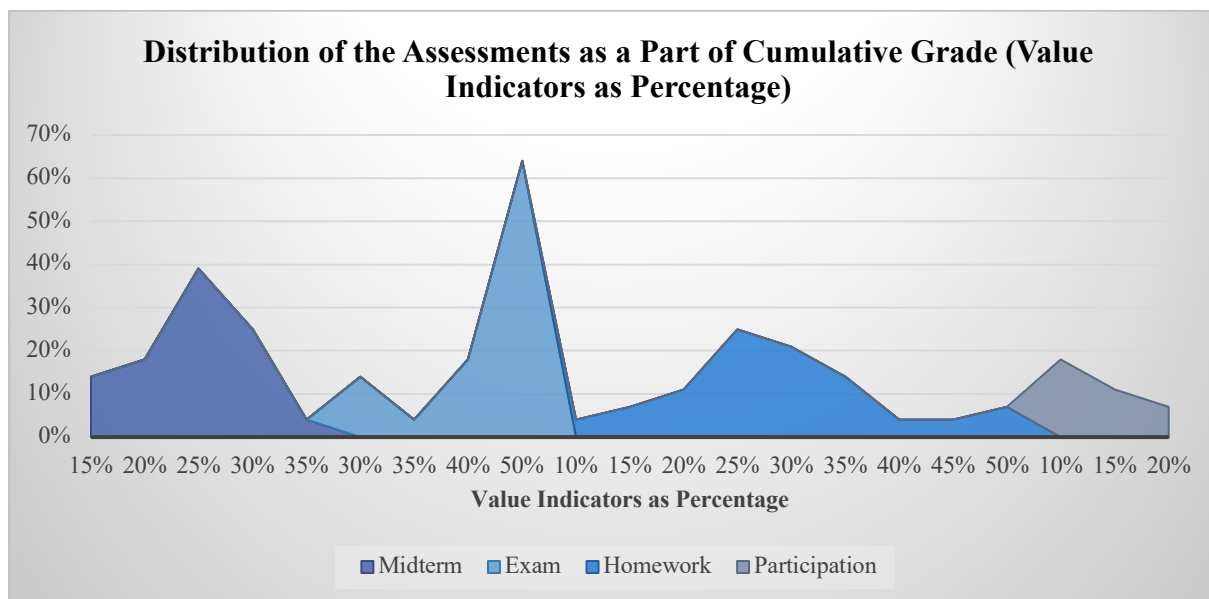


Figure 19. *Distribution of the Assessments as a Part of Cumulative Grade (Value Indicators as Percentage)*

Nevertheless, the highest level of flexibility was observed in the weight distribution in homework assignments and midterms. Homework and midterm grades are often set in an inverse correlation, where one increases, the other decreases. However, homework did not always refer to a single one-time task; the assignment could be divided into a series of small, incremental tasks that added up to a pre-determined percentage of the final. This is considered to be beneficial in supporting and/or implementing LOA. Furthermore, while participation is not required, the analysis has revealed that some teachers have decided to include a participation element in the final calculation. Participation had to be defined in each class, however the main tendency observed was marking students as present in synchronous, online learning sessions. Other participation forms, such as participation in more asynchronous manner, e.g., familiarization with learning materials, completion of tasks, participation in discussion forums, or engagement in peer learning activities, were not commonly noted.

Assignments. Having explained how the grades have been calculated in the analyzed courses, it is necessary to take a closer look at how often the assignments were assigned to the

students. The analysis has demonstrated two dominant tendencies in assignment frequency (see Figure 20).

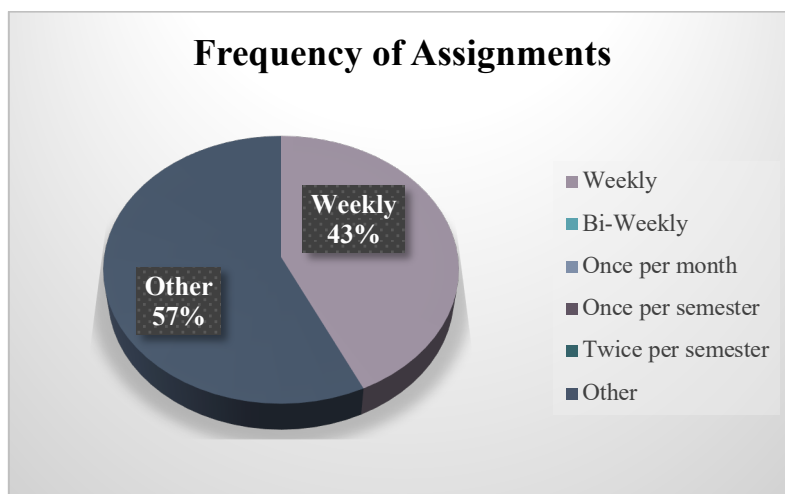


Figure 20. Frequency of Assignments

In many of the analyzed courses (16 courses: 57%), there was no consistency in the frequency of assignments. Nonetheless, a note should be made that the course did meet the official university regulations, i.e., the course included homework, midterm, and exam. The assignments were given based on the current needs of students or to suit pedagogical needs. For example, students received assignments once in three / four / five / six weeks, three times per semester, etc. In the meantime, the other set of analyzed courses have followed an intense, yet structured schedule for when and how many assignments were given to the students. The analysis has shown that in 12 courses, (43%) students would get weekly assignments, which later would add up to a final evaluation for homework. The analysis has shown that teachers tend to manage student's work-in-progress, therefore, submission of homework assignments often consisted of several steps, where students had to upload their homework assignments in various stages to receive interim evaluations and sometimes specific feedback. In the meantime, midterm and exams were more structured, with little room for any deviations from the predetermined schedule. Often, midterms and exams were given on set dates and times.

Another important issue that has been analyzed was the type of assignments (see Figure 21). For this dissertation, it was important to look at whether the assignments were graded or not, whether feedback was given for the students, and whether teachers used any Moodle tools to manage grading and feedback provision procedures. Since several different types of assignments could be included within a course, the total number of assignments is higher than the number of courses analyzed.

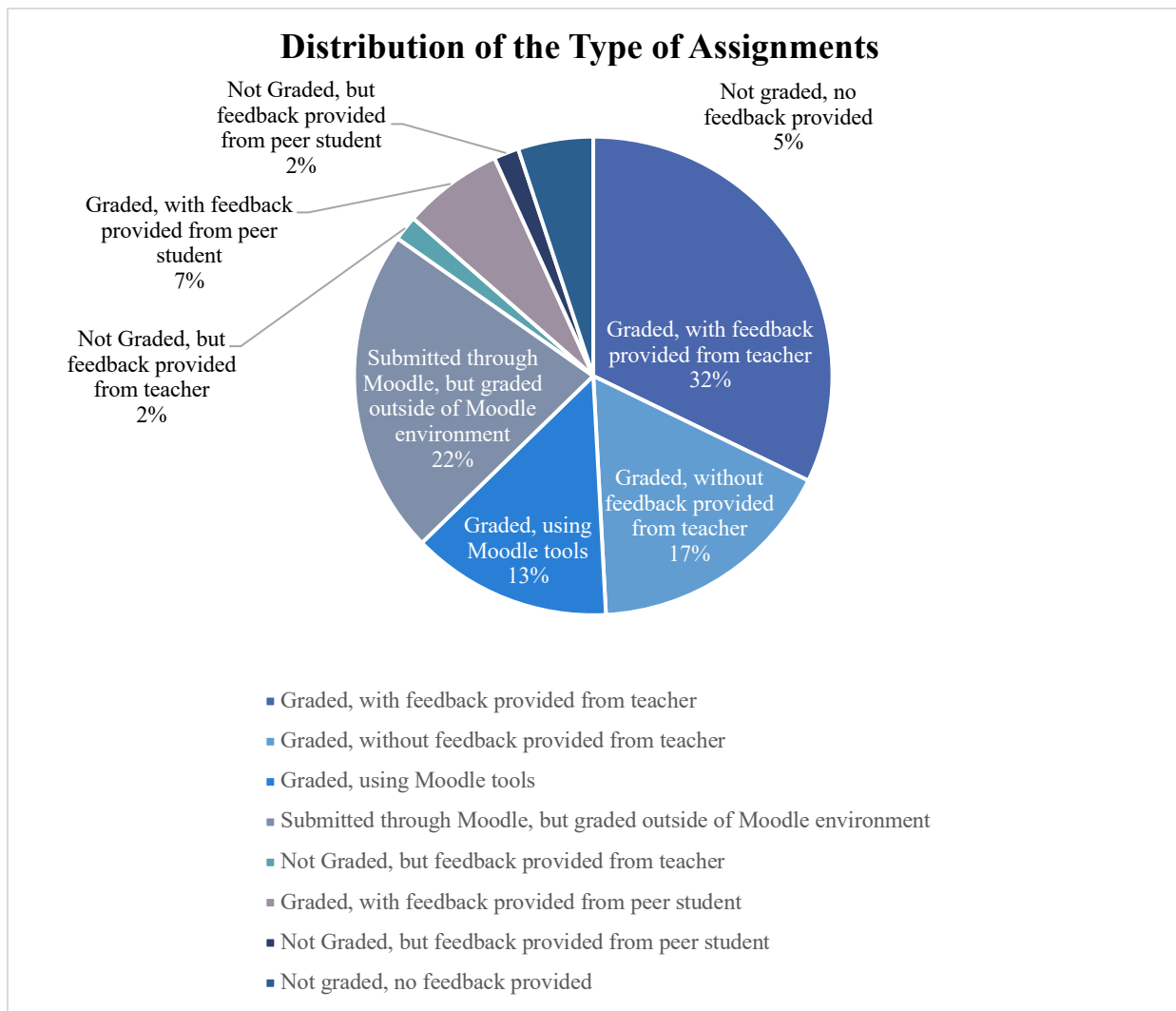


Figure 21. *Distribution of the Type of Assignments*

The analysis has shown that the majority of the analyzed assignments (19 assignments: 32%) were graded, and students received teacher’s feedback on them. This is important when it comes to supporting LOA and facilitating student learning. 17% (10 assignments) of the assignments were graded, however, students did not receive any feedback on their work. Such assignments supported a summative purpose of assessment and were mostly used for accountability purposes. The common examples of these assignments included midterm and final tests in Moodle. Also, around 22% (13 assignments) of assignments were submitted through Moodle, however, no grading activity within the learning environment has been detected. Teachers downloaded the submissions and performed grading outside the Moodle learning environment. This practice was mostly observed with essay-type assignments. 13% (8 assignments) of assignments were graded in the Moodle environment, using technology provided solutions such as automated grading. This function was widely applied in grading tests on Moodle, particularly for close-ended questions. The analysis has indicated that in some of the courses there were assignments (4 assignments: 7%) that were not graded or included in the final evaluation, however, students received peer

feedback on them. This is considered as a step towards LOA, however, since there was no evidence of any kind of teacher overseeing the quality of peer feedback, its potential and value cannot be measured. There were some assignments, in which the main goal was feedback provision, when feedback was given by either the teacher or a peer, however, these assignments were not graded and did not carry any weight in the final grade calculation. Finally, in some of the courses, several assignments (3 assignments: approx. 5%) were discovered that were neither graded nor feedback on them was provided, these assignments were uploaded to Moodle as additional material.

As described in Chapter 1, Section 1.1.3.1, all the assignments can be classified in terms of the assessment purpose they support, i.e., assignments can be treated as learning tasks if they focus on facilitating learning or they can be considered assessment tasks if they carry a summative aspect.

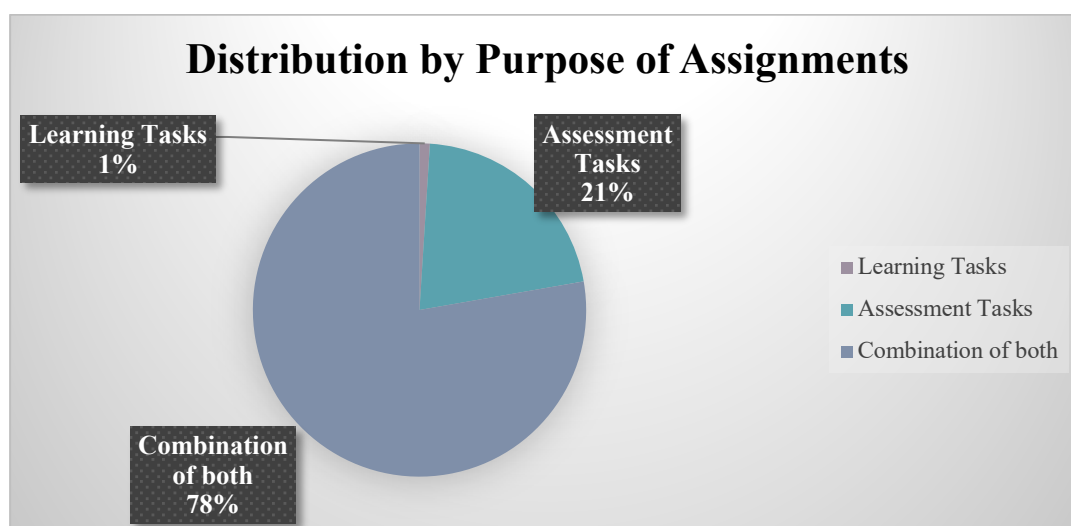


Figure 22. Purpose of Assignments, Used in the Analyzed Moodle Courses

The analysis has demonstrated that the dominant trend in the analyzed courses was to implement both learning and assessment tasks (78%) (see Figure 22). As prescribed by university regulations, assessment tasks were obligatory, learning tasks were not officially promoted, thus implementation of such tasks were left as individual teacher's choice. Only about 1% of all the assignments could be considered as learning tasks as they were not affecting the student's final grade and their primary purpose was to provide feedback and support for the student. In the meantime, 21% of the analyzed tasks were considered as purely assessment tasks, as their primary purpose was to test and rank students in terms of their performance.

Next, it has been attempted to determine what kind of assignments are used in the analyzed online and blended courses (see Figure 23).

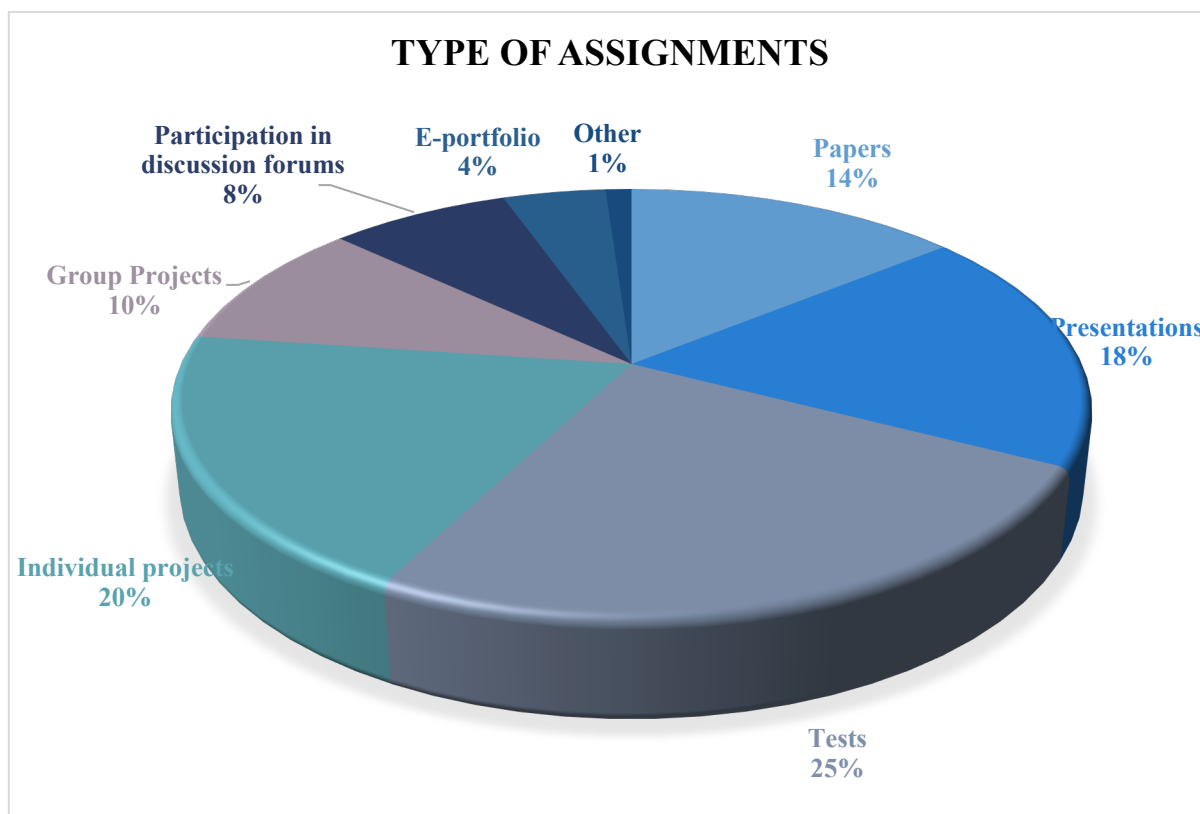


Figure 23. *Assignments, Used in the Analyzed Courses on Moodle*

As the analysis suggests, tests (25% of all the assignments) are the most frequently used of the assignment types, and most assessments are conducted implementing test-based assignments. Tests have been used to conduct final examinations, which, in most of the cases, have had the highest value in the cumulative grade formula. Also, the research has revealed that individual projects (20% of all the assignments) is a commonly chosen assignment type. The tendency observed is that various individual projects (which often consists of a written essay-type paper and presentation during synchronous learning sessions) are used as a homework assignment or as a substitute for midterm exam.

In the meantime, presentations (18% of all the assignments) have been a commonly used assignment type as well. In many analyzed courses, students have to upload their PowerPoint presentation as well as present it during online learning sessions. In some instances, students were asked to upload the recordings of the oral presentations as evidence, but this practice has been infrequent (e.g., only in a single course analyzed). Besides, presentations are often used to deliver the ideas from the written papers, which is a commonly used assignment type (14% of all the assignments) as well. Papers have often been used as part of homework, midterms, or even final examinations. Papers have been assigned both for individual students and for group work. The analysis suggests that this type of assignments, however, is predominant in so-called soft sciences, such as social sciences, and humanities. Additionally, the research has shown that around 10% of all assignments have been implemented in the format of group projects. Again, the research has

shown that these group projects often result in the preparation of a written paper and a presentation. In some instances, peer learning activities (including student-to-student feedback provisions) have been detected, nevertheless, this is not yet a common practice.

Besides, the research has pointed out that participation in online discussion forums (8% of all assignments) has often been considered as obligation or assignment. For example, students are asked to write a pre-determined number of entries in online discussion forum to receive points towards their final grade. In some courses, structured discussion forums can be evidenced, as teachers have enlisted the criteria for a discussion forum entry and have provided guiding questions for the students. However, there are some courses, where the discussion forum is artificial and poor as the discussion is poorly structured with dominant free-flow entries, which often demonstrate low student engagement and inability to express thoughts in cohesive manner.

Finally, the analysis has demonstrated that the e-portfolio is still not a common practice. Only approximately 4% of all the assignments in the analyzed courses have been e-portfolios (see Figure 23). The e-portfolio is advantageous for implementation of LOA, as it allows monitoring the student learning progress and forces students to constantly reflect upon their learning. However, as implementation of an e-portfolio requires more effort and time, this assignment type is still not widespread.

Self-Assessment and Self-Reflection. This part of the analysis of the courses on Moodle has looked at how student self-assessment, as well as self-reflection activities, are implemented within online and blended courses on Moodle. Also, it has been important to determine if any other types of activities that require higher student engagement and collaboration, e.g., peer learning, peer assessment, and peer feedback, have been included. As learning online requires changes in pedagogy, putting students center and giving them more responsibility over their own learning to keep them engaged and to provide fulfilling learning experience, it is crucial to have activities included that would require higher engagement, participation, and constant reflection. This can be achieved through familiarization with assessment criteria as well as self-reflection.

The analysis has shown that student self-assessment is an uncommon practice in the analyzed courses (see Figure 24). To illustrate, many of the courses (18 courses: 64%) do not include any self-assessment activities, only in 10 courses (36%), can such activities be found. The reason for that is the overall design of the courses, because the tendency observed is that course design and structure are still based on a teacher-centered approach, and the Moodle environment is seen more as the storage facility for learning materials and facilitator of assignment submissions. A similar situation is observed when talking about self-reflection practices for the students (see Figure 25).

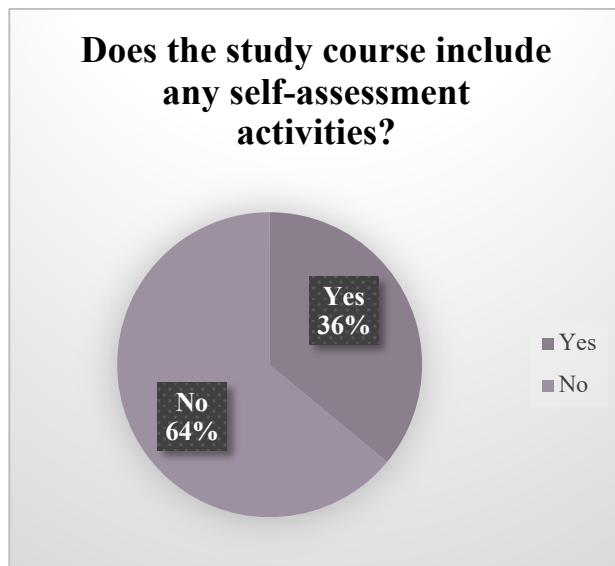


Figure 24. Does the study course include any self-assessment activities?

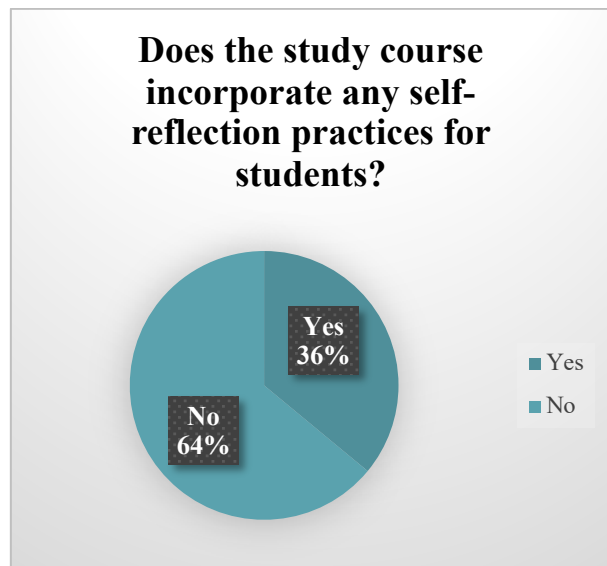


Figure 25. Does the study course incorporate any self-assessing practices for students?

As demonstrated, 18 courses (64%) do not include any activities that would help students to reflect on their own learning, whereas 10 courses (36%) include tasks that would require students to re-think their learning and reflect upon it.

However, as the analysis has demonstrated, most of the self-assessment and self-reflection activities are carried out in a discussion format. The students are asked to participate in a discussion thread and to answer several questions, which often are formulated as follows: how well they think they have done on the task, what they have found the most challenging and why, what they enjoyed about the task and why, etc. As a result, the discussion forum is the most used Moodle tool for self-assessment (see Figure 26).

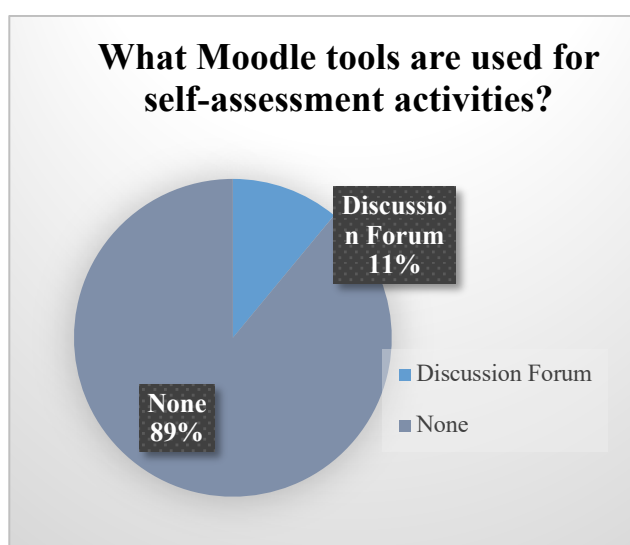


Figure 26. What Moodle tools are used for self-assessment activities?

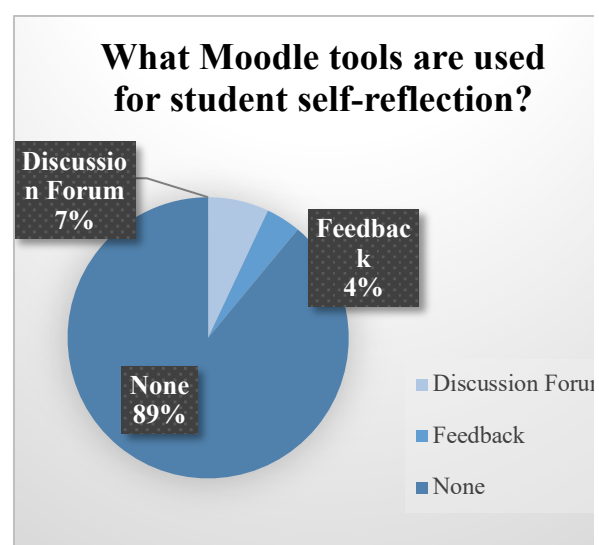


Figure 27. What Moodle tools are used for student self-reflection?

In addition to discussion forums, the analysis has indicated that sometimes teachers have used the Moodle Feedback tool for the purpose of student self-reflection (see Figure 27). However, this has only been witnessed in only one case (4%) of all the analyzed courses. Also, a note should be made that the primary goal there has been to collect feedback about the course to improve the quality of pedagogy. Nonetheless, students have been forced to rethink and assess their learning, therefore, it has served the purpose of self-reflection. Finally, this activity is voluntary, which may have been the reason for low student participation, as only one student provided responses to the questions in the Moodle Feedback form.

Peer Learning. When analyzing peer learning and assessment in the selected courses, a note can be made that these collaborative learning experiences are not yet a common practice (see Figure 28).

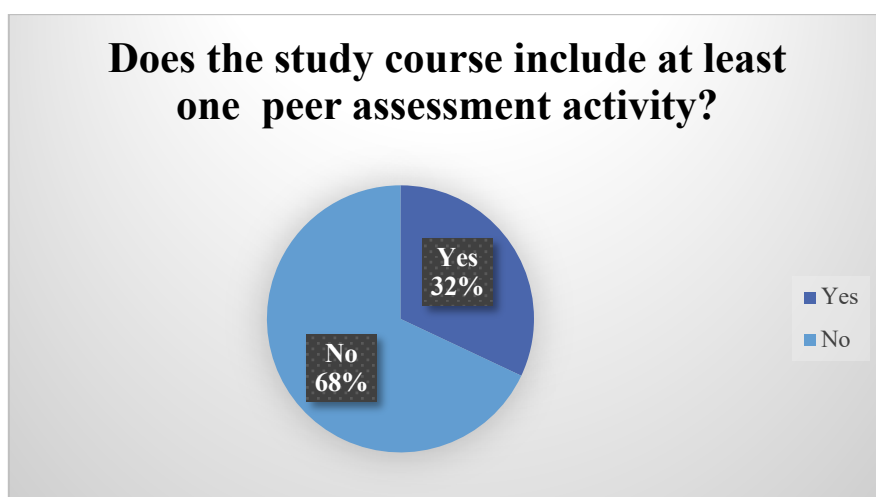


Figure 28. Does the study course include at least one peer assessment activity?

As demonstrated above, the analysis has shown that 19 courses (68%) have not included any peer learning or assessment activities, while the opportunities of peer learning have been explored in the minority of courses (9 courses: 32%). As shown, the course is usually structured in such way that it mainly focuses on tasks and activities designed for individual student learning, while collaborative learning practices, including peer learning, and peer feedback and assessment, are infrequent. Thus, it can be stated that the potential of peer learning in actual online or blended learning context is still not realized.

Progress Monitoring. Another important thing that has been analyzed is progress monitoring within the selected courses on Moodle. As previously discussed, (see Section 1.1.3.1), learning progress tracking is an inseparable element of LOA design in any educational context, e.g., face-to-face classroom or TEL environment. However, a TEL environment, in this case, Moodle, equips teachers with tools to facilitate student learning progress monitoring. The research has attempted to determine which Moodle tools have been used to monitor student learning

progress (see Figure 29). However, learning progress monitoring is still not a common activity in the analyzed courses.

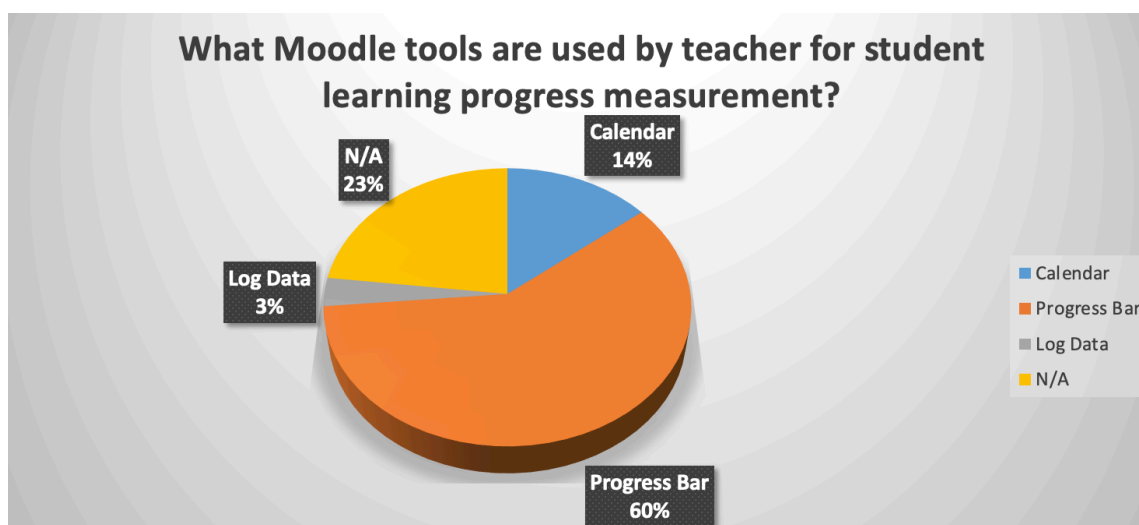


Figure 29. Moodle tools, used by teacher for student learning progress measurement

The findings suggest the Moodle progress bar has been the most popular tool to track student learning. The progress bar has been used in 60% (17 courses) of all analyzed courses. In most of the courses, the progress bar is set up so that the activity or resource is automatically marked off as *done* when a student opens it. By analyzing graphically presented data, both teachers and students can see the journey through the course in terms of engagement with the study materials and completion of assignments.

In addition to the progress bar tool, the calendar has been used in four courses (14%) as well. The calendar has been used more as tool to inform students about upcoming assignments so that students can plan their learning better. Besides, Moodle allows teachers to monitor student's learning through log data, unfortunately, this option is not popular among teachers as in only one of the analyzed courses, log data reports have been used. Nonetheless, it is difficult to determine whether teachers use that or not from the course analysis on Moodle. Instead, this information was more likely to be obtained through the semi-structured interviews with the teachers.

Finally, the study has shown that learning progress measurement is still not a commonly used practice yet, as 23% (6 courses) of the courses have not activated any progress monitoring tools in Moodle. In fact, as later observed through the analysis of interviews with the teachers, a lot of teachers, including these who are using Moodle progress measurement tools, have serious doubts about their potential to track student learning. Many teachers claim technology can be easily cheated, especially the progress bar, consequently they prefer using different, non-technological approaches and methods such as assessing the content of student's papers or their thoughts.

Feedback Provision. In this part of the dissertation, the findings on feedback provision in the analyzed courses on Moodle are going to be presented. Feedback is essential to facilitate learning and provide a deep learning experience for the students. Moodle environment tools (e.g., Moodle messaging, grading tools, forums, etc.) and other external tools such as emailing systems (e.g., MS Outlook, MS Teams video conferencing tool) used at the university offer various options for both students and teachers for fruitful exchanges. Therefore, it has been interesting to look at how feedback provision (e.g., teacher-to-student, student-to-student) is being handled, using different technological elements.

To begin with, the analysis has suggested that students do receive feedback rather often. However, this feedback is often one-way, from teacher to student (see Figure 30).

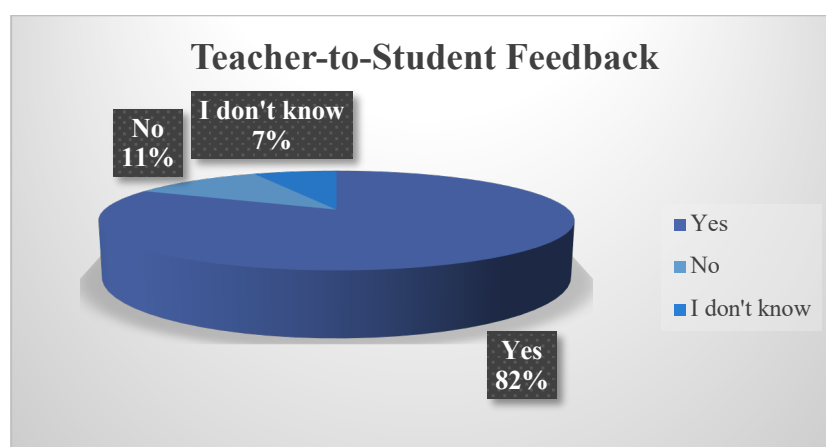


Figure 30. Students receive feedback on assignments from the teacher (teacher-to-student feedback)

As demonstrated above, in 82% (23 courses) of the courses, there is evidence that students receive feedback from the teacher on their assignments. Only in three courses (11%), no evidence was found that students would get any feedback from the teacher. In two courses (7%), it has been difficult to determine whether students receive the teacher feedback or not, because there was no written or recorded evidence of such activity, however, there have been some hints (e.g., a note in study guide and entry in the discussion forum that feedback is available on request via email or students can expect teacher's feedback during online presentations) that students can receive oral feedback during synchronous learning sessions online or written individualized feedback via email. Since the analysis is strictly limited by the boundaries of online or blended courses on the Moodle environment, there has been no possibility to check the afore-mentioned information in the external sources such as emails or video lectures.

The next step was to examine the mode of feedback, i.e., whether teachers provide written, oral, audio, or video feedback (see Figure 31). The analysis has demonstrated that out of the 23 courses where teachers provided feedback to their students, in 22 courses (96%) written feedback was prevailing. Teachers were writing comments on the submitted assignments or giving feedback

on the received grade. In some courses, teachers used criteria-based assessment while grading the assignments, consequently, such feedback was structured, and students could know exactly why their grade was what it was. Nonetheless, this practice was not common, as teachers would only provide brief messages to explain the grade.

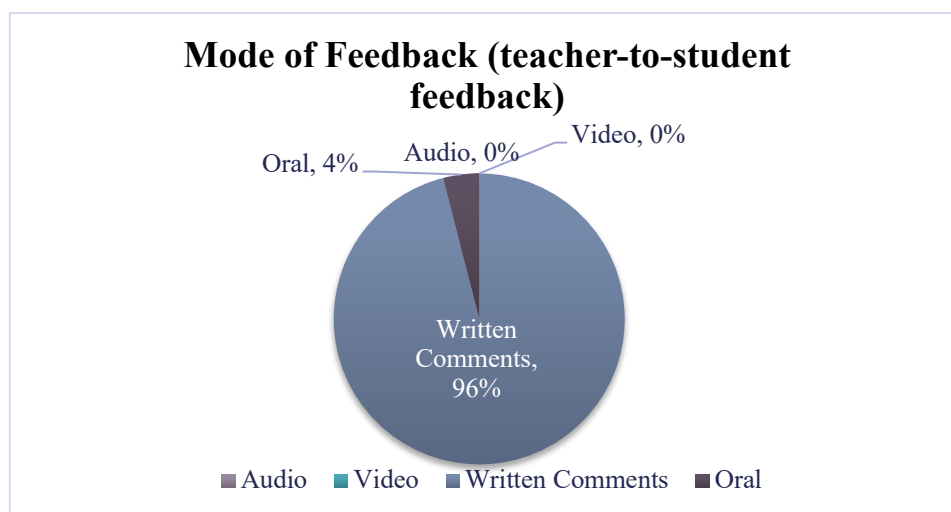


Figure 31. Mode of Feedback (teacher-to-student feedback)

In addition to written feedback on Moodle, students also received oral feedback. In one course (4%), students would receive verbal feedback during synchronous learning sessions on MS Teams video conferencing tool², and then had to upload their work after revisions, based on the received feedback. In this course, such practice was relatively easy to execute because of the small number of students taking the course. However, implementation of such practice in larger classroom may be problematic.

Another type of feedback that has been observed in the analyzed courses was student-to-student feedback (see Figure 32). As discussed in previous chapters (see Section 1.1., Sub-section 1.1.4) feedback provision is one of the key principles of LOA, thus it has been necessary to look at whether students have to provide feedback for their peers and how this is being handled. The analysis has suggested that peer feedback provision is still not a frequent phenomenon within the analyzed courses, as the majority of the courses (21 courses: 75%) have not incorporated any activities that would require students to engage in student-to-student feedback exchanges. The dominant trend is that the teacher provides feedback for the students, and this is often done sporadically and/or on request rather than in a systematic, re-occurring manner.

² Since the research is limited to the boundaries of the course within Moodle environment, there has been no possibility to document oral feedback cases. However, the fact of oral feedback provision has been confirmed during the semi-structured interview with the teacher who designed and teaches the analyzed course.

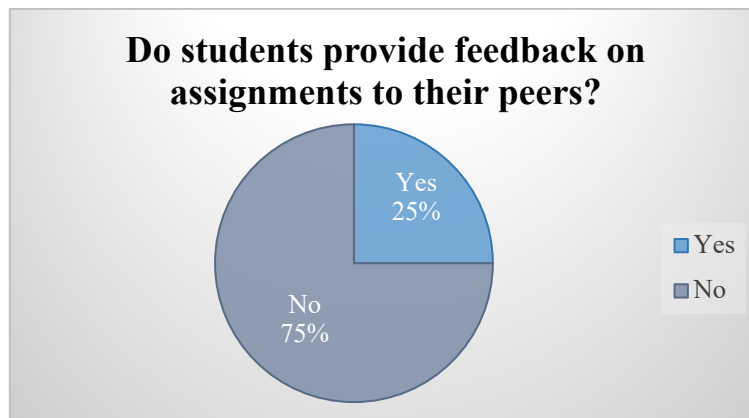


Figure 32. Do students provide feedback on assignments to their peers?

As shown in the graph above, peer feedback provision as an activity is incorporated in only seven courses (25%) (see Figure 32).

Even though peer feedback provision is an uncommon procedure, it was still interesting to examine how teachers have organized such activities within their online or blended courses. As the analysis has shown, internal Moodle tools have rarely been used for peer feedback provision (see Figure 33).

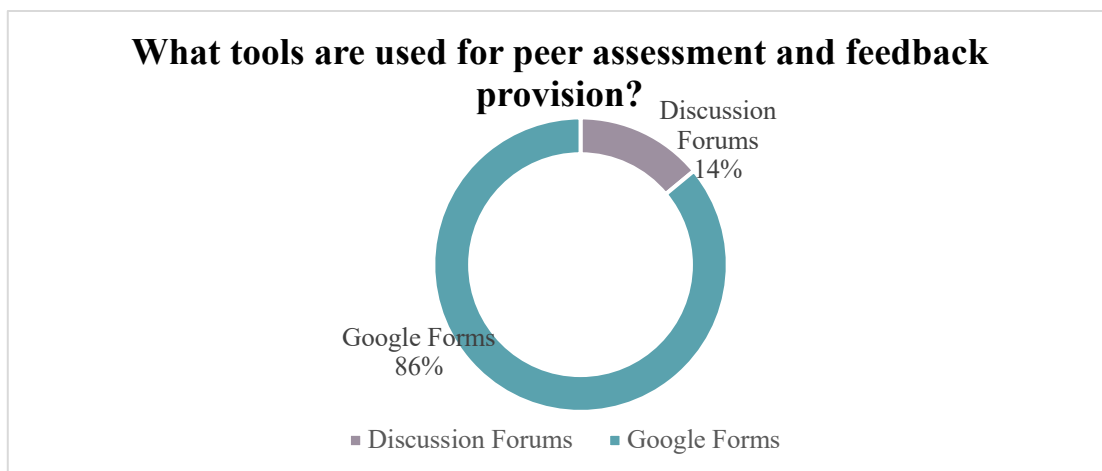


Figure 33. What tools are used for peer assessment and feedback provision?

In fact, only one course (14%), out of all seven courses that included peer feedback activities, used a discussion forum to handle student-to-student feedback. However, examining the content of the discussion forum entries, an observation can be made that the entire peer feedback activity has been chaotic, mostly because students were confused of what was expected from them and how the whole process was going to be arranged or they had issues due to insufficient level of feedback literacy skills. Also, the technical specifications of the discussion forum make it harder for both teachers and students to successfully implement and monitor peer feedback provision. On the other hand, the analysis has shown that external aids, such as Google Forms, have been used for peer feedback (in 6 courses: 86%). Google Forms has appeared as a user-friendly way to provide guiding questions for students so they know what they should pay attention to while

examining their peer’s work. However, most of the Google Forms have been used to evaluate and provide feedback on student presentations in synchronous online learning sessions. Unfortunately, the analysis has not indicated any instances where Google Forms would be used to assess and provide feedback on any other kind of assignments.

Peer learning and peer feedback has often been considered as an assignment so that participation in these activities was mandatory, whereas absence from peer learning activities could have negatively affected a student’s mark on the overall homework evaluation. Likewise, teacher-to-student feedback and peer feedback provision seems to be delivered in conventional ways, because alternative channels and modes, such as audio or video, have not been considered (see Figure 34).

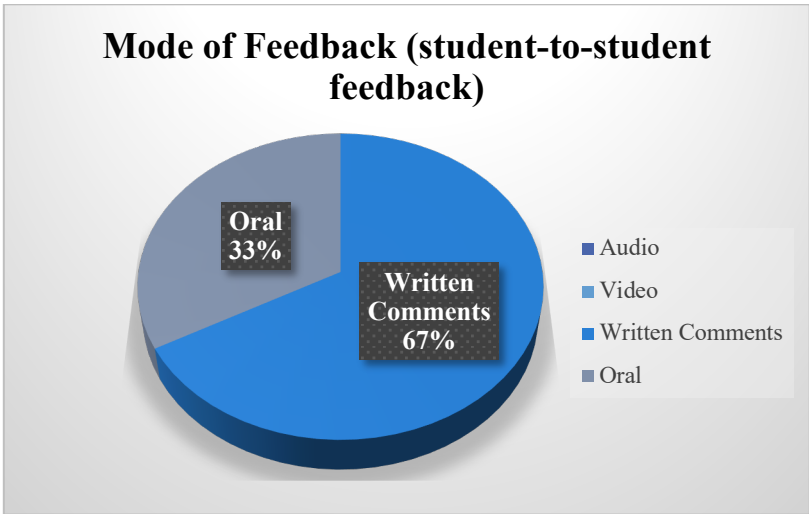


Figure 34. Mode of Feedback (student-to-student feedback)

In some analyzed courses, teachers have opted for a combination of both teacher-to-student and peer feedback (see Figure 35).

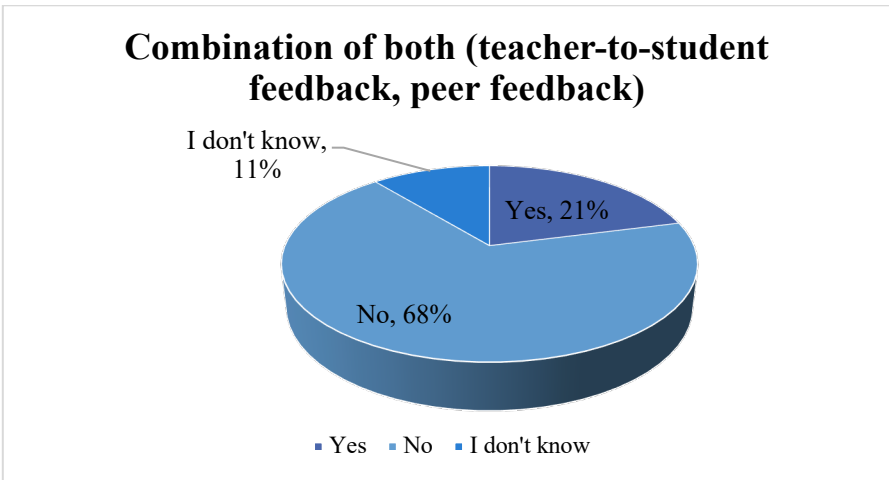


Figure 35. Combination of both (teacher-to-student feedback, peer feedback)

However, as teacher-to-student feedback is considered as a norm, peer learning and peer feedback is still an innovative student-centered method, thus, it is still not a common practice. As the research has shown, only 21% (6 courses) have combined peer feedback activities with teacher-to-student feedback. In the meantime, most courses (19 courses: 68%) have only implemented practices where the teacher provided either oral or written feedback to their students. Therefore, a statement is made that teachers need to learn more about more engaging and student-centered learning practices online to design deep learning experiences for their students.

When analyzing the mode of feedback, e.g., written, audio, video recording, or oral feedback, in the courses (total: 6 courses) that integrated both teacher-to-student and peer feedback, a note should be made that the written comments form of feedback is prevailing (5 courses: 83%) (see Figure 36). Only in one course (17%), was a different feedback mode, such as oral feedback, allowed.

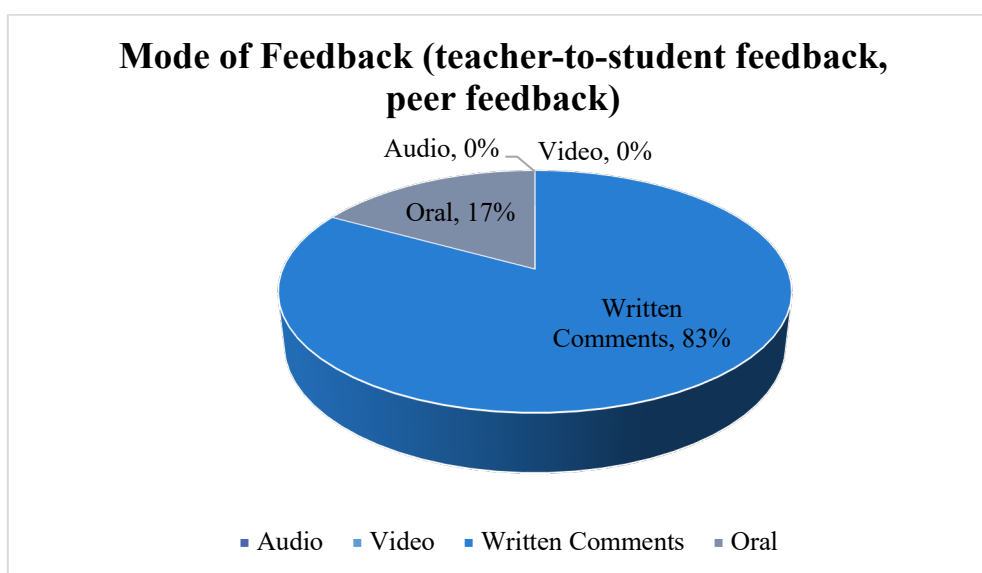


Figure 36. Mode of Feedback (teacher-to-student feedback, peer feedback)

On the other hand, feedback as written commentary is useful as it allows documentation of activities, contributes to increasing transparency of assessment online, and is easier to monitor, especially in relevant cases regarding peer feedback provision. However, technology allows for alternative options, such as recorded audio or video feedback, which can be advantageous, but these options are still underexplored.

The analysis has also looked at how often students receive any type of feedback, e.g., teacher-to-student or peer feedback (see Figure 37).

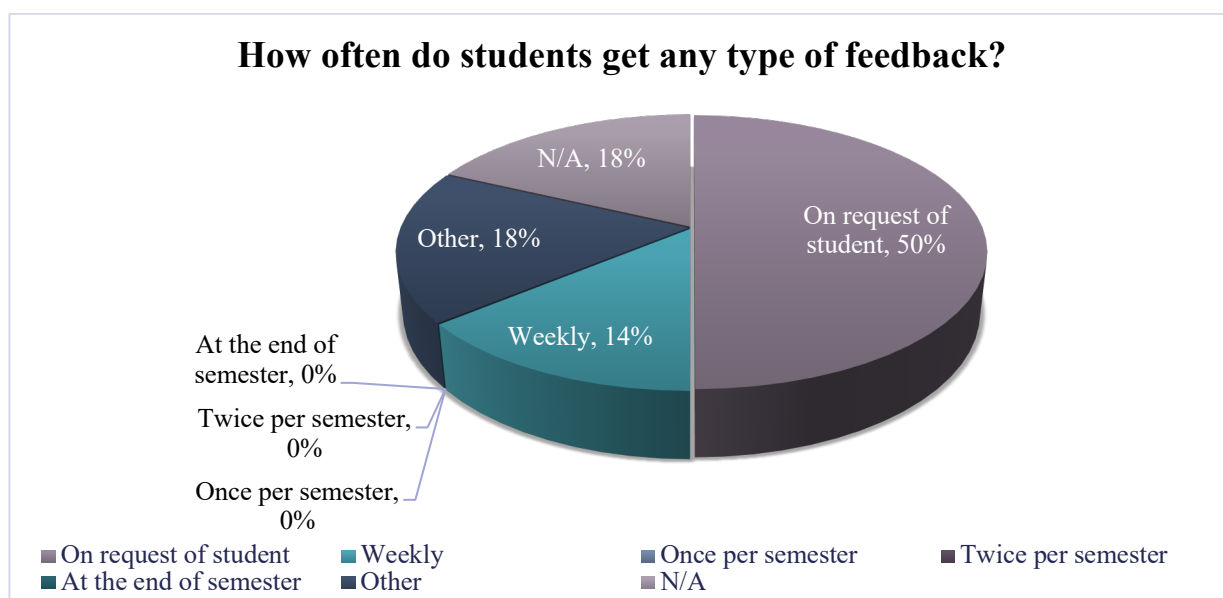


Figure 37. Frequency of Feedback

The findings suggest that students often receive feedback from the teacher upon individual request (14 courses: 50%). In these cases, students have to contact their teachers to ask for specific individualized feedback. Usually, this information is explained during the first synchronous online session and then later in a PowerPoint presentation with first lecture notes, and detailed additional information is uploaded as a resource to Moodle or feedback provision arrangements are explained in the study guide. Nonetheless, in some analyzed courses (4 courses: 14%), feedback provision has been performed on a weekly basis, and feedback exchanges have been incorporated into the course to develop a continuous and engaging learning experience. In the rest of the analyzed courses, no evidence of feedback provision has been detected (18%) or feedback provision could be described as sporadic (18%).

As shown, the most used tools for feedback provision have been identified (see Figure 38). Since feedback provision has been done only on the request of the student, teachers preferred an external communication tool, such as email (65%)³. Another external tool that has been used for the purpose of feedback provision is Google Forms (23%). A note should be made that Google Forms is used mainly to help students manage and structure their feedback to their peers. Besides, as Google Forms offer an easy way to document student activities, filling out the form is often considered as an assignment, which would make up a part in a cumulative grade calculation.

In the meantime, the analysis has demonstrated that Moodle tools have also been used for feedback provision. To illustrate, discussion forum (8%) has been used for feedback provision. Finally, in courses where criteria-based assessment has been enabled, Moodle grading tool could have been used to provide written feedback for students, however, it has not appeared to be a common practice since only 4% (one course) of courses has used such tool for that purpose.

³ This information was confirmed after the semi-structured interviews with teachers since no evidence of feedback provision via email could have been traced because of the research limitations.

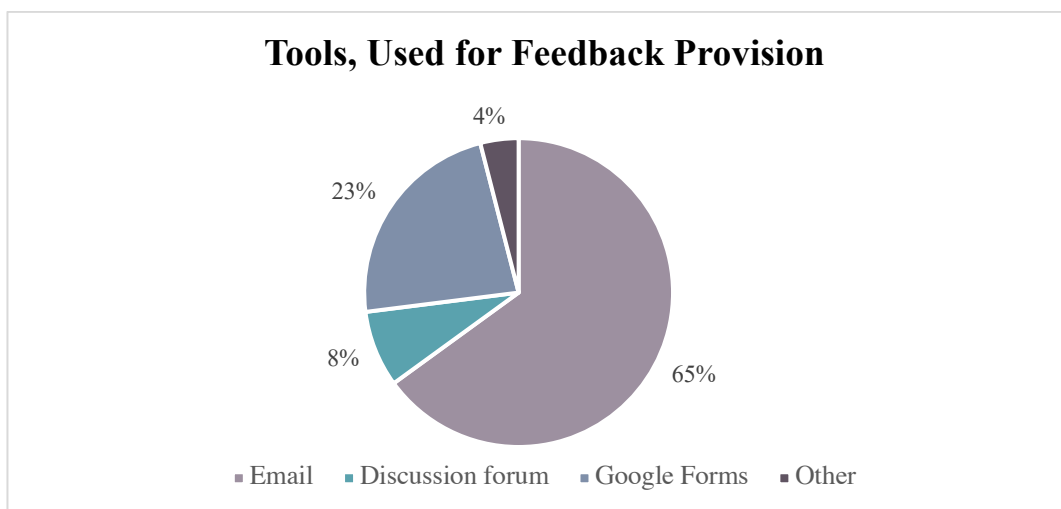


Figure 38. *Tools, Used for Feedback Provision*

Usage of Digital Badges. The Moodle environment offers teachers innovative solutions in the form of digital micro-credentials, i.e., digital badges, to motivate students and at the same time to have a legitimate tool for assessing students’ learning, skills, and competences. The usage of digital badges, for the purpose of motivating and assessing students, has been investigated, and the findings have shown that digital badges are not a common practice yet (see Figure 39). Only four courses (14%) have digital badges activated and issued to students. The main purpose of these badges is to motivate and encourage students to learn. Digital badges for motivational purposes often have not met the design and metadata content standards proposed by the university, therefore, they look informal and provided no information as to what conditions students have to fulfill to be awarded with the badge, or what skills or competences they have acquired.

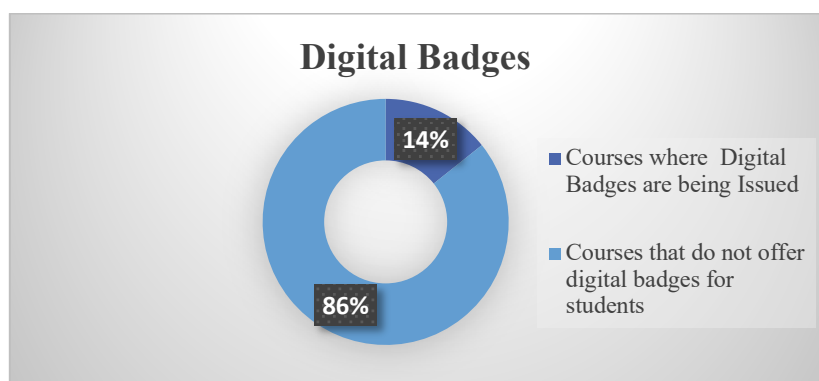


Figure 39. *Data on Digital Badge Usage for Motivation and/or Assessment*

Besides, the analysis has shown that in the courses which use digital badges, they are mainly used in the courses that belong to the education science study field (digital badges used in 2 analyzed courses). Also, one course each in humanities and economics have activated and awarded students with digital badges as a form of motivation. The design and incoherent content of the digital badge metadata insinuate that the digital badge is perceived as an entertainment element rather than an educational innovation which can facilitate assessment.

DISCUSSION

The rise of learning technologies in a higher education context has been observed as an optimal way to facilitate learning/teaching and assessment, as well as to address global challenges, e.g., the COVID-19 pandemic, globalization and digitalization of education, demand for flexibility in learning, a necessity for increased accessibility of education, and limited financial and human resources, etc. (Liu, Geertshuis & Grainger, 2020; Schneckenberg, 2009; Kirkwood & Price, 2014). Indeed, this research has illustrated the potential of a TEL environment and its tools to support teachers in the development and implementation of LOA to facilitate and enhance learning. This potential can be observed through the following: a TEL environment increases flexibility in assessment, as its technical capacities allow for adapting to constantly changing situations and accommodating an individual student's needs, as well as helping to develop, implement, manage, and monitor all the assessment related processes. Also, as this research demonstrated, a TEL environment offers teachers a wide selection of tools to implement a preferred assessment strategy, for example, tests with different test item options, interactive tests, task submission tools for more complex, essay-based assignments, tools for collaborative learning, feedback provision, etc. For instance, a TEL environment eases the submission process by allowing teachers to indicate deadlines, enlist the assessment criteria, set the parameters for submissions, accept group submissions, etc., while the technical capacity of the environment allows establishing connections between the assessment and learning components with appropriate progress monitoring options, like a calendar or progress bar, consequently enabling students to take control of their own learning. Besides, a TEL environment offers automatization in grading procedures which, in a long-term perspective, reduces workload, saves time, and allows teachers to focus on complex tasks such as assessing a student's abilities, skills and competencies at a more sophisticated level or dedicating more time for feedback provision, which is highly relevant for LOA.

On the other hand, this research has also shown that a TEL environment on its own cannot enhance or facilitate student learning. In fact, a TEL environment should be seen as a mediator, while pedagogic decisions and interventions are predominant. As teaching/learning and assessment in a TEL environment is fundamentally different from face-to-face contexts, pedagogy needs to be re-visited and adjusted accordingly. Usually, implementation of learning technologies is artificial as they are seen as more of a must-have element of current educational trends or in other cases is a burden for the teachers. Indeed, the success of design and implementation strongly

depends on the teachers' digital competence⁴, i.e., knowledge⁵, attitudes⁶ (which is directly linked to TAM), skills⁷ and values⁸. To illustrate, once COVID-19 was recognized as a serious health threat, a high proportion of teachers were tasked with transferring their courses to a TEL environment (Kurtz and Herold, 2020) and for most of them, the expectation was that their in-person teaching/learning and assessment strategies and methods would easily convert to an experience in a TEL environment. Sadly, that anticipation created a pattern of systemic breakdown due to a number of factors, including unsuited educational beliefs, face-to-face techniques which were problematic to reproduce, diminished instructional efficacy, and weak online curriculum planning (Kurtz & Herold, 2020; Shea et al., 2022; Greenhow, Graham & Koehler, 2022; Moore & Piety, 2022).

Indeed, this research has drawn attention to challenges teachers face while designing LOA in a TEL environment. These challenges can be categorized as internal (e.g., insufficient digital skills and competences) and external (e.g., restricting institutional policies and improper institutional support, and technical challenges embedded in learning technologies). Thus, this research invites a re-evaluation of currently existing pedagogic approaches and practices that are related to insufficient levels of a teacher's digital skills and competences as well as the lack of dynamic and comprehensive support for the teachers at the institutional level, as well as limitations of a TEL environment itself. In fact, the research has shown that teachers struggle with designing and implementing LOA in a TEL environment to facilitate and enhance student learning if they lack an educator's digital skills and competences. Without having a sufficient level of digital skills and competences, teachers are less likely to embrace the potential of a TEL environment and its tools. Moreover, in line with TAM, teachers, lacking digital skills and competences, are more likely to demonstrate conservative attitudes towards the digitalization of

⁴ *Competence* is defined as “proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development” (p.4). The term is much broader as and is used to refer to a person's facility, when approaching unfamiliar tasks or unknown conditions, to employ natural talent and experience in an autonomous fashion (European Parliament, Council of the European Union, 2008).

⁵ *Knowledge* is understood as “the outcome of the assimilation of information through learning” (European Parliament, Council of the European Union, 2008, p. 4). In the context of EQF, knowledge is characterized as theoretical or objective, as it is comprising of a collection of evidence, schemes and philosophies on a given context or topic (European Parliament, Council of the European Union, 2008).

⁶ *Attitudes* are strengthened by one's core values and principles and affect their conduct. They reveal an inclination to respond to an external influence, either person or event, in an optimistic or pessimistic way. Attitudes can fluctuate depending on circumstances and conditions (Haste, 2018; UNESCO IBE, 2013).

⁷ *Skills* are “the ability to apply knowledge and use know-how to complete tasks and solve problems” (European Parliament, Council of the European Union, 2008, p. 4). Skills are categorized as either cognitive, involving logical, creative thinking, or practical, referring to practical applications of tools, methods, or techniques.

⁸ *Values* are described as the overriding ideologies which support what a person considers to be significant when choosing between options within the space of personal or communal life. They define how a person will rank their options when a decision is necessary, and what they hope to achieve when looking for progress (Haste, 2018).

teaching/learning and assessment and refuse implementing innovative, learner-centered practices, which could significantly contribute to ensuring a rich learning experience in a TEL environment. Besides, as a rule, setting up a TEL environment for teaching/learning and assessment and managing feedback provision and interactions with students take a lot of a teacher's time and effort, thus posing another challenge for teachers, i.e., increasing an already excessive workload. In addition, teachers expressed frustration about scarce financial support, which often plays a key role in deciding how and to what extent to perform work-related responsibilities.

Since the topic of an educator's digital competence is out of the scope of this dissertation, it has not been discussed earlier. However, the findings of the research emphasize the need to discuss an educator's digital competences in regards with what implications it has on designing and implementing LOA in a TEL environment to facilitate and enhance student learning. Furthermore, such insights and discussions may be more than useful for the institution where the research has been conducted to support their academic staff and improve the overall quality of teaching/learning and assessment in a TEL environment.

New challenges, introduced with teaching/learning and assessment in a TEL environment, have generated more responsibilities and tasks for HE teachers who need to design courses online as well as being required to demonstrate their excellent digital competencies. Overall, the implementation of technology in teaching/learning and, especially, assessment is a complicated process that is affected by a number of internal and external factors, including organizational context, the teacher's skills, competences, attitudes towards learning technologies and their acceptance (which directly corresponds to fundamental ideas of TAM), technical specificities of TEL environments, immense number of tools, etc. Teaching/learning and assessment in a TEL environment is largely dependent on the pedagogical decisions as well as technological components and their capacities to support and implement those pedagogical solutions (Heng & Sol, 2021). This supports the findings of this dissertation and is in line with TAM. Teachers, who do not have sufficient levels of digital competence, or are less experienced, or lack adequate training and support, often find technology itself as a key obstacle to designing and implementing teaching/learning and assessment in a TEL environment.

Even though pedagogical approaches in a TEL environment may seem similar to face-to-face learning contexts, their implementation, as well as teacher's role and responsibilities, is different (Goldstein & Behuniak, 2012; Alavi et al., 2021). The shift in pedagogic paradigm, i.e., increasing focus on learner-centeredness, is promoted by LOA in online or blended learning contexts, consequently, there is a need for teachers to revisit and adjust pedagogic practices. Relying on teacher-centered approaches to teaching/learning and assessment have resulted in the exclusion of students from making certain pedagogical decisions, for instance, in the development

of assessment criteria. As research has shown, in most cases, students are passive receivers rather than active participants in teaching/learning and assessment. Development of assessment strategy and assessment criteria is primarily a teacher's responsibility, while discussion about assessment criteria and collaboration between teachers and students is a rare practice, and the overall course design is permeated with the teacher-centered ideas, while a TEL environment is seen as a storage facility for learning materials and facilitator for assignment submission processes. Thus, the application of LOA in a TEL environment and, overall, a transition to online or blended teaching/learning and assessment, significantly re-sketched the teacher's role and responsibilities, which resulted in the increased demand for a certain level of skills, knowledge, and competences. As this research demonstrated, teachers need to acknowledge the changing role of an educator and be open for innovative approaches to teaching/learning and assessment in a TEL environment, because holding conservative attitudes towards learning technologies may have a detrimental effect on efficient designing and implementation of teaching/learning and assessment in a TEL environment. In fact, the research by Naveh, Tubin, and Pliskin (2010) supports the findings of this research by highlighting the need for an attitude change, claiming that conservative teaching, or teacher-centered approach, can no longer be an option in online teaching/learning and assessment, as a TEL environment, by its nature, is designed to promote a learner-centeredness.

Besides, this research once again proves that the common perception to learning technologies and, in general, online learning, continued to be rather negative, as TEL is often considered to be unable to provide and maintain high-quality education in comparison to face-to-face learning. The development of teacher digital competences can enable such understanding and increase flexibility (Redecker, 2017). The research literature emphasizes the necessity for teachers to continually improve their digital competence, to keep investigating the latest digital tools and their pedagogic characteristics, and maintain their proficiencies so that they use state-of-the-art advancements to produce inventive instructional approaches and tactics (Gallardo-Echenique et al, 2015; Redecker, 2017), because having an insufficient level of digital competence may lead to learning design solutions which do not take full advantages of technologies when developing LOA in a TEL environment. Thus, for teachers, development and keeping digital competences up-to-date is a required precondition for the efficient organization and management of teaching, learning and assessment in a TEL environment.

Besides, an insufficient level of teacher's digital competence is indeed one of the most prevailing challenges to implement LOA in an online setting. If teachers do not know how to use Moodle or certain tools, they cannot efficiently construct and implement the preferred assessment strategy (Sánchez-Cruzado et al., 2021). As this research illustrated, issues occur when teachers are not aware which tools to select and how to use them to achieve certain educational goals or to

design assessments that could evaluate students' subject knowledge and more complex skills and competencies, e.g., critical thinking skills. For those who have little or no prior experience of working on Moodle, this becomes even more challenging. Teachers have noted that initially, it takes a lot of time to set up Moodle for testing and grading. Indeed, this can be time-consuming and complicated for those teachers whose digital skills are at a novice level or who have little experience in using a TEL environment. Setting up Moodle can take a lot of time even for those teachers who already have experience with how to use the learning environment, however, as this research has indicated, in a long-view perspective, the usage of TEL environment solutions for teaching/learning and assessment saves time.

Moreover, teachers are required to constantly research new, efficient ways to design teaching/learning and assessment and provide feedback in a TEL environment. Teachers need to know the functionality of different tools so they can select the ones that best fit their educational goals and strategies. However, this seems overwhelming when combined with other obligations that teachers have during the semester. Besides, learning technologies and TEL environments are continually being improved, consequently, teachers face both challenges and prospects when designing teaching/learning and assessment in a TEL environment (Deeley, 2018). As this research illustrated, those teachers who have insufficient levels of digital skills and competences describe the process of researching tools and figuring out how to use different tools within Moodle learning environment as a detrimental task.

This research supplements the ideas of other studies (e.g., Naveh, Tubin & Pliskin, 2010) claiming that traditional teacher-oriented pedagogical practices cannot respond to the intricacies of teaching/learning and assessment in a TEL environment, and therefore implementation of innovative solutions becomes unescapable. As prescribed by TAM, teachers are still skeptical towards the use of TEL environment tools, and they often prefer replicating face-to-face teaching/learning and assessment in a TEL environment. However, ill-designed assessment in a TEL environment directly contributes to the deterioration of the quality of studies (Fueller et al., 2022). Therefore, it is important to provide teachers with training on how to design and implement proper assessment strategies in a TEL environment that would indeed create deep learning opportunities for students.

There is a huge concern about the efficiency of TEL environment tools for learning, monitoring, and ensuring the principle of transparency. Despite the fact that a TEL environment has the potential to support teachers in developing LOA by offering numerous options for increasing and ensuring transparency in assessment, e.g., allowing teachers to indicate assessment criteria and assessing student's work against them; allowing students to interact with assessment criteria and receive feedback based on the given criteria; documenting learning through digital

tracing; preventing students from cheating on tests, as well as more complex assignments. Because of the possibility to instantly run them through plagiarism checks, the attitude that the technology can be easily cheated is still dominant, thus it cannot be trustworthy, which is directly in line with the central ideas of TAM. As a result, teachers still prefer traditional, non-technological ways, e.g., assessing the content of student's work.

Another example that showcases teacher's distrust in learning technologies and supports the ideas presented by TAM can be observed when looking at the implementation of more rigorous and learner-centered teaching/learning and assessment activities, such as e-portfolio usage, or implementation of online peer learning activities. Even though e-portfolios can be used to support implementation of LOA in a TEL environment, as it enables and encourages students to track and continuously reflect on their learning, the popularity of such an innovative and flexible assessment method is still rather low. Also, peer learning as a collaborative learning practice is not normally implemented in the analyzed courses. Again, this is related to the restricting, traditional teacher-centered approach to teaching/learning and assessment.

As the research demonstrated, LOA is dependent on practices like timely and adequate feedback provision, constant learning monitoring, and engagement in self-regulated and peer learning processes. Here, a TEL environment acts as an enabler, which supports and facilitates all the above-listed processes, providing added benefits to innovating teaching/learning and assessment. To illustrate, all the interactions between the stakeholders (e.g., students, teachers, peers, content material, etc.) within a TEL environment can be arranged in both synchronous or asynchronous manner, while the technical parameters allow storing learning materials in almost any format and organizing it in a structured way, providing students with options for self-paced learning. Nonetheless, teachers are still reserved and prefer seeing a TEL environment as a storage facility rather than an enabler of certain pedagogical practices.

Also, this research has demonstrated that a TEL environment supports a peer learning process as it facilitates submissions and feedback exchange between peers as well as allowing for peer review against given assessment criteria. Teachers are still rather conservative when it comes to the exploration of possibilities of a TEL environment or other related and compatible tools for feedback provisions. This research has shown that the format of feedback in written comments is still seen as an acceptable, easy to execute, and efficient way to facilitate learning and assessment. Nonetheless, technology offers numerous ways, formats, and modes to engage in feedback provisions, which often seem to be more efficient as it reduces workload, saves time, and increases personalization. Besides, a TEL environment allows for not only interactive and timely feedback but also different modes of feedback (e.g., recorded video or audio and written feedback is allowed and supported by technical solutions). While discussion forums, grading tools with incorporated

commentary functions, workshops for peer written feedback provisions, Google forms, and Padlet are popular for feedback provisions, teachers seem to be more conservative towards the use of more innovative and flexible solutions, as interactive possibilities to provide personalized feedback have not yet been explored, this again points to the topic of technology acceptance.

In addition to feedback provision, as the research has witnessed, self-assessment and self-reflection practices are infrequent. As self-assessment and reflection are highly student-centered activities, they require a certain level of skills, competences, preparation, and engagement, while their implementation and execution in TEL may be more complex, demanding for a creative and holistic approach. The added benefits of self-assessment and reflection need to be understood, and the idea of self-assessment practices moving beyond the format of student discussion should be accepted.

Moreover, lacking digital competence, teachers are more likely to dismiss teaching/learning and assessment innovations, which is in the core of TAM. The research has shown that the application of micro-credentials, in the form of digital badges, as learning innovations in online or blended learning contexts can be advantageous, as their contribution to increase student engagement is undisputable. However, micro-credentials, in the form of digital badges as teaching/learning and assessment innovations, are at the early stages of adoption. Mostly, this has happened as digital badges are still seen as mere entertainment elements rather than an educational tool that can support assessment strategy. Finally, the poor design choices, as well as the ill-constructed metadata descriptions of the digital badges, have contributed to such reputation.

In addition to professional challenges, this research has demonstrated HE teachers have found themselves struggling with the implementation of learning technologies or other TEL environment tools for assessment due to insufficient managerial guidance and support. The research has emphasized the importance of comprehensive support for teachers at the institutional level. This research illustrated that it is essential for the university leadership, as well as those tasked with the job of providing information and resources, to enable faculty implementation and recognize the procedures with which learning technologies are (or are not) accepted, since a lack of technical, pedagogical, and even financial support may have a detrimental effect on the quality of teaching/learning and assessment as well as on a teacher's motivation.

Moreover, as this research has shown, current institutional practices and regulations towards assessment do not satisfy existing needs and challenges introduced by the teaching/learning and assessment in a TEL environment. Thus, HE institutions need to rethink their practices and policies towards assessment, allowing for innovative, comprehensive, and flexible ways to assess student learning by shifting the focus from summative to a more formative

aspect of assessment. This research has indicated that the institutional policies are designed to support and promote the summative assessments, e.g., exams in the format of a test in a TEL environment always carry the highest value in the cumulative grade calculations and are obligatory, while decisions whether to implement learning tasks is usually left for the teacher. Institutional regulations promote the idea that students should be acquainted with assessment criteria by obliging teachers to provide such information to pass formal quality assurance assessments, used for assessing whether course preparation is sufficient for either fully online or blended delivery mode. However, without realizing the pedagogical benefits of introducing students to, and even including them in, the development of assessment criteria, many teachers still do not practice this.

To sum up, the research has revealed the potential of a TEL environment to support design and implementation of LOA to facilitate and enhance student learning. Even though a TEL environment has its own issues and limitations, which point out the necessity to further develop its technical functionality. However, the implementation of LOA in a TEL environment relies on how well teachers are prepared to embrace technologies (corresponding to TAM) and new responsibilities and challenges brought by online or blended teaching/learning and assessment. The development of digital competences in teachers becomes necessary, as that would help them to cope with technology brought challenges better and invite them to explore innovate teaching/learning and assessment strategies and methods, which can result in higher student engagement, and a fruitful learning experience.

Recommendations. Considering the findings of this dissertation, the following recommendations are provided:

1. It is highly recommended to initiate and to foster the development of teacher communities within the HEI. Within such peer communities, teachers could share their good practice examples of teaching and assessing students in a TEL environment. Besides, teachers, engaging in peer learning themselves, could foster their professional growth as well as the development of different skills and competences such as collaborative working and learning skills and interpersonal skills, etc. Moreover, such teacher communities could help beginner teachers to smoother integrate within the institution and encourage them to try out innovative teaching and assessment methods in a TEL environment, and to foster development vital skills and competences for teaching/learning and assessment in a TEL environment. This is highly important because insufficient levels of teacher's digital competence are directly related with deterioration of quality of teaching/learning and assessment in a TEL environment.

2. Regarding the practical implementation of the assessment strategy within a TEL environment, a common recommendation for teachers would be to design assessment strategy first, while the selection of adequate methods and TEL environment tools should come after the assessment strategy design stage. Thorough development of assessment strategy is prerequisite element for efficient teaching/learning and assessment in a TEL environment. A TEL and its tools cannot dictate the design of assessment strategy, instead the assessment strategy should prescribe appropriate methods and tools within a TEL environment. In fact, it is highly recommended for the teachers to prepare exhaustive study guides for their students where they should indicate all the details regarding the assessment. For instance, the learning objectives and outcomes, assessment criteria with value indicators for each foreseen assessment activity. Also, it is preferred that teachers discuss the structure of the course, including tasks and assessment procedures and assessment criteria with students prior the study period. This could highly be appreciated by the online students, who have limited interaction opportunities. Besides, information regarding assessment tasks and assessment criteria should also be included where it is possible in a TEL environment, e.g., task descriptions, grading tools, feedback tools. Finally, teachers should explore feedback provision opportunities within a TEL environment. It is recommended to arranged feedback according to assessment criteria as this would increase student involvement and increase overall transparency of assessment.
3. As the research has illustrated that in most cases teaching/learning and assessment, especially LOA, in a TEL environment requires more time and effort. Thus, it is recommended to reconsider various incentives to keep teachers engaged and motivated. For instance, as this research has pointed out increased financial support for teachers would increase incentive to embrace digitalization of teaching/learning and assessment.
4. Finally, considering the research findings, it is highly recommended to re-visit and re-evaluate priorities in terms of assessment. Current emphasis on the summative approach to assessment is limiting the implementation of more pro-learning, i.e., learning-oriented, assessment strategies and methods. Even though many research studies have already illustrated the potential hazards related to overly dependence on summative assessment, it is highly preferred by the institutions and that is reflected in policy guidelines. However, to ensure efficient implementation of LOA in a TEL environment, a top-down approach would be highly relevant. Institutional documentation and guidelines for implementation of LOA in a TEL environment might assist with quality assurance, while transition from summative assessment to LOA strategy would result in fruitful learning experience.

CONCLUSIONS

The conclusions are being drawn from the theoretical analysis and the findings from the two-staged empirical research, e.g., qualitative research through semi-structured interviews with the experts in the field (Expert Interviews), and a case study at the selected HE institution (Teacher Interviews and Analysis of Courses on Moodle). The conclusions are organized in correspondence with the research questions of the dissertation.

1. Based on theoretical research, analysis of expert interviews and interviews with HE teachers, it should be noted that defining learning-oriented assessment requires one to consider many different components, e.g., the relationship between formative and summative assessment, assessment *of, for* and *as* learning, feedback provision, the student's and teacher's roles and involvement in teaching/learning and assessment and determining their roles in the process of supporting learning through assessment. LOA has emerged as a new trend in assessment, which primarily focuses on facilitating and enhancing learning and enabling feedback provision. In LOA, feedback is described as feed-forward, meaning that feedback is supposed to be used to improve current and future student's work. Through LOA, students are expected to develop certain skills and competences, such as metacognitive, collaborative skills, self-directed learning skills, and evaluative competence.

Finally, LOA addresses challenges regarding students' motivation, engagement, and academic integrity, however, its implementation, especially in a TEL environment, is much more time-consuming and demanding on both teachers and learners. Indeed, LOA design and implementation in a TEL environment is different, requiring a holistic approach and significant changes in pedagogy. The differences occur as a TEL environment sets requirements for teaching/learning design and assessment, including changes in pedagogic approach, a need for constructive alignment, changes in communication and interactivity mode and channels as well as duration and frequency of assessment, while its tools enable and facilitate teaching/learning and assessment processes, such as feedback provision, peer learning, self-assessment, and learning progress monitoring.

2. This research has confirmed that implementation of LOA in a TEL environment is a sophisticated process, however, the use of technological solutions for facilitating assessment has a lot of considerable benefits. This research has demonstrated that a TEL environment can indeed support LOA and its potential to facilitate a learning process, by fostering autonomous and self-regulated learning, and allowing for interactive peer learning and feedback. A TEL environment facilitates assessment procedures by equipping teachers with tools for tracking

and monitoring student learning progress, enables interactive and timely exchanges between teachers and students, as well as students with peers, and supports learner-centeredness in teaching/learning, and assessment and in that way reducing the teacher's workload, and saving time. Also, a TEL environment has different tools to assess different skills and competences and varying complexity levels, thus, it can accommodate teachers in different study fields and support their chosen assessment strategy. A TEL environment and its tools has the capacity to monitor and track student learning progress and inform teachers about the necessary adjustments in pedagogy so that they can provide the required assistance for their students or to prevent students from demonstrated unethical learning behavior. Furthermore, TEL environment tools allow teachers to indicate assessment criteria and perform grading against them, thus the overall assessment process becomes more transparent. Finally, a TEL environment has the capacity and adequate tools to significantly contribute to increasing student's motivation and engagement, which is crucial in a fully online learning context.

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APPENDICES



VYTAUTAS
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APPENDIX 1

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO PARTICIPANT

PLAIN LANGUAGE STATEMENT

Date:

Current Research Project Title: The Role of a Technology Enhanced Learning Environment in Supporting Learning-Oriented Assessment

Supervisor: Prof. dr. Airina Volungevičienė

PhD Candidate: Rasa Greenspon

Your Consent:

You are invited to take part in this research as a part of my PhD project. This Plain Language Statement contains detailed information about the research. Its purpose is to explain to you as openly and clearly as possible all of the procedures involved in this project so that you can make a fully informed decision whether you are going to participate. Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document.

Once you understand what the project is about and if you agree to take part in it, you can continue with the study.

You should print off a copy of the online Plain Language Statement to keep as a record.

Purpose and Background:

The **aim** of the research is to identify the potential of a technology enhanced learning environment to support learning-oriented assessment. Through this research, it is planned to provide an answer to the following research question: How is learning-oriented assessment understood in digital assessment strategies?

The participants for the research are chosen according to their expertise, experience, competences, and reputation in the field. It is planned to interview from eight to ten experts.

Procedures:

If you agree to participate, you'll be asked to take part in an interview where you'd have to answer eight questions. The interview would be conducted via the Zoom platform and would take no more than an hour. You will receive the link to the Zoom meeting once the date and time are confirmed.

On request, you can receive the questions in advance. The interview session would be recorded. However, the data would not be shared with third parties and would be used solely for the purpose of this research. The recordings will be stored locally on a separate hard drive until successful defense of the dissertation, after which, the recordings will be deleted.

The researcher takes responsibility for the data protection and insurance of all ethical regulations established by Vytautas Magnus University.

Possible Benefits

Possible benefits of the study include the opportunity to share your knowledge and expertise. Additionally, upon completion of the dissertation, the results would be made available to you upon request.

Possible Risks

By agreeing to participate in this research, you are not expected to experience any personal (physical or emotional) inconveniences.

Privacy, Confidentiality, and Disclosure of Information

Data collected as part of the research will not be associated with any identifying information.

All information gathered from participants will be kept securely.

Results of the Research Project

The results of this research will be reflected in my dissertation work. Additionally, I am planning to prepare an article based on my findings, and for which I would seek publication in an

international scientific journal. The findings in the article would be summarized, no personal or information that would help to identify research participants would be provided.

Participation

Participation in the research project is strictly on a voluntary basis. IF YOU DO NOT WISH TO TAKE PART YOU ARE NOT OBLIGED TO. If you decide to take part and later change your mind, you are free to withdraw from the research at any stage. If you do wish to withdraw from the research, contact me via email advising that you wish to withdraw from the research.

Further Information, Queries, or Any Problems

If you require further information or have any problems, please can contact me or my supervisor directly.

Rasa Greenspon

rasa.greenspon@vdu.lt

Vytautas Magnus university, Kaunas, Lithuania

Prof. Dr. Airina Volungevičienė

airina.volungeviciene@vdu.lt

Vytautas Magnus university, Kaunas, Lithuania

APPENDIX 2

(Email Text for the Experts)



Dear XXX,

My name is Rasa Greenspon. I am a PhD student at Vytautas Magnus University in Kaunas, Lithuania, working on my dissertation, which is on Learning-Oriented Assessment in a Technology Enhanced Learning Environment. The main goal of the dissertation is to the **aim** is to identify the potential of a technology enhanced learning environment to support learning-oriented assessment.

Currently, I'm working on conducting research with experts in the field of assessment and assessment in education. With this empirical study, I'm addressing the issue of how learning-oriented assessment is implemented within assessment theories.

The results of this research will be reflected in my dissertation work. Additionally, I am planning to prepare an article based on my findings, and for which I would seek publication in an international scientific journal. Considering your experience and competences in the field, I'd kindly ask if you could spare some time to answer a few questions. The interview would be done via Zoom platform and would take no more than an hour. If it would make things easier, I could email you the questions in advance.

Obviously, if this research would benefit you in any way, I'd be happy to share the results.

Thank you for your time and consideration. I'm looking forward to hearing from you soon.

Sincerely,

Rasa Greenspon

APPENDIX 3



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PLAIN LANGUAGE STATEMENT AND CONSENT FORM TO PARTICIPANT

PLAIN LANGUAGE STATEMENT

Date:

Current Research Project Title: The Role of a Technology Enhanced Learning Environment in Supporting Learning-Oriented Assessment

Supervisor: Prof. Dr. Airina Volungevičienė

PhD Candidate: Rasa Greenspon

Your Consent:

You are invited to take part in this case study as a part of my PhD project. This Plain Language Statement contains detailed information about the case study. Its purpose is to explain to you as openly and clearly as possible all of the procedures involved in this project so that you can make a fully informed decision whether you are going to participate. Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document.

Once you understand what the project is about and if you agree to take part in it, you can continue with the study.

You should print off a copy of the online Plain Language Statement to keep as a record.

Purpose and Background:

Through this case study research, it is planned to provide an answer to the following research question: how can technology support teachers in developing learning-oriented assessment in a technology enhanced learning environment for facilitating and enhancing student's learning?

In order to evaluate whether you are a suitable candidate to take part in this research, please take a look at Table 1 below, where **the selection criteria for research participants** are explained.

Table 1. Selection Criteria for Research Participants

Criteria	Explanation
Experience	You are expected to have at least 5 years of experience (prior to the Covid-19 pandemic obligatory switch to online teaching mode) in teaching, assessing, and designing courses online.
Level	You are teaching Bachelor or Master level courses
Assessment Competences	You are using digital technologies to enhance assessment process. Also, you can interpret and use digital evidence (e.g., learning analytics) on student progress to facilitate learning process. Finally, you use digital technologies to provide timely feedback for students.
Mode of Teaching	Your course(s) are accredited for blended or fully online teaching mode.
Language	You speak English .

It is planned to interview approximately 20 teachers.

For the **research of Moodle courses**, the selection criteria include the following:

- The course is offered at **undergraduate or graduate levels**.
- You use at least one of the following Moodle tools: **progress bar, calendar, discussion forum, digital badges**, to facilitate and improve assessment and student learning.
- You can interpret and use **learning analytics** and/or **log data** to inform teaching and to prevent undesired learning behavior.
- In your course, you use **technologies to give feedback** for students (e.g., **audio, video feedback, AI generated feedback**, and other **Moodle options** to provide feedback).
- In your course, you have implemented at least one of the following: **student self-assessment, peer feedback, peer learning, teamwork, student self-reflection, discussion forum**.
- The course is active and offered for students either **spring or fall semester of 2021**.

If in your Moodle course you have implemented **more than one** of the above listed, you are eligible to take part in the research.

Procedures:

If you agree to participate, there are two activities planned, i.e., qualitative research through semi-structured interviews with teachers, who design and teach courses on Moodle, followed by analysis of the courses on Moodle.

Firstly, semi-structured interviews will be conducted. You're asked to take part in a semi-structured interview where you'd have to answer ten main questions and, in some cases, several additional questions that may vary, depending on the context. The interview would be conducted via the Zoom platform and would take no more than an hour. You will receive the link to the Zoom meeting once the date and time are confirmed.

The next stage is you'll be asked to allow me to examine your courses on Moodle beforehand. For the purpose of the research, some print screens will be taken, however, any personal information or information that would allow identifying you or your students (i.e., name, student ID number, email, photos), or information regarding students' achievements will be redacted or hidden in an adequate manner. However, the print screens will not be included in my dissertation, only generalized findings will be provided. To provide an agreement to perform analysis of your course, you are kindly asked to fill out and sign a document, called **Consent Form for Moodle Course Analysis** that you've received as part of this email.

The interview will be conducted in **ENGLISH**.

On request, you can receive the main questions in advance. The interview session would be recorded. However, the data would not be shared with third parties and would be used solely for the purpose of this research. The recordings will be stored locally on a separate hard drive until successful defense of the dissertation, after which, the recordings will be deleted.

The researcher takes responsibility for the data protection and insurance of all ethical regulations established by Vytautas Magnus University.

Possible Benefits

Possible benefits of the study include the opportunity to share your knowledge and expertise, which may be rather beneficial to colleague teachers or other educators who are dealing with teaching and designing and implementing assessment strategies in a technology enhanced learning

environment. Additionally, upon completion of the dissertation, the results would be made available to you upon request.

Possible Risks

By agreeing to participate in this case study, you are not expected to experience any personal (physical or emotional) inconveniences.

Privacy, Confidentiality, and Disclosure of Information

Data collected as part of the case study will not be associated with any identifying information.

All information gathered from research participants will be kept securely.

Results of the Research Project

The results of this case study will be reflected in my dissertation work. Additionally, I am planning to prepare an article based on my findings, and for which I would seek publication in an international scientific journal. The findings in the article would be summarized, no personal or information that would help to identify research participants would be provided. Also, no print screens from Moodle courses would be provided in the article.

Participation

Participation in the research project is strictly on a voluntary basis. IF YOU DO NOT WISH TO TAKE PART YOU ARE NOT OBLIGED TO. If you decide to take part and later change your mind, you are free to withdraw from the case study at any stage. If you do wish to withdraw from the research, contact me via email advising that you wish to withdraw from the research.

Further Information, Queries, or Any Problems

If you require further information or have any problems, please can contact me or my supervisor directly.

Rasa Greenspon
rasa.greenspon@vdu.lt
Vytautas Magnus university, Kaunas, Lithuania

Prof. dr. Airina Volungevičienė
airina.volungeviciene@vdu.lt
Vytautas Magnus university, Kaunas, Lithuania

APPENDIX 4

Laba diena,

Esu Rasa Greenspon, Vytauto Didžiojo universiteto Švietimo akademijos trečio kurso doktorantė. Šiuo metu vykdu tiriamąjį projektą ir norėčiau Jus pakviesti dalyvauti tyrime, kurio tikslas yra išsiaiškinti, kaip skaitmeninės technologijos gali padėti sukurti ir įgyvendinti skaitmenines mokymąsi orientuotas vertinimo strategijas, kurių pagrindinė paskirtis yra pagerinti studentų mokymosi procesą. Šio tyrimo rezultatai padės išsiaiškinti, kaip skaitmeninės technologijos gali padėti dėstytojams, kurie projektuoja studijų turinį nuotolinėje studijų aplinkoje, kurti skaitmeninio vertinimo strategijas, analizuoti mokymosi duomenis ir pastarųjų pagrindu teikti grįžtamąjį ryšį besimokantiejiems.

Tyrime kviečiame dalyvauti **DĖSTYTOJUS**, jei Jūs:

- Turite bent **5 metus patirties** (prieš privalomą mokymą nuotolinėje aplinkoje, prasidėjus Covid-19 pandemijai) projektuojant ir dėstant studijų dalykus nuotolinių studijų aplinkoje.
- Jūsų dėstomi dalykai skirti **pirmosios (Bakalauro) ir antrosios (Magistro) pakopos** studijų programų studentams.
- Naudojate **Moodle aplinkos įrankius** (pvz., pažangos juosta, kalendorius, diskusijų forumai, skaitmeniniai ženkleliai, t.t.), siekdami pagerinti net tik vertinimo, bet ir studentų mokymąsi.
- Gebate tinkamai **interpretuoti ir naudoti mokymosi duomenis** (pvz., naudojate mokymosi analitikos duomenis, duomenis apie studentų prisijungimą), kurie yra generuojami nuotolinės studijų aplinkos, vertinant studentų mokymąsi bei renkantis atitinkamas mokymo strategijas.
- Naudojate **technologijas teikti grįžtamąjį ryšį** studentams (pvz., audio ir video grįžtamasis ryšys, naudojate dirbtinį intelektą grįžtamojo ryšio teikimui, kitomis Moodle galimybėmis teikti grįžtamąjį ryšį studentams).
- Savo dėstomuose dalykuose taikote bent vieną iš pastarųjų praktikų – e-portfelį, studentų vienas kito vertinimą, bendrakursių grįžtamojo ryšio teikimas vienas kitam, studentų savi-refleksiją, komandinį darbą.
- Jūsų studijų dalykai pritaikyti ir atestuoti nuotolinėms studijoms, t.y., pagal Rektoriaus įsakymą dėl Studijų dalykų perkėlimo į VDU nuotolinių studijų aplinką, Jūsų studijų dalykai yra akredituoti **daliniam (II-ajam) arba visiškam (III-ajam) lygiui**;

- Jūs kalbate **angliškai**.

Šis tyrimas sudarytas iš dviejų dalių – studijų dalykų Moodle aplinkoje analizės ir kokybinio interviu su dėstytojais. Todėl pirmiausia prašau Jūsų suteikti **raštišką sutikimą** atlikti Jūsų dėstomo dalyko Moodle aplinkoje analizę (sutikimo forma rasite prisegtuke).

Jūsų dalyvavimas grindžiamas savanorystės principu. Įsipareigoju užtikrinti Jūsų duomenų saugumą, todėl nei Jūsų atsakymai į klausimus interviu metu, nei informacija apie Jūsų dėstomus kursus Moodle aplinkoje nebus susieti su Jumis asmeniškai. Tyrimo rezultatai bus apibendrinti prieš juos pristatant.

Numatoma interviu trukmė - valanda. Interviu vyks anglų kalba. Atsižvelgiant į prastėjančią epidemiologinę situaciją šalyje, interviu numatoma atlikti per komunikacijos platformą - Zoom. Interviu bus įrašomi, vėliau transkribuojami.

Daugiau informacijos apie tyrimą galite rasti prisegtukuose.

Susidomėjusius prašome susisiekti su manimi el. paštu – rasa.greenspon@vdu.lt

Ačiū už bendradarbiavimą!

Pagarbiai,

Rasa Greenspon

APPENDIX 5

A CONSENT FORM FOR MOODLE COURSE ANALYSIS

_____ Date _____

I, _____ pedagogical title, title, first name, last name _____, _____ grant
permission to perform an analysis of the course _____ course title, code _____
_____. I understand that the analysis of the course is a part of a
PhD project called “The Role of a Technology Enhanced Learning Environment in Supporting
Learning-Oriented Assessment”, and summarized findings will be used for research purposes
only.

Participant’s First name, Last name

Signature

APPENDIX 6

Template for Moodle Course Analysis

Demographical Data. To begin with, it is important to present some relevant information on the courses selected for analysis. This information should help to develop a general understanding of the course goals, however, none of the specific details provided would allow identification of the selected course. In Table X, the main characteristics of the selected Moodle course are described.

Table 1. Characteristics of Selected Moodle Course

Characteristics	Description
Study Field	
Study Level (e.g., undergraduate or graduate)	
Volume in ECTS Credits	
Mode of Delivery (e.g., Blended or Online)	
Assessment Strategies (e.g., Formative, Summative, LOA) with Value Indicators in Percentage Format	
Course Outline:	
- Course Objectives and Learning Outcomes; Criteria for Assessment (if listed)	
- Number of Topics;	
- Number of Assignments	
- Type of Assignments (e.g., essays, tests, projects, etc.)	
Language	

Having provided information on a course, it is necessary to give some background information on the teacher who designed and/or is teaching the course (see Table X below). Again, only general information, including study field, level, and experience in teaching and assessing in a TEL environment, will be provided. No personal details that could help to identify the research participant will be revealed.

Table 2. Background Information on Teacher

Characteristics	Description
Study Field	
Teaching at Study Levels (e.g., BA, MA, PhD)	
Years of Experience in Teaching Blended and/or Online Courses	
Years of Experience in Assessing Students in a TEL Environment	

Analysis of Moodle Study Course in terms of Practical Implementation of LOA strategy.

Here, a selected Moodle course will be analyzed in accordance to below listed criteria. In this part, screen shots of certain elements of the study course will be provided, followed by brief explanations by the author of this dissertation. Screen shots will be taken in such way that comply with research ethics regulations and will not provide any chance for identification.

Criteria for Analysis of Moodle Course:

- Student Self-Assessment Activities (e.g., self-reflective practices, self-assessing practices, Moodle tools used)
- Peer Learning Activities (e.g., peer assessment activities, peer feedback, discussions, Moodle tools used)
- Learning Progress Measurement: Usage of Moodle Tools for Student Learning Progress Measurement (e.g., calendar, progress bar, log data, learning analytics, etc.)
- Feedback Provision:
 - Mode (e.g., audio, video, written comments, discussion forum entries, etc.)
 - Type (e.g., teacher-to-student feedback, peer-to-peer student feedback, combination of both)
 - Frequency (How often do students get any type of feedback?)
 - Moodle Tools Used for Feedback Provision (List of the tools used for feedback provision on Moodle)
- Other Relevant Elements for LOA in a TEL environment (e.g., Digital Badges, e-portfolios)



Template for Moodle Study Course Analysis

General Information on a Study Course:

Characteristics	Description
Study Field	<input type="checkbox"/> Education Science <input type="checkbox"/> Humanities <input type="checkbox"/> Social Science <input type="checkbox"/> Political Science
Study Level	<input type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
Volume in ECTS Credits	
Course Language	<input type="checkbox"/> Lithuanian <input type="checkbox"/> English
Mode of Delivery	<input type="checkbox"/> Blended <input type="checkbox"/> Fully Online
Study Course Offered for Students	<input type="checkbox"/> Spring Semester 2021 <input type="checkbox"/> Fall Semester 2021
Learning Outcomes	Learning outcomes are indicated and described within every assignment: <input type="checkbox"/> Yes No
Information on Assessment Strategy and Assessment Criteria	Students are aware and well acquainted with assessment strategy: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know Comments:
	Learners are involved in development of assessment criteria: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know
	Assessment criteria are clear and presented to the students: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not indicated

	<p>Where can assessment criteria be found?</p> <ul style="list-style-type: none"> - Assessment criteria are described in the course description - Assessment criteria are described in the assignment description - Assessment criteria are described in both the course and assignment descriptions <hr/> <p>Are Moodle tools being used to provide assessment criteria?</p> <ul style="list-style-type: none"> - Yes - No <p>Comments.....</p> <hr/> <p>Type of assessments as a part of cumulative grade (Value Indicators in Percentage):</p> <p>Homework % Mid-term % Exam % Classwork % Participation % Other</p> <p>Comments.....</p>
Assignments	<ul style="list-style-type: none"> <input type="checkbox"/> Graded, with feedback provided from teacher <input type="checkbox"/> Graded, without feedback provided from teacher <input type="checkbox"/> Graded, using Moodle tools <input type="checkbox"/> Submitted through Moodle but graded outside of Moodle environment <input type="checkbox"/> Not Graded, but feedback provided from teacher <input type="checkbox"/> Graded, with feedback provided from peer student <input type="checkbox"/> Graded, without feedback provided from peer student <input type="checkbox"/> Not Graded, but feedback provided from peer student <input type="checkbox"/> Not graded, no feedback provided <p>Type of assignments: Learning tasks or/and summative tasks (<u>underline</u>)</p> <p>Comments:</p>
Frequency of Assignments	<ul style="list-style-type: none"> <input type="checkbox"/> Weekly <input type="checkbox"/> Bi-Weekly <input type="checkbox"/> Once per month <input type="checkbox"/> Once per semester <input type="checkbox"/> Twice per semester <input type="checkbox"/> Other
Type of Assignments (can be more than one)	<ul style="list-style-type: none"> - Essays - Papers - Presentations - Tests - Individual projects - Group projects - Participation in discussion forums - E-Portfolio - Other..... <p>Comments:</p>

Information on Design and Implementation of LOA within the Study Course:

Topic	Criteria	Evidence from Moodle	
Student Self-Assessment Activities	Does the study course include any self-reflective practices? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know Comments: Moodle tools used for student self-reflection:		
	Does the study course incorporate any self-assessing practices for students? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know List of Moodle tools used for student self-assessment:		
	Peer Learning Activities	There is at least one peer assessment activity included in the course activities: <input type="checkbox"/> Yes <input type="checkbox"/> No	
		Students must provide feedback on assignments to their peers: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Learning Progress Measurement	Teacher measures student's learning progress: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know Comments:		
	What Moodle tools are used by teacher for student learning progress measurement? <input type="checkbox"/> Calendar - Progress bar - Log data - Learning analytics - Other.....		
	Student monitors their learning progress by themselves: - Yes		

	<ul style="list-style-type: none"> - No - I don't know <p>Comments:</p> <p>What Moodle tools are used by the student for their own learning progress measurement?</p> <ul style="list-style-type: none"> - Calendar - Progress bar - Log data - Learning analytics - Other..... 	
Feedback Provision	<p>Students receive feedback on assignments from the teacher:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know <p>Comments:</p>	
	<p>Mode of Feedback:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Audio <input type="checkbox"/> Video <input type="checkbox"/> Written Comments <input type="checkbox"/> Entries in Discussion Forum <input type="checkbox"/> Other..... 	
	<p>Students give and receive feedback from their peers:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know <p>Comments:</p>	
	<p>Mode of Feedback:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Audio <input type="checkbox"/> Video <input type="checkbox"/> Written Comments <input type="checkbox"/> Entries in Discussion Forum <input type="checkbox"/> Other..... <p>Comments:</p>	
	<p>Combination of both (teacher-to-student feedback, peer-to-peer student feedback):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No 	
	<p>Mode of Feedback:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Audio <input type="checkbox"/> Video <input type="checkbox"/> Written Comments <input type="checkbox"/> Entries in Discussion Forum <input type="checkbox"/> Other..... 	

	<p>Frequency (How often do students get any type of feedback?)</p> <ul style="list-style-type: none"> <input type="checkbox"/> On request of student <input type="checkbox"/> Weekly <input type="checkbox"/> Once per semester <input type="checkbox"/> Twice per semester <input type="checkbox"/> At the end of semester <input type="checkbox"/> Other 	
	<p>Moodle Tools Used for Feedback Provision:</p>	
<p>Other Relevant Elements for LOA in a TEL environment</p>	<p>Are Digital Badges activated in the study course?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No 	
	<p>For what purpose can student be awarded a digital badge?</p>	
	<p>Additional information:</p>	

APPENDIX 8



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Dėstytojų apklausa dėl sutikimo dalyvauti tyrime

Maloniai kviečiu užpildyti šią anketą, kurios tikslas surasti potencialius tyrimo dalyvius.

* Privaloma

1. Ar sutiktumėte duoti interviu ir taip pasidalinti savo patirtimi apie vertinimą Moodle mokymosi aplinkoje?

Pažymėti tik vieną atsakymo variantą.

Taip / Ne

2. Ar sutiktumėte duoti interviu anglų kalba? *

Pažymėti tik vieną atsakymo variantą.

Taip / Ne

3. Ar sutiktumėte, kad Jūsų studijų dalykas Moodle mokymosi aplinkoje būtų naudojamas analizei? *

Pažymėti tik vieną atsakymo variantą.

Taip / Ne

4. Jeigu į visus viršuje esančius klausimus atsakėte „taip“, prašau nurodyti savo el. pašta:

SUMMARY

Introduction

Within a technology enhanced learning (TEL) environment, teaching/learning and assessment practices often require different approaches, as the application of face-to-face pedagogical practices does not work, because a TEL environment allows for new interactions and feedback options. In fact, the recent pandemic situation, when all teaching/learning and assessment procedures have had to be moved online, has once again pointed out the critical necessity to examine and rethink the approach to teaching/learning and assessment before moving to blended or online learning contexts. For instance, during the 2020 examinations, assessment faced a serious challenge as previous formats would not work, even for higher education institutions (HEIs) that already had experience with teaching/learning and assessment in a TEL environment, as no assessments could be held in person. Teachers had to improvise, combining assessment methods to achieve satisfactory results (Cirlan & Loukkola, 2021). However, it should be noted that other assessment strategies, such as LOA, in a TEL environment allows for frequent assessment interventions throughout the study period, which enables teachers to monitor students' learning, thus the importance of summative assessment at the end of the study period becomes less relevant. Nevertheless, research suggests teachers are often unacquainted with innovative and constantly emerging tools (Boud, 2000; Dikli, 2003), or they simply lack digital assessment competences. While trying to minimize risks related to poor performance in assessment, some HEIs have permitted their students to delay their examination sessions or offered flexible conditions for re-takes (Cirlan & Loukkola, 2021). However, this solution cannot address the issues related to teaching/learning and assessment in a TEL environment and should only be used as a stopgap measure, not as a permanent solution.

The **aim** of the research is to identify the potential of a technology enhanced learning environment to support teachers in designing learning-oriented assessment.

The **object** of the research is learning-oriented assessment in a technology-enhanced learning environment.

The following **research questions** are being formulated:

1. How is learning-oriented assessment understood in relation to assessment theories?
2. How can technology support teachers in developing learning-oriented assessment in a technology enhanced learning environment for facilitating and enhancing student's learning?

Structure of the Dissertation. This dissertation consists of one theoretical chapter which consists of two sections, a chapter on research methodology, a chapter which presents the findings, a discussion which also provides recommendations, and conclusions. The theoretical chapter is devoted to analyzing the phenomenon of LOA in relation to assessment theories as well as looking at how a TEL environment supports teachers in implementation of LOA. In research methodology chapter, the first empirical study with experts and a case study, conducted at a selected HEI are presented. The findings chapter is divided in three sections, each presenting the findings of the different stage in the research: findings from the research with experts, findings from research with HE teachers, and the findings from database analysis. This is followed by a discussion and conclusions, interpreting, and summarizing the findings. Finally, in Appendices, templates and other documents related to research are provided.

Learning-Oriented Assessment in Relation to Assessment Theories

In the theoretical analysis, the concept of LOA and its characteristics in relation to assessment theories have been explored. Also, by looking at scholarly works, the potential of LOA to facilitate and enhance student learning has been explored. And an analysis of various teaching/learning and assessment methods that support LOA has been provided.

The theoretical analysis has revealed the intricacies of the concept LOA. LOA is described as a holistic strategy of assessment, derived from already existing assessment strategies such as summative and formative, encompassing features of assessment *of*, *for*, and *as* learning and creating a balance among their similarities and differences (Carless, 2006, 2007, 2015; Keppell et al., 2006; Zeng et al., 2018). The relationship between assessment *of*, assessment *for*, and assessment *as* learning is very important because it may determine the purpose of assessment (Earl, 2003).

Since LOA is rooted in the fundamental ideas of formative and summative assessment, it aims at enhancing and facilitating learning, supporting development of metacognitive, social, and emotional skills, in meantime allowing to certify student's achievements (Carless, 2006; Zeng et al., 2018). LOA consists of the following elements, including assessment tasks, student engagement, and feedback (Carless, Joughin & Liu, 2006; Carless, 2007; 2013a, 2013b; Keppell & Carless, 2006; Zeng et al., 2018). Assessment tasks are understood as learning tasks and they are supposed to keep learners focused through the learning period, contrary to assessment tasks, used at the end of learning period to check learner's knowledge (Carless, 2013a, 2013b). Similar to formative assessment, LOA seeks to increase learner's engagement and participation in the teaching/learning and assessment as well as stresses the importance of feedback to student

learning. Since under the framework of LOA, the nature of feedback is described as feed-forward, when it comes to comments, received in a form of feedback, the learner is required to provide closure to any notices which arrived through these feed-forward comments (Carless, 2007).

The theoretical analysis has suggested that LOA should be developed within highly innovative, primarily technology enhanced environments, because that may help to increase students' involvement into self-directed learning. Learning technologies can open numerous opportunities for developing and implementing LOA through monitoring of learning progress, ensuring adequate feedback provision, and spotting learning challenges that students are dealing with (Zeng et al., 2018).

How can a Technology Enhanced Learning Environment Support Teachers in Designing Learning-Oriented Assessment for Learning Facilitation and Enhancement?

The theoretical analysis looks at different assessment methods for LOA and TEL environment tools to implement these methods. Also, it dives into discussion of possibilities and challenges of a TEL environment for designing LOA. A TEL environment may facilitate and enhance teaching/learning and assessment, providing high quality education (Dhawan, 2020), however, the barriers may occur when HE institutions, teachers and students are not ready to embrace the digitalization.

Assessment in a TEL environment is different in comparison to a traditional face-to-face setting and requires some pedagogic decisions to support efficient learning experience for students (Alavi et al., 2021). The difference occurs because of the specific nature of a TEL environment and its pedagogic requirements for learning design (e.g., implementation of learner-centered approach becomes mandatory) and assessment (Alavi et al., 2021). The analysis of scholarly work has demonstrated that elements, dictated by a TEL environment, should be taken into consideration while trying to design proper LOA in a TEL environment. Thus, LOA, designed for traditional classroom context, cannot be applied in online context without making some major modifications. Taking into consideration issues such as technical specifications of a TEL environment, changing interaction channels, adoption of learner-centered approach, and promotion of innovative teaching methods, LOA should be adjusted to fit within learning design and to efficiently use the potential of technologies to facilitate and enhance learning.

Research Methodology

Due to the intricacy of the aim and the research questions, the dissertation employs qualitative approach to the research as this allowed comprehensively addressing the analyzed

phenomenon and to deliver insightful yet valid and reliable findings. The dissertation is divided in several parts, including the following: the first part where theoretical analysis of scholarly works has been conducted, then second part – the empirical part of the research has been applied, which has been conducted in several stages.

In the first stage of empirical research, qualitative research has been conducted by performing semi-structured interviews with experts in the areas assessment and technology enhanced learning. The goal of this part of the research has been to learn more about how LOA in a TEL environment. The experts are considered to be a primary source of information, as there is a gap in the research literature addressing this issue. Through this research, it was aimed at defining LOA in a TEL environment, by highlighting the main features of the phenomenon and determining its relation to the assessment theories. Also, it allowed determining the potential of technologies as well as assessing the potential of LOA in a TEL environment to facilitate and enhance teaching/learning and assessment. Finally, this research has helped to identify the potential challenges that teachers, designing LOA in a TEL environment, may face. In this stage of the empirical research, as a data collection method, semi-structured interviews with open-ended questions, the focus and latitude of which had been provided to the subject beforehand, has been used. Based on the characteristics of LOA and research questions, interview questions have been designed mainly addressing the following investigation: a) which characteristics and the potential of LOA should be highlighted and supported by technology enhanced learning environment solutions? b) how a TEL environment may support LOA implementation and which challenges may occur?

The criterion sampling method has been applied to determine the potential research participants, i.e., the experts. This stage of the empirical research has stepped out the boundaries of the country as the input from internationally recognized experts was considered to enrich the research by offering valuable insights. The collected data through semi-structured interviews with experts have been transcribed and analyzed using an inductive content analysis method.

In the second stage of empirical research, a case study has been implemented by conducting qualitative research through semi-structured interviews with higher education (HE) teachers, who designed and are teaching courses (1), followed by the analysis of a database (a TEL learning environment, to be more specific, Moodle, which contains blended and fully online courses at the selected HE institution) (2). For the purpose of this research, a unit of the case study has been defined as a HE institution, i.e., a state-funded university at a Baltic state, the analyzed blended or fully online courses on Moodle learning environment, and teachers who designed these courses and implemented assessment strategy within the course on Moodle.

The criterion sampling method has been applied to determine the research participants within the selected HEI. Once the research participants have been identified, data has been collected through semi-structured interviews, which later were transcribed in a word-by-word manner and analyzed by applying inductive content analysis method, which allowed identification of relevant categories and subcategories.

For the analysis of a database, i.e., Moodle learning environment within selected HEI, the template has been developed as a data collection and analysis instrument for the purpose of analyzing online and/or blended study courses on a TEL environment, to be specific, the Moodle environment, which is used at the selected HEI. The template consists of two major parts: general data, including characteristics of the course and some background information on the teacher who is teaching the course, followed by the criteria for a detailed course analysis that looks at practical implementation and application of the main components of LOA in a TEL environment, highlighted through the theoretical analysis of scholarly work as well as through the findings of analysis of expert interviews. The courses have been selected by using criterion sampling. A total of 28 blended or fully online study courses on Moodle learning environment that are offered in the selected HEI. The courses are active and have been offered for students either spring or fall semester of 2021. The collected data has been analyzed and summarized by highlighting the main tendencies on how LOA is practically implemented within a TEL environment.

(1) Defining Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Expert Interviews)

The qualitative content analysis of the key informant interview transcripts has identified the relevant categories and their sub-categories that have helped to provide the answer to the research question by explaining the potential of a TEL environment to facilitation and improvement of LOA as well as it identified the main barriers for successful implementation of LOA in a TEL environment. The research has revealed the fact that a TEL environment may improve learning and assessment, while the contribution of a TEL environment can be observed through a facilitation of continuous progress monitoring.

Also, this research has demonstrated that a TEL environment has the potential of facilitating peer learning and feedback. Assessment should be designed so that its primary goal becomes supporting student learning. A TEL environment and other internal or external, yet compatible tools can be used to support or/ and enable peer learning.

Besides, the research has suggested that LOA relies on student autonomy, thus, assessment should be designed and implemented accordingly, while a TEL environment is seen as facilitator.

Assessment strategy should be designed to support and foster development of student autonomy, while a TEL environment and its tools should be used to support the implementation of adequate assessment methods that would help students become independent learners.

This research has illustrated that a TEL environment may alleviate implementation of a learner-centered approach, vital for LOA and facilitate development of student autonomy and self-regulation. A TEL environment requires pro-active student involvement into learning and LOA, whereas teachers are required to take a passive role of moderators. The experts believe that the shift in teacher's role in teaching/learning and assessment is inevitable as teachers should be stepping aside, allowing students to take more control and responsibilities of their own learning. A TEL environment can provide teachers with opportunities to monitor teaching/learning and assessment. As all procedures related with teaching/learning and assessment are arranged in an online mode, teachers have a possibility to constantly monitor student's learning progress, even without students knowing about it. Furthermore, this research has shown that learners in a TEL environment require more reinforcement and attention to keep them motivated and engaged throughout the learning process. The analysis has shown integration of technology addresses this issue by introducing new ways of feedback provision.

However, the research has also suggested that a TEL environment may introduce some undeniable challenges for teachers, and in such way making teaching/learning and assessment challenging. The analysis has illustrated a TEL environment may pose a few challenges for teachers. First, implementation of learning technologies for LOA may be problematic as teachers may lack digital assessment competencies for designing courses online, monitoring learning, and performing assessment in a TEL environment. This has moved to the center of attention in the context of the pandemic, when a lot of courses had to be switched online. Also, the experts have indicated teachers should hold certain attitudes towards technological and pedagogical innovations. If the teacher holds more conservative views to learning/teaching and assessment, they may face challenges in switching to innovative pedagogic approaches. Finally, the study has shown that teachers are expected to become innovators and leaders who inspire their students to study in a TEL environment.

(2) Designing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Teacher Interviews)

The qualitative content analysis of the interviews with HE teachers allowed enlisting the advantages the learning technologies offer for designing LOA, showing how LOA in a TEL environment can facilitate and enhance learning as well as identifying the common challenges for

teachers to design and implement LOA in a TEL environment. This research has illustrated the potential of a TEL environment and its tools to support teachers in the development and implementation of LOA to facilitate and enhance learning. This potential can be observed through the following: a TEL environment increases flexibility in assessment, as its technical capacities allow for adapting to constantly changing situations and accommodating an individual student's needs, as well as helping to develop, implement, manage, and monitor all the assessment related processes.

The research has indicated that the technology enables monitoring of student's learning progress. Technological solutions embedded within a TEL environment not only allows tracking of students' performance in a systematic manner throughout the entire study cycle but also informs teachers about any inconsistencies in student learning, consequently, giving teacher an opportunity to identify any unwanted or inappropriate learning behavior early and take measures accordingly to eliminate it.

As this research has illustrated, a TEL environment enables easier feedback provision. Since, LOA strongly relies on feedback provisions as means for continuous learning and improvement, it is important that both students and teachers have as many opportunities as possible to exchange ideas, give and receive comments on how to proceed and/or improve their work. Regardless the chosen tool, mode or medium, the advantages of technology for feedback provisions are undeniable. Teachers have explored the possibilities of a TEL environment and its tools for feedback provision during synchronous online learning sessions. However, by giving oral feedback during synchronous online learning sessions, teachers seem to imitate traditional face-to-face learning experience, without further exploring the alternative technology enabled and enhanced feedback provision channels.

The analysis of the interview transcripts with HE teachers has revealed the fact that a TEL environment can facilitate grading procedures and, in that way, save teacher's time and reduce workload. Again, automatization of grading is a highly preferable option by many interviewed teachers. Moodle environment facilitates assignment submission and allows teachers to do grading and commenting on the submissions directly, without having to download every individual submission. Also, the analysis has revealed yet another advantage of the use of a TEL environment and its tools for assessment, e.g., the introduction of a technological element in assessment ensures the principle of transparency by allowing teachers to enlist assessment criteria and perform grading against them.

However, again this empirical research has shown that implementation of LOA in a TEL environment can introduce considerable challenges for teachers. These challenges could be categorized into *personal* (e.g., insufficient levels of digital assessment skills and competences),

institutional (e.g., lack of support at institutional level), and *technological* (e.g., limitations of technologies). Also, the research has showed that teachers do not want to spend a lot of time on figuring out the technology. Finally, the research has demonstrated that teachers often struggle with acceptance of learning technologies, i.e., if teachers do not see the technology or specific tool worthwhile or their usefulness is not immediately obvious, teachers tend to abandon such tools.

(3) Implementing Learning-Oriented Assessment in a Technology Enhanced Learning Environment (Analysis of Courses on Moodle)

This final part of the empirical research has demonstrated, a TEL environment offers teachers a wide selection of tools to implement a preferred assessment strategy, for example, tests with different test item options, interactive tests, task submission tools for more complex, essay-based assignments, tools for collaborative learning, feedback provision, etc. For instance, a TEL environment eases the submission process by allowing teachers to indicate deadlines, enlist the assessment criteria, set the parameters for submissions, accept group submissions, etc., while the technical capacity of the environment allows establishing connections between the assessment and learning components with appropriate progress monitoring options, like a calendar or progress bar, consequently enabling students to take control of their own learning. Besides, a TEL environment offers automatization in grading procedures which, in a long-term perspective, reduces workload, saves time, and allows teachers to focus on complex tasks such as assessing a student's abilities, skills and competencies at a more sophisticated level or dedicating more time for feedback provision, which is highly relevant for LOA.

On the other hand, this research has also shown that a TEL environment on its own cannot enhance or facilitate student learning. In fact, a TEL environment should be seen as a mediator, while pedagogic decisions and interventions are predominant. As teaching/learning and assessment in a TEL environment is fundamentally different from face-to-face contexts, pedagogy needs to be re-visited and adjusted accordingly. However, the success of design and implementation strongly depends on the teachers' skills and competences.

Conclusions

The conclusions have been being drawn from the theoretical analysis and the findings from the two-staged empirical research, e.g., qualitative research through semi-structured interviews with the experts in the field (Expert Interviews), and a case study at the selected HE institution (HE Teacher Interviews and the Analysis of Courses on Moodle).

1. Based on theoretical research, analysis of expert interviews and interviews with HE teachers, it should be noted that defining learning-oriented assessment requires one to consider many different components, e.g., the relationship between formative and summative assessment, assessment *of, for* and *as* learning, feedback provision, the student's and teacher's roles and involvement in teaching/learning and assessment and determining their roles in the process of supporting learning through assessment. LOA has emerged as a new trend in assessment, which primarily focuses on facilitating and enhancing learning and enabling feedback provision. In LOA, feedback is described as feed-forward, meaning that feedback is supposed to be used to improve current and future student's work. Through LOA, students are expected to develop certain skills and competences, such as metacognitive, collaborative skills, self-directed learning skills, and evaluative competence.

Finally, LOA addresses challenges regarding students' motivation, engagement, and academic integrity, however, its implementation, especially in a TEL environment, is much more time-consuming and demanding on both teachers and learners. Indeed, LOA design and implementation in a TEL environment is different, requiring a holistic approach and significant changes in pedagogy. The differences occur as a TEL environment sets requirements for teaching/learning design and assessment, including changes in pedagogic approach, a need for constructive alignment, changes in communication and interactivity mode and channels as well as duration and frequency of assessment, while its tools enable and facilitate teaching/learning and assessment processes, such as feedback provision, peer learning, self-assessment, and learning progress monitoring.

2. This research has confirmed that implementation of LOA in a TEL environment is a sophisticated process, however, the use of technological solutions for facilitating assessment has a lot of considerable benefits. This research has demonstrated that a TEL environment can indeed support LOA and its potential to facilitate a learning process, by fostering autonomous and self-regulated learning, and allowing for interactive peer learning and feedback. A TEL environment facilitates assessment procedures by equipping teachers with tools for tracking and monitoring student learning progress, enables interactive and timely exchanges between teachers and students, as well as students with peers, and supports learner-centeredness in teaching/learning, and assessment and in that way reducing the teacher's workload, and saving time. Also, a TEL environment has different tools to assess different skills and competences and varying complexity levels, thus, it can accommodate teachers in different study fields and support their chosen assessment strategy. A TEL environment and its tools has the capacity to monitor and track student learning progress and inform teachers about the necessary adjustments in pedagogy so that they can provide the required assistance for their students or

to prevent students from demonstrated unethical learning behavior. Furthermore, TEL environment tools allow teachers to indicate assessment criteria and perform grading against them, thus the overall assessment process becomes more transparent. Finally, a TEL environment has the capacity and adequate tools to significantly contribute to increasing student's motivation and engagement, which is crucial in a fully online learning context.

Recommendations. Considering the findings of this dissertation, the following recommendations are provided:

1. It is highly recommended to initiate and to foster the development of teacher communities within the HEI. Within such peer communities, teachers could share their good practice examples of teaching and assessing students in a TEL environment. Besides, teachers, engaging in peer learning themselves, could foster their professional growth as well as the development of different skills and competences such as collaborative working and learning skills and interpersonal skills, etc. Moreover, such teacher communities could help beginner teachers to smoother integrate within the institution and encourage them to try out innovative teaching and assessment methods in a TEL environment, and to foster development vital skills and competences for teaching/learning and assessment in a TEL environment. This is highly important because insufficient levels of teacher's digital competence are directly related with deterioration of quality of teaching/learning and assessment in a TEL environment.
2. Regarding the practical implementation of the assessment strategy within a TEL environment, a common recommendation for teachers would be to design assessment strategy first, while the selection of adequate methods and TEL environment tools should come after the assessment strategy design stage. Thorough development of assessment strategy is pre-requisite element for efficient teaching/learning and assessment in a TEL environment. A TEL and its tools cannot dictate the design of assessment strategy, instead the assessment strategy should prescribe appropriate methods and tools within a TEL environment. In fact, it is highly recommended for the teachers to prepare exhaustive study guides for their students where they should indicate all the details regarding the assessment. For instance, the learning objectives and outcomes, assessment criteria with value indicators for each foreseen assessment activity. Also, it is preferred that teachers discuss the structure of the course, including tasks and assessment procedures and assessment criteria with students prior the study period. This could highly be appreciated by the online students, who have limited interaction opportunities. Besides, information regarding assessment tasks and

assessment criteria should also be included where it is possible in a TEL environment, e.g., task descriptions, grading tools, feedback tools. Finally, teachers should explore feedback provision opportunities within a TEL environment. It is recommended to arranged feedback according to assessment criteria as this would increase student involvement and increase overall transparency of assessment.

3. As the research has illustrated that in most cases teaching/learning and assessment, especially LOA, in a TEL environment requires more time and effort. Thus, it is recommended to reconsider various incentives to keep teachers engaged and motivated. For instance, as this research has pointed out increased financial support for teachers would increase incentive to embrace digitalization of teaching/learning and assessment.
4. Finally, considering the research findings, it is highly recommended to re-visit and re-evaluate priorities in terms of assessment. Current emphasis on the summative approach to assessment is limiting the implementation of more pro-learning, i.e., learning-oriented, assessment strategies and methods. Even though many research studies have already illustrated the potential hazards related to overly dependence on summative assessment, it is highly preferred by the institutions and that is reflected in policy guidelines. However, to ensure efficient implementation of LOA in a TEL environment, a top-down approach would be highly relevant. Institutional documentation and guidelines for implementation of LOA in a TEL environment might assist with quality assurance, while transition from summative assessment to LOA strategy would result in fruitful learning experience.

INFORMATION ABOUT THE AUTHOR

Rasa Greenspon is a PhD candidate and a junior researcher at Vytautas Magnus University. She holds a bachelor's degree in English and German Philology, a master's in education management with a UNESCO IBE Certificate in Course Curriculum and Design. Her research includes technology enhanced learning and digital assessment. She has already published a number of articles, contributed chapters to several books, worked at national and international projects, and participated in national and international conferences.

List of publications, published during the doctoral studies:

1. Greenspon, R., Teresevičienė, M., & Naujokaitienė, J. (2020). "Modelling teacher practices to apply learning analytics as a metacognitive tool in learning to enhance student success". In *Enhancing the Human Experience of Learning with Technology: New challenges for research into digital, open, distance & networked education European Distance and E-Learning Network (EDEN) Proceedings*, Lisbon. 113-123. doi: 10.38069/edenconf-2020-rw0013
2. Greenspon, R., & Trepulė, E. (2019). "Teacher's Role in Developing Digital Competencies for Students". *Role of higher education institutions in society: challenges, tendencies and perspectives*. Academic papers, 1(8), 33-38.
3. Tamoliūnė, G., Greenspon, R., Teresevičienė, M., Volungevičienė, A., Trepulė, E. & Daukšienė E. (2022). "Exploring the potential of micro-credentials: A systematic literature review". *Frontiers in Education*, 7, 1-15. doi:10.3389/educ.2022.1006811
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5. Teresevičienė, M., Trepulė, E., Šadauskas, M., Greenspon, R., & Costa, N. (2020). "Digital badges for students' assessment and recognition. A university case". *Human and Artificial Intelligence for the Society of the Future Inspiring Digital Education for the Next STE(A)M Student Generation European. Distance and E-Learning Network (EDEN) Proceedings 2020 Annual Conference, Timisoara*. 91-99.
6. Greenspon, R., & Volungevičienė, A. (2023). "How can a technology enhanced learning environment support learning-oriented assessment in higher education?" [Manuscript accepted for publication].

7. Trepulė, E., Volungevičienė, A., Teresevičienė, M., Daukšienė, E., Greenspon, R., Tamoliūnė, G., Šadauskas, M., & Vaitonytė, G. (2021). *Atvirojo nuotolinio mokymosi vertinimo ir pripažinimo gairės: ieškant dermės su Nacionaline ir Europos kvalifikacijų sąrangomis. Mikro-kredencialų sprendimai siekiant dermės ir skaidrumo*. Vytauto Didžiojo universitetas. <https://doi.org/10.7220/9786094674907>.
8. Trepulė, E., Volungevičienė, A., Teresevičienė, M., Daukšienė, E., Greenspon, R., Tamoliūnė, G., Šadauskas, M., & Vaitonytė, G. (2021). *Guidelines for open and online learning assessment and recognition with reference to the National and European qualification framework. Micro-Credentials as a proposal for tuning and transparency*. Vytautas Magnus University. DOI: <https://doi.org/10.7220/9786094674792>.
9. Trepulė, E., Volungevičienė, A., Teresevičienė, M., Greenspon, R., & Costa, N. (2021). “How to increase the value of digital badges for assessment and recognition in higher education. A University Case”. *Informatics in Education*, 20(1), 131–152. Vilnius University, ETH Zürich. DOI:10.15388/infedu.2021.07.
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11. Volungevičienė, A., Brown, M., Greenspon, R., Gaebel, M. & Morrisroe, A. (2021). *Developing a high-performance digital education system: institutional self-assessment instruments*. European University Association.

Training Materials:

- Under the international project DIGI-PROF - Transparent Assessment for Online Learning by Digitally Competent Professors, No. 2021-1-LT01-KA220-HED-000031154, prepared training material for higher education teachers: “Designing transparent assessment strategies for online learning in HE”.
 - Training language: English (also available in Lithuanian, Catalan, Portuguese, German, and Polish)
 - Volume in Credits: 3 ECTS

List of conferences attended:

- 24 June 2022 – participated in AHE Conference in Manchester, UK. Gave a presentation on the topic “Adopting Technologies for Learning-Oriented Assessment: Opportunities and Challenges in a Baltic State University”.
- 21 June 2021 – participated in EDEN PhD Symposium and gave a presentation on „Digital Assessment Strategies for Learning-Oriented Assessment.”
- 21-23 October 2020 – participated in EDEN Research Workshop and gave a presentation on “Modeling Teacher Practices to Apply Learning Analytics as a Metacognitive Tool in Learning to Enhance Student Success”.
- 9 October 2020 – participated in LETA conference and gave a presentation on “Digital Assessment Strategies for Learning-Oriented Assessment”.
- 23 June 2020 – attended the event: “MicroHE Final Conference”.
- 19 June 2020 – participated in EDEN PhD Symposium, where I gave a presentation on my dissertation progress.
- 18 June 2020 – participated in EDEN Annual Conference 2020 in Timisoara (Romania) and gave presentations on the following topics “Digital Badges for Students Assessment and Recognition. A Case study” and “Teacher Practices in Using Learning Analytics to Enhance Learning in Blended Online Studies”.
- 9 May 2019 – participated in the international applied research conference “Information Technologies 2019: Theory, Practice, Innovations” and presented a report “Teachers Role in Developing Digital Competencies for Students” (Lithuania)

Education:

- 2019 – present (expected end date September 21, 2023)
PhD in Education Science, Vytautas Magnus University, Kaunas (Lithuania)
- 2016–2018
Master’s Studies in Education Management, Vytautas Magnus University, Kaunas (Lithuania)
- 2011–2015
Bachelor’s Studies in English and German Philology, Vytautas Magnus University, Kaunas (Lithuania)

Professional Experience:

- 2022 – present
Teaching Assistant at Education Academy at Vytautas Magnus University (Lithuania)
(Class taught: E-Learning Technologies, MA level)
- 2022–2023
EDEN Annual Conference Program Committee member
- 2022–2023
Researcher at Vytautas Magnus University (Lithuania)
- 2019 – present
Working as a Junior Researcher at Vytautas Magnus University (Lithuania)
- 2018 September – 2021
Freelance translator and editor
- 1 September 2015–2018 Summer
Working as a business assistant at FESTO (Lithuania).

Projects

- 2022 May – 2022 November
Project: Open Educational Resources for Collaborative Online & Distance Education and eXchange (OER CODEX), No. 2021-1-DE01-KA220-HED-000023196
Role: Researcher
Project Coordinator: Technische Universitaet Dresden (Germany)
- 2022 February – 2023 February
Project: DIGI-PROF – Transparent Assessment for Online Learning by Digitally Competent Professors, No. 2021-1-LT01-KA220-HED-000031154
Role: Researcher
Project Coordinator: Vytautas Magnus University
- 2021 November – current
Project: Skaitmeniniai mikrokredencialai aukštajame moksle (MIKRO KREDENCIALAI), No. 13.1.1-LMT-K-718-05-0003
Role: Junior Researcher
Project Coordinator: Vytautas Magnus University
- 2020 March – 2023 January

Project: DIGI-HE - a Strategic Reflection Tool on Digitalisation at European Higher Edu,
No. 612897-EPP-1-2019-1-BE-EPPKA3-PI-FORWARD

Role: Junior Researcher

Project Coordinator: European University Association (EUA)

- 2019 November – 2021 December

Project "Open Online Learning (OOL) for Digitalised and Networked Society (DNS)",
No. 3.3-LMT-K-712-01-0189

Role: Junior Researcher.

Project funded by the ESF and Lithuanian Research Council under High Level R&D grant.

Participation in seminars and webinars:

- 24 June 2022 – participated in AHE Conference in Manchester, UK. Gave a presentation on the topic “Adopting Technologies for Learning-Oriented Assessment: Opportunities and Challenges in a Baltic State University”
- 21 June 2021 – participated in EDEN PhD Symposium and gave a presentation on „Digital Assessment Strategies for Learning-Oriented Assessment.”
- 21–23 October 2020 – participated in EDEN Research Workshop and gave a presentation on “Modeling Teacher Practices to Apply Learning Analytics as a Metacognitive Tool in Learning to Enhance Student Success”.
- 9 October 2020 – participated in LETA conference and gave a presentation on “Digital Assessment Strategies for Learning-Oriented Assessment”.
- 23 June 2020 – attended the event: “MicroHE Final Conference”.
- 19 June 2020 – participated in EDEN PhD Symposium, where I gave a presentation on my dissertation progress.
- 18 June 2020 – participated in EDEN Annual Conference 2020 in Timisoara (Romania) and gave presentations on the following topics “Digital Badges for Students Assessment and Recognition. A Case study” and “Teacher Practices in Using Learning Analytics to Enhance Learning in Blended Online Studies”.
- 9 May 2019 – participated in the international applied research conference “Information Technologies 2019: Theory, Practice, Innovations” and presented a report “Teachers Role in Developing Digital Competencies for Students” (Lithuania)

SANTRAUKA

Įvadas

Technologijomis grindžiamoje mokymo(si) (TGM) aplinkoje mokymo(si) ir vertinimo praktikos dažnai reikalauja skirtingo požiūrio, nes pedagoginių praktikų, veiksmingų mokyme auditorijose, taikymas neveikia, nes TGM aplinka įgalina dėstytojus ir besimokančiuosius naudotis naujomis sąveikoms ir grįžtamojo ryšio galimybėmis. Tiesą sakant, pastarojo meto pandemijos situacija, kai visos mokymo(si) ir vertinimo procedūros turėjo būti perkeltos į nuotolį, dar kartą parodė, kad prieš pereinant prie mišraus arba nuotolinio mokymo(si) konteksto būtina išnagrinėti ir permąstyti požiūrį į mokymą(si) ir vertinimą. Pavyzdžiui, 2020 m. egzaminų sesijos metu besimokančiųjų vertinimas tapo rimtu iššūkiu, net ir toms aukštojo mokslo institucijoms, kurios jau turėjo mokymo(si) ir vertinimo TGM aplinkoje patirties, nes ankstesni formatai neveikė ir nebuvo galimybės organizuoti besimokančiųjų vertinimo kontaktiniu būdu. Dėstytojai turėjo improvizuoti, derindami vertinimo metodus, kad pasiektų bent patenkinamų rezultatų (Cirlan ir Loukkola, 2021). Tačiau reikia pažymėti, kad tam tikros vertinimo strategijos, tokios kaip į mokymąsi orientuotas vertinimas, TGM aplinkoje leidžia atlikti vertinimo intervencijas visą studijų laikotarpį, todėl dėstytojai gali stebėti studentų mokymąsi, taigi apibendrinamojo vertinimo svarba studijų laikotarpio pabaigoje tampa mažiau aktuali. Nepaisant to, tyrimai rodo, kad dėstytojai dar nėra susipažinę su naujoviškais ir nuolat atsirandančiomis vertinimo priemonėmis bei įrankiais (Boud, 2000; Dikli, 2003), arba jiems tiesiog trūksta skaitmeninio vertinimo kompetencijų. Baimindamosi prastų rezultatų bei mėgindamos sumažinti rizikas, susijusias su vertinimu, kai kurios aukštojo mokslo institucijos leido savo studentams atidėti egzaminų sesijas arba siūlė lanksčias egzaminų perlaikymo sąlygas (Cirlan ir Loukkola, 2021). Tačiau šis sprendimas negali išspręsti problemų, susijusių su mokymu(si) ir vertinimu TGM aplinkoje, ir turėtų būti naudojamas tik kaip laikina priemonė, o ne kaip nuolatinis sprendimas.

Į mokymąsi orientuotas vertinimas TGM aplinkoje nebuvo nuodugnai išanalizuotas, tačiau buvo ne kartą bandoma ištirti vertinimo strategijas ir metodus, kurie pagerintų studentų mokymosi patirtis, bendrą mokymosi procesą, taip pat mokymo pasiekimus, didinant studentų įsitraukimą ir bendradarbiavimą bei motyvacijos lygį. Tačiau visi šie tyrimai buvo vykdomi mokymo(si) auditorijose kontekste. Tik keli empiriniai tyrimai buvo atlikti siekiant išsiaiškinti, kaip panaudoti mokymosi technologijas, siekiant palengvinti ir pagerinti mokymą(si), vertinimą ir grįžtamojo ryšio teikimą (Lunt ir Curran, 2010). Be to, mokslinėje literatūroje trūksta gerosios praktikos pavyzdžių, kaip efektyviai įgyvendinti į mokymąsi orientuotą vertinimą TGM aplinkoje. Kitaip tariant, stokojama tyrimų, kurie galėtų atskleisti TGM aplinkos potencialą, padėti dėstytojams

įgyvendinti į mokymąsi orientuotą vertinimą, siekiant palengvinti ir pagerinti besimokančiųjų mokymąsi.

Tyrimo tikslas yra nustatyti technologijomis grindžiamos mokymo(si) aplinkos potencialą padėti dėstytojams kurti į mokymąsi orientuotą vertinimą.

Tyrimo objektas – į mokymąsi orientuotas vertinimas technologijomis grindžiamoje mokymo(si) aplinkoje.

Tyrimo klausimai:

1. Kaip į mokymąsi orientuotas vertinimas suvokiamas atsižvelgiant į vertinimo teorijas?
2. Kaip technologijos gali padėti dėstytojams įgyvendinti į mokymąsi orientuotą vertinimą technologijomis grindžiamoje mokymo(si) aplinkoje, siekiant palengvinti ir pagerinti besimokančiųjų mokymąsi?

Konstruktivizmo paradigma. Ši disertacija remiasi konstruktivizmo paradigmos (Vygotsky, 1962; 1978) idėjomis. Viena iš pagrindinių konstruktivizmo paradigmos idėjų, yra ta, kad žinias kuria besimokantysis, o mokymuisi įtakos turi įvairios socialinės sąveikos (Vygotsky, 1962; 1978). Kadangi šioje disertacijoje tyrimo centre yra į mokymąsi orientuotas vertinimas, kuriuo teigiama, kad mokymas(is) yra nenutrūkstamas procesas, paremtas į studentą orientuotu požiūriu, studento vaidmens svarba yra neginčijama. Studentai yra žinių kūrimo proceso centre. Tačiau studentai taip pat laikomi pasyviais vartotojais mokymo(si) ir vertinimo procesuose. Tuo tarpu dėstytojai yra pagrindiniai mokymo(si) ir vertinimo procesų organizatoriai. Todėl, atsižvelgiant į tikslą ir tyrimo klausimus, disertacijoje daugiausia dėmesio skiriama dėstytojams, nes jie yra pagrindiniai į mokymąsi orientuoto vertinimo kūrėjai TGM aplinkoje.

Epistemologija. Atsižvelgiant į abiejų empirinio tyrimo dalių išvadas, konceptualių pagrindų buvo pasirinktas *Technologijų priėmimo modelis* (TPM) (Davis, 1989). Šis modelis kelia klausimą, kaip vartotojai priima technologijas (Davis, 1989). Visas modelis pasisako už vartotojo suvokimo apie technologijų naudojimą svarbą (Davis, 1989). Šios disertacijos kontekste manoma, kad dėstytojai labiau linkę priimti ir naudoti TGM aplinką mokymui(si) ir vertinimui, jei laikosi tam tikro požiūrio į technologijų naudojimą mokymui(si) ir vertinimui ir mano, kad technologijų naudojimas praturtina mokymą(si) ir vertinimo procesą. Dėstytojų pareigos apima vertinimo strategijos kūrimą bei įgyvendinimą TGM aplinkoje, taip pat mokymosi technologijų ir jų funkcionalumo tyrinėjimą, padedantį tobulinti pasirinktą vertinimo strategiją. Dėl to dėstytojas yra laikomas pirminiu technologijų vartotoju ir jo nuomonė bei suvokimas apie technologijų naudojimą gali turėti reikšmingos įtakos sprendžiant, kaip bus įgyvendinama vertinimo strategija ir kaip bus pasinaudota technologijos teikiamais pranašumais.

Disertacijos struktūra. Šią disertaciją sudaro vienas teorinis skyrius, kurį sudaro dvi dalys, taip pat skyrius apie tyrimo metodologiją, skyrius, kuriame pateikiami radiniai, diskusija, kurioje taip pat pateikiamos rekomendacijos, bei, galiausiai, išvados. Teorinis skyrius skirtas analizuoti į mokymosi orientuoto vertinimo fenomeną, atskleidžiant sąsajas su vertinimo teorijomis, taip pat nagrinėti, kaip TGM aplinka padeda dėstytojams įgyvendinti į mokymąsi orientuotą vertinimą. Tyrimo metodologijos skyriuje pristatomas pirmasis empirinis tyrimas su ekspertais ir atvejo studija, atlikta pasirinktoje aukštojoje mokykloje. Radinių skyrius suskirstytas į tris poskyrius, kuriuose pristatomi skirtingų empirinio tyrimo etapų radiniai: tyrimo su ekspertais radiniai, tyrimų su aukštojo mokslo dėstytojais radiniai ir duomenų bazių analizės radiniai. Po to pristatoma diskusija ir pateikiamos išvados, apibendrinančios tyrimo radinius. Galiausiai, prieduose pateikiami šablonai ir kiti su tyrimu susiję dokumentai.

Į mokymąsi orientuotas vertinimas sąsajoje su vertinimo teorijomis

Teorinėje dalyje išnagrinėta į mokymą(si) orientuoto vertinimo samprata ir bruožai, išryškintos jo sąsajos su vertinimo teorijomis. Taip pat, analizuojant mokslinius šaltinius, buvo ištirtas į mokymosi orientuoto vertinimo potencialas palengvinti ir pagerinti studentų mokymą(si). Pateikta įvairių mokymo(si) ir vertinimo metodų, remiančių į mokymosi orientuoto vertinimo, analizė. Dėl šios disertacijos tikslo ir apimties, vertinimo strategijos, įskaitant ugdomąjį ir apibendrinamą vertinimą, taip pat mokymosi vertinimas, vertinimas mokymuisi ir vertinimas kaip mokymasis, įsivertinimas ir tarpusavio vertinimas buvo aptariami, nes į mokymąsi orientuoto vertinimo strategija yra paremta pastarųjų pamatinėmis idėjomis.

Teorinė analizė atskleidė mokymąsi orientuoto vertinimo sąvokos subtilybes. Į mokymąsi orientuotas vertinimas apibūdinamas kaip holistinė vertinimo strategija, išvesta iš tokių vertinimo strategijų, kaip apibendrinamasis ir ugdomasis vertinimas, apjungianti mokymosi vertinimą, vertinimo mokymuisi ir vertinimo kaip mokymasis bruožus bei sukurianti pusiausvyrą tarp pastarųjų panašumų ir skirtumų (Carless, 2006, 2007, 2015; Keppell ir kt., 2006; Zeng ir kt., 2018). Ryšys tarp mokymosi vertinimo, vertinimo mokymuisi ir vertinimo kaip mokymasis yra labai svarbus, nes jis gali nulemti vertinimo tikslą (Earl, 2003).

Kadangi į mokymąsi orientuotas vertinimas remiasi pagrindinėmis ugdomojo ir apibendrinamojo vertinimo idėjomis, juo siekiama sustiprinti ir palengvinti mokymąsi, prisidėti prie besimokančiojo metakognityvinių, socialinių ir emocinių įgūdžių ugdymo, o tuo tarpu, leisti dokumentuoti besimokančiojo pasiekimus (Carless, 2006; Zeng ir kt., 2018). Į mokymąsi orientuotas vertinimas susideda iš šių elementų: vertinimo užduočių, studentų įsitraukimo ir grįžtamojo ryšio (Carless, Joughin ir Liu, 2006; Carless, 2007; 2013a, 2013b; Keppell ir Carless,

2006; Zeng ir kt., 2018). Vertinimo užduotys suprantamos kaip mokymosi užduotys ir jos turi išlaikyti besimokančiųjų dėmesį visą mokymosi laikotarpį, priešingai nei apibendrinamojo vertinimo užduotys, naudojamos mokymosi laikotarpio pabaigoje besimokančiojo žinioms patikrinti (Carless, 2013a, 2013b). Panašiai kaip ugdomasis vertinimas, į mokymąsi orientuotas vertinimas siekia padidinti besimokančiojo įsitraukimą ir dalyvavimą mokymo(si) ir vertinime, taip pat pabrėžia grįžtamojo ryšio svarbą studentų mokymuisi. Į mokymąsi orientuoto vertinimo kontekste, grįžtamojo ryšio pobūdis apibūdinamas kaip į ateitį orientuotas, kuomet besimokančiajam suteikiami komentarai grįžtamojo ryšio forma, o besimokantysis turi sureaguoti į komentarus ir pasinaudoti gautomis įžvalgomis rengiant sekančius atsiskaitomuosius darbus (Carless, 2007).

Teorinė analizė rodo, kad į mokymąsi orientuotas vertinimas turėtų būti įgyvendinamas labai inovatyviose, pirmiausia technologijomis grindžiamose aplinkose, nes tai gali padėti padidinti studentų įsitraukimą į mokymąsi. Mokymosi technologijos gali atverti daugybę galimybių kurti ir įgyvendinti į mokymąsi orientuotą vertinimą, stebinti mokymo(si) pažangą, užtikrinanti tinkamą ir savalaikį grįžtamojo ryšio teikimą ir atskleisti mokymo(si) iššūkius, su kuriais susiduria studentai (Zeng ir kt., 2018).

Kaip technologijomis grindžiama mokymosi aplinka gali padėti dėstytojams rengti į mokymąsi orientuotą vertinimą, kuris palengvintų ir pagerintų mokymą(si)?

Teorinėje analizėje nagrinėjami skirtingi į mokymąsi orientuoto vertinimo ir TGM aplinkos įrankių, skirti pastarųjų metodų įgyvendinimui. Taip pat pasineriama į TGM aplinkos galimybes ir iššūkius, įgyvendinant į mokymąsi orientuotą vertinimą. Mokymas(is) ir vertinimas TGM aplinkoje gali būti diferencijuojami pagal keletą dimensijų, pvz., jis gali būti sinchroninis arba asinchroninis, formalus arba neformalus, ir gali būti organizuojamas nuotoliniame mokymo(si) arba mišriame mokymo(si) ir vertinimo kontekste (Greenhow, Graham, ir Koehler, 2022; Greenhalgh ir kt., 2020; Gleason ir Greenhow, 2017; Greene, Copeland ir Deekens, 2021; Hibbard, Sung ir Wells, 2016; Ranga, 2017).

TGM aplinka gali palengvinti ir sustiprinti mokymą(si) ir vertinimą, suteikdama aukštos kokybės išsilavinimą (Dhawan, 2020), tačiau kliūtys gali atsirasti tada, kai aukštojo mokslo institucijos, dėstytojai ir studentai nėra pasirengę priimti mokymo(si) ir vertinimo skaitmenizacijos. Vertinimas TGM aplinkoje skiriasi nuo tradicinio mokymo(si) auditorijose ir reikalauja tam tikrų pedagoginių sprendimų, kurie padėtų studentams įgyti turtingą mokymosi patirtį (Alavi ir kt., 2021). Skirtumas atsiranda dėl specifinio TGM aplinkos pobūdžio ir joje keliamų pedagoginių reikalavimų mokymosi projektavimui ir vertinimui (pvz., į besimokantįjį

orientuoto požiūrio įgyvendinimas tampa privalomas) (Alavi ir kt., 2021). Mokslinių darbų analizė parodė, kad bandant sukurti tinkamą į mokymąsi orientuoto vertinimo strategiją TGM aplinkoje, reikia atsižvelgti į TGM aplinkos diktuojamus elementus. Taigi, į mokymąsi orientuotas vertinimas, sukurtas tradiciniam auditoriniam mokymui(si), negali būti taikomas nuotoliniame mokyme(si) neatlikus tam tikrų esminių pakeitimų. Atsižvelgiant į tokias problemas kaip techninės TGM aplinkos specifikacijos, besikeičiantys sąveikos kanalai, į besimokantįjį orientuoto požiūrio taikymas ir novatoriškų pedagoginių metodų skatinimas, į mokymąsi orientuoto vertinimo strategija turėtų būti pritaikyta taip, kad atitiktų mokymo(si) planą ir efektyviai išnaudotų technologijų potencialą, taip galiausiai, būtų palengvintas ir sustiprintas mokyma(sis).

Galiausiai, teorinė analizė parodė, kad vertinimas TGM aplinkoje gali atverti daug galimybių, tačiau gali turėti ne mažai rizikų, į kurias būtina atsižvelgti. Fueller ir kt. (2022) perspėja, kad tiesioginis vertinimo strategijų perkėlimas iš auditorijos į TGM aplinką gali būti žalingas, nes tai gali turėti didelių pasekmių mokymo ir mokymosi kokybei, o tai gali prisidėti prie institucijos įvaizdžio blogėjimo. Kuriant vertinimą strategiją TGM aplinkoje, rekomenduojama užtikrinti, kad mokymosi rezultatai, turinys, mokymosi veiklos ir vertinimo metodai būtų derinami konstruktyviai (Biggs ir Tang, 2011; Villarroel ir kt., 2019). Pagal konstruktyvizmo paradigmą (Vygotsky, 1978), mokymas(is) yra susiję su žinių, įgūdžių ir kompetencijų kaupimu, t. y. žinių, įgūdžių ir kompetencijų konstravimu, todėl vertinimas neturėtų būti traktuojamas kaip fragmentuota praktika (Fueller ir kt., 2022). Taigi, norint besimokantiesiems suteikti prasmingą mokymosi patirtį, reikalingas holistinis požiūris į vertinimą TGM aplinkoje.

Tyrimo metodologija

Atsižvelgiant į tikslo ir tyrimo klausimų kompleksiskumą, pasirinkta kokybinė prieiga, leidžianti tyrėjui visapusiškai išnagrinėti analizuojamą reiškinį ir pateikti įžvalgių bei pagrįstų išvadų. Disertacija suskirstyta į kelias dalis, tarp jų: pirmoje dalyje atlikta teorinė mokslinių darbų analizė, antroje dalyje pristatomas – atliktas empirinis tyrimas, kuris atliktas keliais etapais.

Pirmajame empirinio tyrimo etape buvo atliktas kokybinis tyrimas, atliekant pusiau struktūruotus interviu su vertinimo ir technologijomis grindžiamo mokymosi sričių ekspertais. Šios tyrimo dalies tikslas buvo daugiau sužinoti apie į mokymąsi orientuotą vertinimą TGM aplinkoje. Ekspertai laikomi pirminiu informacijos šaltiniu, nes mokslinėje literatūroje, kurioje nagrinėjama ši problema nėra pakankamai informacijos, atsiranda žinių spragų. Šiuo tyrimu buvo siekiama apibrėžti į mokymąsi orientuotą vertinimą TGM aplinkoje, išryškinant pagrindinius

reiškinių bruožus ir nustatant jo ryšį su vertinimo teorijomis. Taip pat jis leido nustatyti technologijų potencialą bei įvertinti į mokymosi orientuoto vertinimo TGM aplinkoje potencialą, palengvinanti ir gerinanti mokymą(si) ir vertinimą. Galiausiai, šis tyrimas padėjo nustatyti galimus iššūkius, su kuriais gali susidurti dėstytojai, įgyvendindami į mokymąsi orientuotą vertinimą TGM aplinkoje. Šiame empirinio tyrimo etape pusiau struktūruoti interviu su atviro tipo klausimais buvo pasirinkti kaip duomenų rinkimo metodas. Remiantis į mokymąsi orientuoto vertinimo ypatybėmis ir tyrimo klausimais, interviu klausimai buvo skirti nagrinėjant šiuos aspektus: a) kokias į mokymąsi orientuoto vertinimo savybes reikėtų pabrėžti ir paremti technologijomis grindžiamos mokymosi aplinkos sprendimais? b) kaip TGM aplinka gali paremti į mokymąsi orientuoto vertinimo įgyvendinimą ir kokių problemų gali kilti įgyvendinant šią vertinimo strategiją TGM aplinkoje?

Šiame empirinio tyrimo etape, siekiant nustatyti potencialius tyrimo dalyvius, t. y. ekspertus, taikytas kriterinis atrankos metodas. Šio empirinio tyrimo etape buvo peržengtos šalies geografinės ribos, nes buvo manoma, kad tarptautiniu mastu pripažintų ekspertų indėlis praturtintų tyrimą, bei suteiktų vertingų įžvalgų. Duomenys buvo rinkti pasitelkiant pusiau struktūruotus interviu, interviu įrašyti ir paskui transkribuoti bei analizuoti taikant indukcinės turinio analizės metodą.

Antrajame empirinio tyrimo etape atlikta atvejo analizė, atliekant 1) kokybinį tyrimą per pusiau struktūrizuotus interviu su aukštųjų mokyklų dėstytojais, kurie kuria ir dėsto studijų dalykus ir 2) po to atlikta duomenų bazės analizė, t. y. analizuojami mišrūs arba nuotoliniai studijų dalykai TGM mokymosi aplinkoje, t. y. Moodle nuotolinio mokymo(si) aplinkoje. Atvejo analizės metodas taikomas, kai reikia detaliai išnagrinėti konkretų reiškinį šiuolaikiniame kontekste, siekiant pabrėžti jo išskirtinumą. Atvejo analizė suteikia išskirtinę galimybę tyrėjui pamatyti, kaip ir kodėl vartotojai reaguoja realiomis sąlygomis, taikant šį metodą tampa lengviau suvokti sąvokas, nes šis metodas įgalina tyrėją gilintis į konceptualias idėjas ar įsitikinimus, keliant klausimus: *kaip* ir *kodėl* (Yin, 2009). Atsižvelgiant į atvejo analizės metodo pobūdį bei šios disertacijos tyrimo tikslą ir tyrimo klausimus, sprendimas taikyti atvejo analizės metodą pasirodė pagrįstas. Šiuo atvejo analizės tyrimu planuojama pateikti atsakymus į abu tyrimo klausimus. Atvejo analizės yra universalios, nes jos sutelkiamos į konkretų reiškinį, programą, įvykį, veiklą, procesą arba vieną ar kelis asmenis (Creswell, 2009). Atvejo analizės tyrimo vienetas buvo apibrėžiamas kaip aukštojo mokslo institucija, t. y., valstybės finansuojama aukštoji mokykla vienoje iš Baltijos šalių, mišrūs bei nuotoliniai studijų dalykai Moodle nuotolinėje mokymo(si) aplinkoje ir dėstytojai, sukūrę šiuos studijų dalykus bei įgyvendinę į mokymą(si) orientuotą vertinimo strategiją dėstomame studijų dalyke, Moodle nuotolinėje mokymo(si) aplinkoje.

Siekiant nustatyti potencialius tyrimo dalyvius pasirinktoje aukštojoje mokykloje, taikomas kriterinis atrankos metodas. Nustačius tyrimo dalyvius, duomenys renkami pasitelkiant pusiau struktūruotą interviu kaip duomenų rinkimo įrankį. Interviu buvo transkribuojami. Surinktų duomenų analizei buvo taikytas indukcinės turinio analizės metodas, kuris leido identifikuoti dominuojančias kategorijas ir subkategorijas. Tyrime dalyvavo 17 dalyvių, turintys įvairaus lygio mokymo ir vertinimo TGM aplinkoje patirtį. Dauguma tyrimo dalyvių yra iš edukologijos arba humanitarinių mokslų srities. Daugelis tyrimo dalyvių dėsto bakalauro ir/arba magistrantūros dieninėse, nuolatinėse studijų programose.

Duomenų bazės, t. y., Moodle nuotolinės mokymo(si) aplinkos pasirinktoje aukštojoje mokykloje, analizei šablonas buvo sukurtas ir naudojamas kaip duomenų rinkimo ir analizės priemonė, skirta analizuoti nuotolinius ir (arba) mišrius studijų dalykus TGM aplinkoje. Šabloną sudaro dvi pagrindinės dalys: bendrieji duomenys, įskaitant studijų dalyko charakteristikas ir pagrindinės informacijos apie studijų dalyką, kur pateikiami kriterijai, skirti išsamiai studijų dalyko analizei, nagrinėjamas praktinis pagrindinių studijų dalyko komponentų įgyvendinimas ir taikymas, t. y., į mokymąsi orientuotas vertinimas TGM aplinkoje. Šablonas kurtas remiantis teorinės analizės įžvalgomis bei ekspertų interviu analizės radiniais. Studijų dalykai atrinkti taikant kriterinės atrankos metodą. Iš viso buvo analizuoti 28 mišrūs arba nuotoliniai studijų dalykai Moodle nuotolinėje mokymo(si) aplinkoje. Studijų dalykai yra aktyvūs ir studentams buvo dėstomi 2021 m. pavasario arba rudens semestruose. Surinkti duomenys buvo analizuoti ir apibendrinti, išryškinant pagrindines tendencijas, kaip į mokymąsi orientuotas vertinimas praktiškai įgyvendinamas TGM aplinkoje.

Informacija apie kontekstą. Tyrimas atliekamas aukštojo mokslo lygmeniu, vykdomas Rytų Europos aukštojo mokslo įstaigoje, kuri siūlo auditorinį, mišrų ir nuotolinį mokymą(si). Pasirinkta įstaiga turi daugiau nei 10 metų technologijomis grindžiamo mokymo patirtį. Pasirinktoje aukštojoje mokykloje Moodle nuotolinė mokymo(si) aplinka yra pagrindinė TGM aplinka. Įstaigoje taip pat teikiama pagalba dėstytojams ir organizuojamo akademinio personalo mokymai, kad būtų lengviau integruoti mokymosi technologijas į mokymo(si) procesus. Pasirinkta aukštoji mokykla yra valstybės finansuojama aukštoji mokykla, siūlanti daugybę visų studijų kryptių studijų programų, įskaitant humanitarinius, socialinius, ekonomikos, gamtos mokslus, menų, žemės ūkio mokslus, informatikos mokslus. Be to, aukštoji mokykla siūlo studijų dalykus, kurie dėstomi įvairių tiek auditorijose, tiek mišriai, tiek nuotoliniu būdu. Norėdama paspartinti studijų kursų migraciją į Moodle nuotolinę mokymo(si) aplinką, pasirinkta aukštoji mokykla paskelbė institucines gaires, kuriose paaiškinami reikalavimai dėstytojams, kaip pritaikyti ar sukurti studijų dalykus, pritaikytus pilnavertiškoms studijoms TGM aplinkoje. Šiose gairėse buvo įtraukti organizaciniai, struktūriniai kriterijai ir turinio reikalavimai, taikomi mišriam

ir nuotoliniam mokymuisi. Galiausiai, būtina paminėti, kad pasirinkta aukštoji mokykla nuolat tobulina savo paslaugas, puoselėdama inovatyvius mokymo ir mokymosi metodus, integruodama mokymosi technologijas, gerindama studentų mokymosi patirtis ir studijų kokybę bei didindama švietimo prieinamumą.

(1) Į mokymąsi orientuoto vertinimo apibrėžimas technologijomis grindžiamoje mokymo(si) aplinkoje (Interviu su ekspertais)

Atlikus interviu su ekspertais stenogramų kokybinę turinio analizę, buvo atskleistos tam tikros kategorijos ir jų subkategorijos, kurios padėjo atsakyti į tyrimo klausimą, paaiškinant TGM aplinkos potencialą į mokymosi orientuoto vertinimo strategijos įgyvendinimui, siekiant palengvinti ir tobulinti besimokančiųjų mokymą(si), taip pat buvo identifikuoti pagrindiniai iššūkiai, su kuriais susiduria dėstytojai bandydami sėkmingai įgyvendinti į mokymąsi orientuotą vertinimą TGM aplinkoje. Tyrimas atskleidė faktą, kad TGM aplinka gali pagerinti mokymąsi ir vertinimą, o TGM aplinkos indėlis gali būti stebimas per tokius aspektus kaip nuolatinis besimokančiųjų mokymosi pažangos stebėjimas. Ekspertai teigia, kad mokymosi pažangos stebėjimas TGM aplinkoje gali būti apibūdinamas kaip visiškai organiškasis procesas, nes dėstytojai gali lengvai pritaikyti įvairius technologinius sprendimus, kad stebėtų kiekvieno besimokančiojo žingsnius, tam kad esant poreikiui galėtų priimti konkrečius pedagoginius sprendimus ir atlikti reikalingas pedagogines intervencijas.

Be to, šis tyrimas parodė, kad TGM aplinka gali palengvinti tarpusavio mokymąsi ir grįžtamojo ryšio teikimo procesus. Vertinimas turėtų būti suplanuotas taip, kad jo pagrindinis tikslas taptų besimokančiųjų mokymosi rėmimas. TGM aplinka ir kiti vidiniai ar išoriniai lengvai suderinami įrankiai gali būti naudojami siekiant paremti ir (arba) įgalinti tarpusavio mokymąsi.

Be to, tyrime teigiama, kad į mokymąsi orientuotas vertinimas remiasi studentų savarankiškumu, todėl vertinimas turėtų būti kuriamas ir įgyvendinamas atitinkamai, o TGM aplinka turėtų būti traktuojama kaip pagalbinė priemonė. Vertinimo strategija turėtų būti sukurta taip, kad būtų palaikomas ir skatinamas studentų savarankiškumo ugdymas, o TGM aplinka ir jos įrankiai turėtų būti naudojami siekiant padėti įgyvendinti konkrečius vertinimo metodus, kurie padėtų studentams tapti savarankiškais besimokančiais.

Be to, radiniai parodė, kad TGM aplinka reikalauja aktyvaus studentų įsitraukimo į mokymąsi ir į mokymąsi orientuotą vertinimą, o dėstytojai turi imtis pasyvaus moderatoriaus vaidmens. Ekspertai mano, kad dėstytojo vaidmens pasikeitimas mokant/mokantis ir vertinant yra neišvengiamas, dėstytojai turėtų tapti mentoriais, o besimokantieji turėtų kontroliuoti savo mokymosi procesą ir prisiimti daugiau atsakomybės.

Be to, tyrimas parodė, kad besimokantiems TGM aplinkoje dažnai reikia daugiau pastiprinimo ir dėmesio, kad jie išliktų motyvuoti ir įsitraukę viso mokymosi proceso metu. Tyrimas parodė, kad pasitelkiant mokymosi technologijas ši problema gali būti adresuojama išnaudojant naujus grįžtamojo ryšio kanalus, pvz., pasitelkiant individualizuotas garso ir (arba) vaizdo grįžtamojo ryšio teikimo galimybes. Taip pat ekspertai teigė, kad TGM aplinkos priemonių ar išorinių komunikacijos technologijų naudojimas grįžtamojo ryšio teikimui gali labai prisidėti prie studentų mokymosi lengvinimo ir tobulinimo.

Tyrimas taip pat parodo, kad vertinimo procedūrų skaidrumas yra būtina sąlyga norint sukurti patikimą mokymo(si) ir vertinimo kultūrą. Tiesą sakant, technologijos gali būti naudingos numatant besimokančiojo elgesį naudojant mokymosi analizę. Gebėdami numatyti studentų mokymąsi, dėstytojai turi teisę imtis veiksmų, kad užkirstų kelią nepageidaujamam mokymosi elgesiui ar rezultatams, bei palengvintų ir pastiprintų mokymo(si) procesą. Ši technologija gali pranešti dėstytojams ankstyvame mokymosi proceso etape, kad besimokantieji susiduria su tam tikrais sunkumais, todėl dėstytojai gali greičiau ir lengviau pasiruošti ir imtis konkrečių intervencijų, kurios padėtų besimokantiems mokymosi procese.

Šis tyrimas parodė, kad TGM aplinka gali palengvinti į besimokantįjį orientuoto požiūrio įgyvendinimą, kuris yra gyvybiškai svarbus į mokymosi orientuoto vertinimo strategijos komponentas, ir palengvinti studentų autonomijos bei savireguliacijos ugdymą. TGM aplinka gali suteikti dėstytojams galimybę stebėti mokymą(si) ir vertinimą. Kadangi visos su mokymu(si) ir vertinimu susijusios procedūros atliekamos TGM aplinkoje, dėstytojai turi galimybę nuolat stebėti besimokančiojo mokymosi pažangą, net ir patiems besimokantiems apie tai nežinant. Be to, šis tyrimas parodė, kad besimokantiems TGM aplinkoje reikia daugiau pastiprinimo ir dėmesio, kad jie būtų motyvuoti ir įsitrauktų viso mokymosi proceso metu. Analizė parodė, kad technologijų integracija gali prisidėti sprendžiant šią problemą, pasiūlydama naujus grįžtamojo ryšio teikimo kanalus.

Nepaisant to, šis tyrimas taip pat parodė, kad TGM aplinka dėstytojams gali sukelti neabejotinų iššūkių ir tokiu būdu padaryti mokymo(si) ir vertinimo procesą itin sudėtingu. Pirmiausia, mokymosi technologijų diegimas, kuriant ir įgyvendinant į mokymosi orientuotą vertinimą, gali būti problemiškas, nes dėstytojams gali trūkti skaitmeninio vertinimo kompetencijų. Todėl ji gali susidurti su sunkumais rengiant studijų dalykus TGM aplinkoje, stebint mokymąsi ir atliekant vertinimą TGM aplinkoje. Problema dėl nepakankamo dėstytojų skaitmeninių vertinimo kompetencijų lygio itin išryškėjo pandemijos laikotarpiu, kuomet daug studijų dalykų teko perkelti į nuotolinę studijų erdvę. Taip pat ekspertai nurodė, kad dėstytojai turėtų laikytis tam tikro požiūrio į technologines ir pedagogines naujoves. Jei dėstytojas laikosi konservatyvesnio požiūrio į mokymą(si) ir vertinimą, jie gali susidurti su iššūkiais, pereinant prie

inovatyvių pedagoginių metodų. Galiausiai, tyrimas parodė, kad dėstytojai turėtų tapti novatoriais ir lyderiais, kurie įkvepia savo studentus mokytis TGM aplinkoje.

(2) Į mokymąsi orientuoto vertinimo kūrimas technologijomis grindžiamoje mokymosi aplinkoje (interviu su dėstytojais)

Interviu su aukštojo mokslo dėstytojais kokybinė turinio analizė leido atskleisti TGM aplinkos teikiamus pranašumus įgyvendinant į mokymąsi orientuotą vertinimo strategiją, bei pademonstravo, kaip į mokymąsi orientuotas vertinimas TGM aplinkoje gali palengvinti ir pagerinti studentų mokymąsi. Dėstytojų interviu analizė parodė, su kokiais iššūkiais susiduria dėstytojai, kurdami ir įgyvendindami į mokymąsi orientuotą vertinimo strategiją TGM aplinkoje. Šis tyrimas atskleidė TGM aplinkos ir jos įrankių potencialą paremti dėstytojus, kuriant ir įgyvendinant į mokymąsi orientuotą vertinimą, siekiant pagerinti besimokančiųjų mokymąsi. TGM aplinka padidina vertinimo lankstumą, nes jos techninės galimybės leidžia prisitaikyti prie nuolat kintančių situacijų ir prisitaikyti prie individualių studentų poreikių, taip pat padeda kurti, diegti, valdyti ir stebėti visus su vertinimu susijusius procesus.

Tyrimas parodė, kad ši TGM aplinkos sprendimai leidžia stebėti besimokančiojo mokymosi pažangą. TGM aplinkos įrankiai ne tik leidžia sistemingai sekti studentų pasiekimus per visą studijų laikotarpį, bet ir informuoja dėstytojus apie bet kokius studentų mokymosi neatitikimus. Tokiu būdu dėstytojui suteikiama galimybė atpažinti bet kokią nepageidaujamą ar netinkamą mokymosi elgesį bei imtis atitinkamų priemonių jai pašalinti.

Kaip parodė šis tyrimas, TGM aplinka leidžia lengviau teikti grįžtamąjį ryšį. Kadangi, remiantis į mokymąsi orientuoto vertinimo strategija, grįžtamojo ryšio teikimas yra suvokiamas kaip pagrindinė priemonė nuolatiniam mokymuisi ir tobulėjimui. Todėl svarbu, kad tiek studentai, tiek dėstytojai turėtų kuo daugiau galimybių keistis idėjomis, teikti ir gauti pastabas, kaip būtų galima tęsti ir/ar tobulinti savo darbus. Nepriklausomai nuo pasirinkto įrankio, režimo ar mediumo, TGM aplinkos suteikiami privalumai grįžtamojo ryšio teikimui yra nenuginčijami. Didžioji dalis tyrime dalyvavusių dėstytojų buvo išbandę TGM aplinkos grįžtamojo ryšio teikimo įrankius ir sprendimus sinchroninių nuotolinio mokymo(si) sesijų metu, taip dėstytojai tarsi imitavo tradicinį mokymą(si) ir grįžtamojo ryšio teikimą auditorijoje, dėl to daugelis kalbintų dėstytojų nebandė nagrinėdami įvairių TGM aplinkos kanalų ir išorinių komunikacijos priemonių grįžtamojo ryšio teikimui.

Išanalizavus interviu su aukštosios mokyklos dėstytojais stenogramas, paaiškėjo, kad TGM aplinka gali palengvinti vertinimo procesą ir tokiu būdu sutaupyti dėstytojo laiko bei sumažinti pastarųjų darbo krūvį. Be to, tyrimas parodė, kad daugelis apklaustų dėstytojų aktyviai

naudoja TGM aplinkos įrankius vertinimui, nes jie suteikia galimybę automatizuoti daugelį procesų. Pavyzdžiui, Moodle nuotolinio mokymosi aplinka palengvina užduočių pateikimą ir leidžia dėstytojams vertinti ir teikti grįžtamąjį ryšį, neatsisiunčiant kiekvieno individualaus dokumento. Taip pat analizė atskleidė dar vieną TGM aplinkos ir jos vertinimo priemonių naudojimo pranašumą, pvz., technologinio elemento įdiegimas vertinimo procese užtikrina vertinimo skaidrumo principą, leidžiant dėstytojams įtraukti konkrečius vertinimo kriterijus ir pagal juos atlikti studentų darbų vertinimą.

Pašnekovai nurodė vertinimo lankstumą kaip dar vieną TGM aplinkos pranašumą, įgyvendinant į mokymąsi orientuoto vertinimo strategiją. Iš tiesų, dėstytojai gali lanksčiau žvelgti į vertinimo procesą, geriau atliepti individualius besimokančiųjų poreikius. Šis gebėjimas prisitaikyti prie nuolat kintančių situacijų ir bei prie individualių studentų poreikių tapo itin aktualus COVID-19 pandemijos metu. Be to lankstumas, kurį siūlo TGM aplinka, ir įvairūs technologiniai sprendimai bei įrankiai, dėstytojams gali praversti ir popandeminiu laikotarpiu, ypač kalbant apie dėstytojo mobilumą semestro metu.

Be to, tyrimas parodė, kadangi testai gali būti skirti įvertinti tiek turinio žinias, tiek ir aukštesnio lygio įgūdžius bei kompetencijas, galimybė atlikti automatizuotą testų vertinimą yra gana naudinga. Pažymėtina, kad naudojantis TGM aplinkos įrankiais galima nesunkiai įvertinti testus, kuriuose yra uždarų ir trumpų atsakymų klausimų bei testų su skirtingais atsakymų variantais, o dėstytojai gali skirti savo laiką vertindami besimokančiojo gebėjimus, įgūdžius ir kompetencijas arba užsiimti individualizuoto grįžtamojo ryšio teikimu. Tačiau dėstytojai nurodė, kad iš pradžių Moodle nuotolinės mokymosi aplinkos įrankių paruošimas ir naudojimas testavimui ir vertinimo procesams organizuoti užtrunka nemažai laiko, tačiau vertinant iš ilgalaikės perspektyvos, toks pasirengimas atsiperka, atsižvelgiant į laiko ir darbo krūvio santykį. Be to, nuotolinės mokymosi aplinkos įrankių paruošimas ir naudojimas testavimui ir vertinimo procesui gali užimti ypač daug laiko ir būti itin sudėtinga užduotis ypač tiems dėstytojams, kurių skaitmeniniai įgūdžiai yra pradedančiojo lygio arba kurie turi labai mažai patirties naudojantis Moodle nuotolinio mokymosi aplinka.

Verta paminėti, kad šis empirinis tyrimas parodė, kad į mokymąsi orientuoto vertinimo diegimas TGM aplinkoje ne retai sukelia didelių iššūkių dėstytojams. Šiuos iššūkius galima suskirstyti į asmeninius (pvz., nepakankamas skaitmeninio vertinimo įgūdžių ir kompetencijų lygis), institucinius (pvz., paramos trūkumas instituciniu lygmeniu) ir technologinius (pvz., technologijų ribotumas). Be to, tyrimas parodė, kad dėstytojai nenori daug laiko skirti ieškant tinkamų technologinių sprendimų bei įrankių, bei išmokstant pastaraisiais naudotis. Galiausiai, tyrimas parodė, kad dėstytojai dažnai susiduria su problemomis, kai kalbama apie mokymosi technologijų priėmimu, t. y., jei dėstytojai nemano, kad technologija ar konkretus įrankis yra

vertinga arba jų naudingumas nėra akivaizdus iš karto, dėstytojai yra linkę tokių priemonių atsisakyti.

(3) Į mokymąsi orientuoto vertinimo įgyvendinimas technologijomis grindžiamoje mokymo(si) aplinkoje (Studijų dalykų Moodle nuotolinėje mokymo(si) aplinkoje analizė)

Šioje paskutinėje empirinio tyrimo dalyje buvo pateikta informacija apie studijų rezultatus, vertinimo kriterijus ir strategiją bei analizuojamų studijų dalyko užduotys, o vėliau – konkretesnė informacija apie tai, kaip į mokymąsi orientuoto vertinimo strategija kuriama ir įgyvendinama analizuojamuose studijų dalykuose, įskaitant informaciją apie studentų įsivertinimą, tarpusavio mokymąsi, mokymosi pažangos stebėjimą ir grįžtamojo ryšio teikimą. Šis tyrimas taip pat parodė, kaip kiti svarbūs dalykai, pvz., skaitmeniniai ženkleliai, yra naudojami įgyvendinant į mokymąsi orientuotą vertinimo strategiją TGM aplinkoje, siekiant palengvinti ir pagerinti studentų mokymąsi.

Verta paminėti, kad TGM aplinka siūlo dėstytojams platų įrankių pasirinkimą, skirtą pageidaujamai vertinimo strategijai įgyvendinti, pavyzdžiui, testus su skirtingomis testo elementų parinktimis, interaktyvius testus, užduočių pateikimo įrankius sudėtingesnėms, esė formato vertinamąsias užduotis, bendradarbiavimo priemonės. mokymasis, grįžtamojo ryšio nuostatos ir kt. Pavyzdžiui, TGM aplinka palengvina užduočių pateikimo procesą, nes leidžia dėstytojams nurodyti terminus, pateikti vertinimo kriterijus, nustatyti pateikimo parametrus, priimti grupinius darbus ir pan., o aplinkos techninis pajėgumas leidžia užmegzti ryšius tarp vertinimo ir mokymosi komponentų, naudojant atitinkamas pažangos stebėjimo parinktis, pvz., kalendorių ar pažangos juostą, kad studentai galėtų kontroliuoti savo mokymąsi. Be to, TGM aplinka leidžia automatizuoti vertinimo procesą, o tai ilgalaikėje perspektyvoje sumažina dėstytojo darbo krūvį, taupo laiką ir leidžia dėstytojams sutelkti dėmesį į sudėtingesnes užduotis, pvz., besimokančiojo gebėjimų, įgūdžių ir kompetencijų vertinimą aukštesniame lygmenyje arba skirti daugiau laiko grįžtamojo ryšio teikimui, o tai yra labai svarbu įgyvendinant į mokymąsi orientuotą vertinimą.

Kita vertus, šis tyrimas taip pat parodė, kad TGM aplinka pati savaime negali pagerinti ar palengvinti studentų mokymosi. Tiesą sakant, TGM aplinka turėtų būti traktuojama kaip mediumas, o pirmenybė turėtų būti teikiama pedagoginiams sprendimams ir intervencijoms. Kadangi mokymas(is) ir vertinimas TGM aplinkoje iš esmės skiriasi nuo mokymo(si) auditorijoje, būtina peržiūrėti ir atitinkamai pakoreguoti pedagogines priemones, o mokymosi bei vertinimo procesų įgyvendinimo sėkmė priklauso nuo dėstytojų įgūdžių ir kompetencijų.

Išvados

Išvados padarytos remiantis teorine analize ir dviejų etapų empirinio tyrimo radiniais, pvz., kokybiniu tyrimu, įgyvendinti atliekant pusiau struktūruotus interviu su tos srities ekspertais (interviu su ekspertais) ir atvejo analizę pasirinktoje aukštojo mokslo institucijoje (interviu su dėstytojais bei studijų dalykų analizė Moodle nuotolinio mokymosi aplinkoje).

1. Remiantis teorinių šaltinių analizės radiniais, ekspertų interviu analizės ir interviu su aukštojo mokslo dėstytojais analizės radiniais, pažymėtina, kad apibrėžiant į mokymąsi orientuotą vertinimą reikia atsižvelgti į daugybę skirtingų komponentų, pvz., ugdomojo ir apibendrinamojo vertinimo santykį, mokymosi vertinimą, vertinimą mokymuisi, vertinimą kaip mokymasis, grįžtamąjį ryšį, dėstytojo ir besimokančiojo vaidmenis ir įsitraukimą lygi į mokymą(si) ir vertinimą. Į mokymąsi orientuotas vertinimas buvo sukurtas ir yra laikomas kaip nauja vertinimo strategija, kuri visų pirma orientuota į mokymosi palengvinimą ir tobulinimą bei grįžtamojo ryšio teikimą. Remiantis į mokymąsi orientuoto vertinimo samprata, grįžtamasis ryšys apibūdinamas kaip į ateitį orientuotas grįžtamasis ryšys, o tai reiškia, kad grįžtamasis ryšys turi būti naudojamas esamo ir būsimojo studento darbui tobulinimui. Tikimasi, kad taikant į mokymąsi orientuotą vertinimą studentai išsiugdys tam tikrus įgūdžius ir kompetencijas, pavyzdžiui, metakognityvinius, bendradarbiavimo įgūdžius, savarankiško mokymosi įgūdžius ir vertinimo kompetenciją.

Galiausiai, į mokymąsi orientuotas vertinimas sprendžia iššūkius, susijusius su studentų motyvacijos mokytis nebuvimu, problemas su įsitraukimu į mokymą(si) ir vertinimą bei akademinio sąžiningumu, tačiau tokio vertinimo strategijos įgyvendinimas, ypač TGM aplinkoje, yra daug dėstytojų ir besimokančiųjų laiko ir pastangų reikalaujantis procesas. Iš tiesų, į mokymąsi orientuoto vertinimo kūrimas ir įgyvendinimas TGM aplinkoje yra kitoks, todėl reikia holistinio požiūrio ir reikšmingų pedagoginių pokyčių. TGM aplinka nustato tam tikrus reikalavimus mokymo(si) planavimui ir vertinimui, įskaitant pedagoginio požiūrio pokyčius, konstruktyvaus derinimo poreikį, komunikacijos ir interaktyvumo kanalų pokyčius, taip pat vertinimo trukmę ir dažnumą. TGM aplinkos įrankiai leidžia palengvinti ir pagerinti mokymo(si) ir vertinimo procesus, tokius kaip grįžtamojo ryšio teikimą, tarpusavio mokymosi organizavimą, įsivertinimą ir mokymosi pažangos stebėjimą.

2. Šis tyrimas patvirtino, kad į mokymąsi orientuoto vertinimo įgyvendinimas TGM aplinkoje yra sudėtingas procesas, tačiau technologinių sprendimų, palengvinančių vertinimą, panaudojimas turi daug naudos. Šis tyrimas parodė, kad TGM aplinka gali paremti į mokymąsi orientuoto vertinimą. TGM aplinkos potencialas mokymosi proceso lengvinimui ir gerinimui gali būti stebimas: TGM aplinka sukuria galimybes skatinti

savarankišką ir savireguliacinį mokymą(si) bei sudaro sąlygas interaktyviam mokymui(si) ir grįžtamajam ryšio teikimui. TGM aplinka palengvina vertinimo procesą, aprūpindama dėstytojus besimokančiųjų mokymosi pažangos stebėjimo įrankiais, įgalina interaktyvų ir savalaikį grįžtamojo ryšio teikimą tarp dėstytojų ir studentų, taip pat studentų bei palaiko į besimokančiųjų orientuotą požiūrį mokymo(si) bei vertinimo procese. TGM aplinkos siūlomi sprendimai vertinimo strategijos įgyvendinimui padeda sumažinti dėstytojo darbo krūvį ir taip sutaupyti laiko. Taip pat TGM aplinka turi skirtingus įrankius skirtingiems įvairaus sudėtingumo lygio gebėjimams ir kompetencijoms įvertinti, todėl skirtingų studijų kryptių dėstytojai gali lengvai pasirinkti ir pritaikyti TGM aplinkos įrankius paremiant jų pasirinktą vertinimo strategiją. TGM aplinka ir jos įrankiai gali stebėti ir sekti besimokančiųjų mokymosi pažangą ir informuoti dėstytojus apie būtinas pedagogines intervencijas, kad jie galėtų suteikti reikiamą pagalbą savo studentams arba užkirsti kelią neetiško mokymosi elgesio demonstravimui. Be to, TGM aplinkos įrankiai leidžia dėstytojams nurodyti vertinimo kriterijus ir pagal juos atlikti vertinimą, todėl, apskritai, vertinimo procesas tampa skaidresnis. Galiausiai, TGM aplinka turi pajėgumų ir tinkamų priemonių, galinčių reikšmingai prisidėti prie studento motyvacijos ir įsitraukimo didinimo, o tai labai svarbu nuotolinio mokymo(si) kontekste.

Rekomendacijos. Atsižvelgiant į disertacijos radinius, pateikiamos tokios rekomendacijos:

1. Atsižvelgiant į tyrimo radinius, aukštojoje mokykloje rekomenduojama inicijuoti ir skatinti dėstytojų bendruomenių plėtrą. Tokiose bendruomenėse dėstytojai galėtų pasidalinti savo gerosios praktikos pavyzdžiais, kaip mokyti ir vertinti studentus TGM aplinkoje. Be to, dėstytojai, patys mokydamiesi iš savo kolegų, taip prisidėtų prie savo profesinio augimo, taip pat įvairių įgūdžių ir kompetencijų ugdymo, tokių kaip bendradarbiavimo ir mokymosi įgūdžiai bei tarpasmeniniai įgūdžiai ir kt. Be to, tokios dėstytojų bendruomenės galėtų padėti pradedantiesiems dėstytojams lengviau integruotis aukštojo mokslo institucijoje ir skatinti juos išbandyti novatoriškus mokymo ir vertinimo metodus TGM aplinkoje bei skatinti itin svarbių mokymo(si) įgūdžių ir kompetencijų ugdymą. Egzistuoja ryšys tarp dėstytojo skaitmeninės kompetencijos bei mokymo(si) ir vertinimo TGM aplinkoje kokybės, nes esant nepakankamam dėstytojo skaitmeninės kompetencijos lygiui, mokymo(si) ir vertinimo TGM aplinkoje kokybė ženkliai pablogėja.
2. Kalbant apie praktinį vertinimo strategijos įgyvendinimą TGM aplinkoje, bendra rekomendacija dėstytojams būtų: pirmiausia rekomenduojama susikurti vertinimo strategiją, o tik po to reikėtų pasirinkti tinkamus metodus ir TGM aplinkos įrankius, kurie

padėtų įgyvendinti vertinimo strategiją. Kruopštus vertinimo strategijos planavimas ir projektavimas yra būtina efektyvaus mokymo(si) ir vertinimo TGM aplinkoje sąlyga. TGM aplinka ir jos įrankiai negali diktuoti, kaip turi būti kuriama vertinimo strategija. Iš tiesų, vertinimo strategija turėtų numatyti tinkamus metodus ir priemones TGM aplinkoje. Be to, dėstytojams rekomenduojama parengti išsamius studijų vadovus studentams, kuriuose jie turėtų nurodyti visą informaciją apie vertinimą, pavyzdžiui, kiekvienos numatytos vertinimo veiklos mokymosi tikslus ir rezultatus, vertinimo kriterijus su vertės rodikliais. Taip pat pageidautina, kad dėstytojai dar semestro pradžioje aptartų kurso struktūrą, įskaitant užduotis ir vertinimo procedūras bei vertinimo kriterijus, kartu su savo studentais. Tai itin aktualu tiems studentams, kurie studijuoja nuotoliniu būdu, ir kurių bendravimo ir bendradarbiavimo galimybės yra ribotos. Be to, informacija apie vertinimo užduotis ir vertinimo kriterijus taip pat turėtų būti pateikta, jei tai įmanoma, TGM aplinkoje, pvz., šalia užduočių aprašymų, vertinimo įrankiuose, pasitelkiant grįžtamojo ryšio priemones. Galiausiai dėstytojai turėtų paanalizuoti grįžtamojo ryšio teikimo galimybes TGM aplinkoje. Rekomenduojama grįžtamąjį ryšį teikti pagal vertinimo kriterijus, nes tai padidintų studentų įsitraukimą ir vertinimo skaidrumą.

3. Šis tyrimas parodė, kad daugeliu atveju mokymas(is) ir vertinimas, ypač į mokymąsi orientuotas vertinimas, TGM aplinkoje reikalauja daugiau dėstytojų laiko ir pastangų. Taigi, siekiant išlaikyti dėstytojų įsitraukimą ir juos motyvuoti, rekomenduojama apsvarstyti įvairias paskatas, įskaitant ir galimybes teikti didesnę finansinę paramą dėstytojams. Remiantis šio tyrimo radiniais, manoma, kad tokia finansinė paskata paskatintų dėstytojus lanksčiau priimti mokymo(si) ir vertinimo skaitmeninimą.
4. Galiausiai, atsižvelgiant į tyrimo radinius, rekomenduojama dar kartą peržiūrėti ir iš naujo įvertinti prioritetus vertinimo požiūriu. Šiuo metu akcentuojamas apibendrinamasis požiūris į vertinimą riboja mokymąsi skatinančių, t. y., į mokymąsi orientuotų, vertinimo strategijų ir metodų įgyvendinimą. Nors daugelis tyrimų iliustravo galimus pavojus, susijusius su pernelyg didele priklausomybe nuo apibendrinamojo vertinimo, aukštojo mokslo institucijos jam vis dar teikia pirmenybę ir tai atsispindi politikos gairėse. Tačiau norint užtikrinti efektyvų į mokymąsi orientuoto vertinimo strategijos įgyvendinimą TGM aplinkoje, labai svarbu būtų pasitelkti priegą „iš viršaus į apačią“. Institucinė dokumentacija ir į mokymąsi orientuoto vertinimo įgyvendinimo TGM aplinkoje gairės gali padėti užtikrinti kokybę, o perėjimas nuo apibendrinamojo vertinimo prie į mokymąsi orientuoto vertinimo strategijos suteiktų gilią ir prasmingą mokymosi patirtį.

INFORMACIJA APIE AUTORE

Rasa Greenspon yra Vytauto Didžiojo universiteto doktorantė ir jaunesnioji mokslo darbuotoja. Ji yra įgijusi anglų ir vokiečių filologijos bakalauro laipsnį, švietimo vadybos magistro laipsnį, turinti UNESCO IBE kursų mokymo programos ir turinio dizaino sertifikatą. Jos tyrimai apima technologijomis grindžiamą mokymą(si) ir skaitmeninį vertinimą. Ji jau yra publikavusi nemažai straipsnių, prisidėjusi prie kelių knygų skyrių, dirbusi nacionaliniuose ir tarptautiniuose projektuose, bei dalyvavusi nacionalinėse ir tarptautinėse konferencijose.

Publikacijos, parengtos doktorantūros studijų laikotarpiu:

1. Greenspon, R., Teresevičienė, M., ir Naujokaitienė, J. (2020). „Dėstytojo praktikos modeliavimas taikant mokymosi analitiką kaip metakognityvinį mokymosi įrankį siekiant pagerinti besimokančiųjų sėkmę“. *Žmogaus mokymosi patirties gerinimas naudojant technologijas: nauji iššūkiai skaitmeninio, atviro, nuotolinio ir tinklinio švietimo tyrimams Europos nuotolinio ir el. mokymosi tinklo (EDEN) darbai*. Lisabona, 113-123. DOI: 10.38069/edenconf-2020-rw0013.
2. Greenspon, R., ir Trepulė, E. (2019). „Dėstytojo vaidmuo ugdant besimokančiųjų skaitmenines kompetencijas“. *Aukštųjų mokyklų vaidmuo visuomenėje: iššūkiai, tendencijos ir perspektyvos*. Akademiniai darbai, 1(8), 33-38.
3. Greenspon, R., ir Volungevičienė, A. (2023). „How can a technology enhanced learning environment support learning-oriented assessment in higher education?“ [Straipsnis priimtas publikuoti moksliniame žurnale *Pedagogika*].
4. Tamoliūnė, G., Greenspon, R., Teresevičienė, M., Volungevičienė, A., Trepulė, E. ir Daukšienė, E. (2022). „Mikrokredencialų potencialo tyrinėjimas: Sisteminė literatūros analizė“. *Frontiers in Education*, 7, 1-15. Doi:10.3389/educ.2022.1006811
5. Tamoliūnė, G., Naujokaitienė, J., Volungevičienė, A., Trepulė E., Misiulienė, R., ir Greenspon, R. (2021). „Mokymosi analitika kaip metakognityvinis įrankis“. In A. Volungevičienė, M. Teresevičienė, ir E. Trepulė. *Learning analytics: A metacognitive tool to engage students* (p. 8-44). SCIENDO. DOI: <https://doi.org/10.2478/9788366675643>.
6. Teresevičienė, M., Trepulė, E., Šadauskas, M., Greenspon, R., ir Costa, N. (2020). „Skaitmeniniai ženkleliai studentų vertinimui ir mokymo(si) pripažinimui. Universiteto atvejis“. *Žmogus ir dirbtinis intelektas ateities visuomenei. Įkvepiantis skaitmeninis švietimas kitai Europos studentų kartai STE(A)M*. Nuotolinio ir el. mokymosi tinklo (EDEN) pranešimų medžiaga 2020 m. metinė konferencija, Timișoara, 91-99.

7. Trepulė, E., Volungevičienė, A., Teresevičienė, M., Greenspon, R. ir Costa, N. (2021). Kaip padidinti skaitmeninių ženklių, skirtų vertinimui ir pripažinimui aukštosiose mokyklose, vertę? Universiteto atvejis. *Informatika švietime*, 20(1), 131–152. DOI: 10.15388/infedu.2021.07
8. Trepulė, E., Volungevičienė, A., Teresevičienė, M., Daukšienė, E., Greenspon, R., Tamoliunė, G., Šadauskas, M., ir Vaitonytė, G. (2021). *Atviro ir internetinio mokymosi vertinimo ir pripažinimo gairės, atsižvelgiant į nacionalinę ir Europos kvalifikacijų sąrangą. Mikrokredencialai kaip derinimo ir skaidrumo pasiūlymas*. Vytauto Didžiojo universitetas. <https://doi.org/10.7220/9786094674792>.
9. Volungevičienė, A., Duarte, J. M., Naujokaitienė, J., Tamoliunė, G., ir Greenspon, R. (2020). Dėstytojų patirtys naudojant mokymosi analitiką, siekiant pagerinti mokymąsi mišrioje nuotolinėje studijoje. *Žmogus ir dirbtinis intelektas ateities visuomenei. Įkvėpantis skaitmeninis švietimas kitai Europos studentų kartai STE(A)M*. Nuotolinio ir el. mokymosi tinklo (EDEN) pranešimų medžiaga 2020 m. metinė konferencija, Timisoara, 99–109.
10. Volungevičienė, A., Brown, M., Greenspon, R., Gaebel, M., ir Morrisroe, A. (2021). *Efektvios skaitmeninio mokymo(si) sistemos kūrimas: institucijų įsivertinimo priemonės*. Europos universitetų asociacija.

Parengta mokymų medžiaga:

- Pagal tarptautinį projektą DIGI-PROF, nr. 2021-1-LT01-KA220-HED-000031154, kartu su bendraautoriais parengiau mokymo medžiagą aukštųjų mokyklų dėstytojams: „Skaidrių nuotolinio mokymo(si) vertinimo strategijų kūrimas aukštosiose mokyklose”.
 - Mokymų kalba: anglų (taip pat lietuvių, katalonų, portugalų, vokiečių bei lenkų)
 - Apimtis kreditais: 3 ECTS

Konferencijos, kuriose dalyvauta doktorantūros studijų laikotarpiu:

- 2022 m. birželio 24 d. – dalyvavau AHE konferencijoje Mančesteryje, JK. Skaičiau pranešimą tema „Technologijų pritaikymas į mokymąsi orientuotam vertinimui: galimybės ir iššūkiai Baltijos valstybės universitete“.
- 2021 m. birželio 21 d. – dalyvavau EDEN doktorantūros simpoziume ir skaičiau pranešimą „Skaitmeninio vertinimo strategijos į mokymąsi orientuotam vertinimui“.
- 2020 m. spalio 21–23 d. – dalyvavau EDEN tyrimų seminare ir skaičiau pranešimą „Modeling Teacher Practices to Apply Learning Analytics as a Metacognitive Tool in Learning to Enhance Student Success“.

- 2020 m. spalio 9 d. – dalyvavau LETA konferencijoje ir skaičiau pranešimą „Skaitmeninio į mokymąsi orientuoto vertinimo strategijos“.
- 2020 m. birželio 23 d. – dalyvavau renginyje: „MicroHE Final Conference“.
- 2020 m. birželio 19 d. – dalyvavau EDEN doktorantūros simpoziume, kuriame pristačiau disertacijos tyrimo eigą.
- 2020 m. birželio 18 d. dalyvavau EDEN metinėje konferencijoje 2020 Timišoaroje (Rumunija) ir skaičiau pranešimus šiomis temomis „Skaitmeniniai ženkleliai studentų įvertinimui ir pripažinimui. Atvejo studija“ ir „Dėstytojų praktika naudojant mokymosi analitiką, siekiant pagerinti mokymąsi mišrioje nuotolinėje studijoje“.
- 2019 m. gegužės 9 d. dalyvavau tarptautinėje taikomųjų tyrimų konferencijoje „Informacinės technologijos 2019: teorija, praktika, inovacijos“ ir pristačiau pranešimą „Dėstytojų vaidmuo ugdant skaitmenines besimokančiųjų kompetencijas“ (Lietuva).

Išsilavinimas

- 2019 m. – dabar (numatoma studijų baigimo data 2023 m. rugsėjo 21 d.)
Edukologijos mokslų doktorantūros studijos, Vytauto Didžiojo universitetas, Kaunas (Lietuva)
- 2016–2018 m.
Švietimo vadybos magistrantūros studijos, Vytauto Didžiojo universitetas, Kaunas (Lietuva)
- 2011–2015 m.
Anglų ir vokiečių filologijos bakalauro studijos, Vytauto Didžiojo universitetas, Kaunas (Lietuva)

Profesinė patirtis:

- 2022 – dabar
Vytauto Didžiojo universiteto Švietimo akademijos dėstytojo asistentė (Lietuva)
(Studijų dalykas: E. mokymosi technologijos, Magistro studijų dalykas)
- 2022–2023 m.
EDEN metinės konferencijos programos komiteto narė
- 2022–2023 m.
Vytauto Didžiojo universiteto (Lietuva) mokslo darbuotoja tarptautiniuose projektuose
- 2019 – dabar
Dirbu jaunesniąja mokslo darbuotoja Vytauto Didžiojo universitete (Lietuva)

- 2018 rugsėjis – 2021 m.
Vertėja ir redaktorė (individuali veikla)
- 2015 m. rugsėjo 1 d. – 2018 m. vasara
Dirbau verslo asistente FESTO (Lietuva).

Darbas projektuose:

- 2022 gegužės – 2022 lapkričio mėn.
Projektas: atviri mokymo ištekliai, skirti bendradarbiavimui, nuotoliniam mokymui bei mainams (OER CODEX), nr. 2021-1-DE01-KA220-HED-000023196
Pareigos: Tyrėja
Projekto koordinatorius: Technische Universitaet Dresden (Vokietija)
- 2022 vasario – 2023 vasario mėn.
Projektas: DIGI-PROF –Skaidrus nuotolinio mokymosi vertinimas skaitmeniškai kompetentingiems dėstytojams, nr. 2021-1-LT01-KA220-HED-000031154
Pareigos: Tyrėja
Projekto koordinatorius: Vytauto Didžiojo universitetas
- 2021 lapkritis – dabar
Projektas: Skaitmeniniai mikrokredencialai aukštajame moksle (MIKRO KREDENCIALAI), nr. 13.1.1-LMT-K-718-05-0003
Pareigos: jaunesnioji mokslo darbuotoja
Projekto koordinatorius: Vytauto Didžiojo universitetas
- 2020 kovo – 2023 sausio mėn.
Europos aukštųjų mokyklų skaitmeninimo strateginė refleksijos priemonė, nr. 612897-EPP-1-2019-1-BE-EPPKA3-PI-FORWARD
Pareigos: jaunesnioji mokslo darbuotoja
Projekto koordinatorius: Europos universitetų asociacija (EUA)
- 2019 lapkričio – 2021 gruodžio mėn.
Projektas „Atviras internetinis mokymasis (OOL) skaitmenizuotai ir įtinkintai visuomenei (DNS)“, nr. 3.3-LMT-K-712-01-0189
Pareigos: jaunesnioji mokslo darbuotoja.
Projektas finansuojamas ESF ir Lietuvos mokslo tarybos pagal Aukšto lygio MTEP dotaciją.

Seminarai ir internetiniai vebinariai:

- 2023 m. gegužės 25 d. – dalyvavau Europos HUB KBA renginyje tema „Skaitmeninis vertinimas: galimybės ir iššūkiai“.
- 2023 m. balandžio 26 d. – dalyvavau Europos HUB KBA renginyje tema „Bridging the Digital Gender Gap“.
- 2022 m. gegužės 24 d. – dalyvavau EUA organizuotame seminare tema „Aukšto efektyvumo skaitmeninio švietimo ekosistemos kūrimas: institucijų įsivertinimas“.
- 2022 m. kovo 17 d. – dalyvavau mokymuose „Studentų aktyvinimas nuotolinėse studijose“ (Nr. 2020-1-PL01-KA226-HE-096358).

Parengiau ir skaičiau pranešimą tema „Vertinimo strategijos studentų aktyvinimui nuotolinėse studijose“.

Organizatorius: Vytauto Didžiojo universitetas (Lietuva)

- 2021 m. lapkričio 3 d. – dalyvavau EODLW internetiniame seminare
Tema: Skaitmeninio ugdymo praktika universitetams.
- 2021 m. gegužės 26 d. – dalyvavau Erno Lehtinen internetiniame seminare (ELOC)
Tema: Universiteto studentų mokslinio mąstymo įgūdžių ugdymo rėmimas: galimybės ir problemos.
Pranešėjas: dr. Mari Murton, Turku universitetas, Suomija.
- 2021 m. balandžio 28 d. – dalyvavau Erno Lehtinen internetiniame seminare (ELOC)
Tema: Kompiuteriu įgalinamas bendradarbiavimo problemų sprendimas: įgūdžių ir procesų fiksavimas.
Pranešėjas: dr. Päivi Häkkinen, Jyväskylä universitetas, Suomija.
- 2021 m. balandžio 7 d. – dalyvavau EDEN NAP internetiniame seminare tema „Ką aš darau kaip pedagogas su mokymosi analitika?“.
Pranešėjai: dr. Bartas Rientiesas, Anna Gillespie, Edas Fosteris, dr. Dirkas Tempelaaras ir dr. Robertas Bodilis.
- 2021 m. kovo 11 d. – dalyvavau internetiniame seminare „Transatlantinis pokalbis apie universitetų ateitį“.
Pranešėjas: prof. dr. George'as Veletsianos (Kanada)
Organizatorius: Dublino miesto universitetas (DCU)
- 2021 m. kovo 17 d. – dalyvavau Erno Lehtinen internetiniame seminare (ELOC)
Tema: Tarpusavio mokymosi reguliavimo tyrimas – kodėl ir kaip?
Pranešėjas: dr. Sanna Järvelä, Oulu universitetas, Suomija

- 2021 m. vasario 4 d. – dalyvavau kvalifikacijos kėlimo Suomijos mokytojams vebinare ir skaičiau pranešimą bei vedžiau diskusiją tema „Į mokymąsi orientuoto vertinimo skaitmeniniame vertinime link“.
- 2021 m. vasario 10 d. – dalyvavau vebinare tema „Kaip atpažinti MTEP paslaugas / darbus“ (Trukmė: 1 akademinė valanda). Organizatorius Mykolas Romeris universitetas (Lietuva)
- 2021 m. sausio 26 d. – dalyvavau DIGI-HE projekto internetiniame seminare (1 dalis) Tema: „Produktyvios skaitmeninio švietimo ekosistemos kūrimas“.
- 2020 m. lapkričio 3 d. dalyvavau internetiniame seminare „Naujų skaitmeninio vertinimo būdų tyrinėjimas“ (Europos internetinio ir nuotolinio mokymosi savaitės renginys).
- 2020 m. lapkričio 4 d. – dalyvavau internetiniame seminare „Praktiniai ir pedagoginiai būdai, kaip įvertinti savo besimokančiuosius nuotolinėse studijose“ (Europos internetinio ir nuotolinio mokymosi savaitės renginys).
- 2020 m. lapkričio 5 d. – dalyvavau internetiniame seminare „Technologijomis grindžiamas mokymas(is) Europos aukštojo mokslo institucijose – padėtis ir perspektyvos“, kurį organizavo EDEN pagal Europos internetinio ir nuotolinio mokymosi savaitę.

Rasa GREENSPON

**SUPPORTING TEACHERS IN DESIGNING LEARNING-ORIENTED ASSESSMENT IN A
TECHNOLOGY ENHANCED LEARNING ENVIRONMENT**

Doctoral dissertation

Edited by Author

Spausdino – Vytauto Didžiojo universitetas

K. Donelaičio g. 58, LT-44248 Kaunas

Užsakymo Nr. 23-107. Tiražas 15 egz. 2023 07 10

Nemokamai