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ENGAGEMENT OF STUDENTS IN ONLINE LEARNING PLATFORMS: FOLLOW-UP STUDY IN LITHUANIAN GENERAL EDUCATION SCHOOLS

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Abstract. *Online learning platforms with integrated tools of learning analytics (LA) and artificial intelligence (AI) are growing in popularity in general education in Lithuania. Such platforms have a number of advantages in terms of the teaching-learning process, however, there is a lack of research about such aspects of use platforms in general education schools. The follow-up study was organized in schools that participated in the DIMA project for three months and tested different platforms with learning analytics and artificial intelligence components - LearnLab and Eduten Playground. The study aimed to monitor children's progress with the platform, tracking interest and engagement. The same questionnaire was given 3 times within the period of one month. In total, 977 responses were received: 404 students completed in first time; 281 completed second and 252 completed 3d time. Results have showed that the students feel positive about working with online learning platforms, moreover every single time are becoming more engaged in the learning process, since they get acquainted navigation and operation of the program. As a result, the engagement of the students into online learning platforms depends not only on the quality or other features of online learning platforms, but also the ability of students to navigate within the program.*
Keywords: *engagement of students, general education schools, online learning platform.*

Introduction

In recent times, the issue of digitalizing education has gained prominence, especially in EU nations like Lithuania. The COVID-19 pandemic expedited this digital shift, integrating digital technologies into the teaching and learning processes. This incorporation of technology has proven essential for maintaining educational standards during a pandemic, necessitating schools and educators to ensure continuity in education delivery and adapt swiftly to new teaching methods (Cabero-Almenara, 2020; Rupšienė et al., 2021). This surge in educational digitalization has led to the rapid evolution of educational technologies such as computer-based learning environments, adaptive learning technologies, intelligent learning systems, and "smart classrooms." These technologies accumulate vast amounts of data about learners.

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Within scholarly discourse, the endeavor to utilize teaching and learning data to enhance educational practices is termed learning analytics (Long, Siemens, 2011; Romero, Ventura, 2013). Learning analytics serve various purposes in the classroom, including monitoring and analyzing student learning, predicting learning outcomes, planning to teach strategies, personalizing learning experiences, and providing assessment and feedback (Vourikari et al., 2016; Chatti, Dyckhoff, Schroeder, Thüs, 2012; Moissa, Gasparini, Kemczinski, 2015; Pineda, Cadavid, 2018). The potential benefits of learning analytics, such as personalized learning recommendations for students and teachers, are widely acknowledged and proven effective for tracking individual learning progress (Pineda, Cadavid, 2018).

The growing significance and advantages of online learning programs in education are evident from the increasing integration of data analysis technologies into digital tools and platforms. Both commercial tools like MS Teams, Google Classroom, iSpring Learning, and open-source platforms like Moodle, now incorporate data analytics technologies aimed at various educational sectors.

Online learning platforms offer educators insights necessary for enhancing classroom instruction, personalizing training, providing effective feedback, and ensuring educational quality by identifying at-risk student groups (Long, Siemens, 2011; Mangaroska et al., 2019; Ifenthaler et al., 2020; Kurvinen et al., 2020; Mangaroska, Giannakos, 2018). Moreover, successful utilization of learning analytics tools in schools' hinges on teachers' perception of their benefits and their adeptness in utilizing them (Mayer, 2019; Zhu, Urhahne, 2018).

The current study is oriented to monitoring children's progress with the platform, tracking interest and engagement. With main objectives: which devices were used by the pupils when working with the online learning platform; to determine the conditions in the school when working with the online learning platform; to determine how engagement with the online learning platforms has changed during the period.

Online learning platforms

Online learning platforms and their use in schools are becoming increasingly popular. Such platforms have several advantages for the teacher and the learning process: they allow for faster assessment of student performance (Laakso, 2010), faster feedback to students (Butz, Hua, & Maguire, 2006), personalisation of the learning process (Rodrigo, Baker, Agapito, Nabos, Repalam, Reyes, & San Pedro, 2012), and a host of other benefits (see e.g. Hamed, Abu-Naser, & Abualhin, 2018). Research also shows that students using digital learning platforms demonstrate significantly better learning outcomes, even after a short period of use (Christopoulos, Kajasilta, Salakoski & Laakso, 2020), and are more engaged in the learning process, leading to increased motivation and willingness to learn

(Kaila et.al, 2015), and positive perceptions of their satisfaction with the learning process (Youssef et al, 2015). Research also shows that teachers (Manny-Ikan et al, 2016) and children do not face significant challenges in the platform (Kaila et al., 2015). According to Kaila et al. (2015) in a short survey after the use of the ViLLE platform, the following was found: the students) did not encounter any technical problems when using the platform, they found it easy to use the platform, and 95 % of the students would rather take the exam with the platform than with a paper and pen. However, there is a lack of detailed research in the academic literature on students' access to platforms at school and at home, as well as on their abilities and satisfaction, especially in the context of the COVID-19 pandemic period.

In the light of the literature review, a questionnaire for students was developed. The questionnaire was developed taking into account Rekhawi's questionnaire for the development and testing of an intelligent tutoring system on the ability to use intelligent tutoring system platforms, as well as the questionnaire on the ability to use intelligent tutoring system platforms developed by the researchers Rodrigo et al. (2012) research on students' emotional states when using an intelligent tutoring system, as well as to Seleviciene's (2020) dissertation which uses an improved TAM model (Davis, 1989) to investigate 5 dimensions: awareness, ease of use, attitude towards usefulness, and intention to use, as well as to the research of Bernacki, Nokes-Malach Aleven (2012) on the motivation of learners to learn with intelligent learning platforms. The questionnaire also included questions about learners' ability and conditions to use the platforms at home and at school.

Methodology

The follow-up study was organized in schools that participated in the DIMA project for three months and tested different platforms with learning analytics and artificial intelligence components - LearnLab and Eduten Playground. The aim of the study was to monitor children's progress with the platform, tracking interest and engagement. One of the conditions is that the pupils complete the questionnaire as many times as possible during the whole period of working with the online learning platforms (at least once a week, but not less than 3 times) between 15 October and 30 November. The study involved a survey questionnaire with questions on socio-demographic characteristics of the participants, device availability when using the learning platforms, conditions, and evaluation of the platforms according to the time of use.

The data were collected through an electronic (Google forms) survey during the period 2020 October- December. The questionnaires were sent to students after each lesson with LearnLab or Eduten Playground. Before the survey was

organized, teachers received detailed instructions on how to conduct the survey. The survey took place between 15 October and 30 November.

Statistical data were processed in SPSS and graphs were created in Microsoft Excel.

The questionnaires were completed a total of 977 times. 404 pupils completed the questionnaire once, 281 pupils completed it 2 times, 252 pupils completed it 3 times and 40 pupils completed it 4 times. However, for the analysis only 3 times were taken. In total, 424 Eduten Playground licences and 550 Learnlab licences have been granted in the project. A large number of students have been granted access to both platforms.

Limitations of the study. Due to the high turnover of children (due to illness, isolation and other reasons), it was not possible to collect a consistent number of questionnaires in all three sessions during the school day. Also, as the questionnaire was only asked to be completed for the lesson in which the student was working with the software (e.g. if today a student worked with Eduten Playground in one lesson and Learnlab in another, he/she completed the questionnaire twice. If a student worked with the same online learning platforms in several lessons today (e.g. in Lithuanian and Chemistry with Learnlab), he/she only had to fill in the form once. Therefore, the number of responses is not even. And even 3 schools worked particularly hard with the above-mentioned online learning platforms, so it was possible to complete the questionnaires 4 times each.

Research results

In total, 977 questionnaires were completed from 11 schools. 404 pupils completed the questionnaire once, 281 pupils completed it twice, 252 pupils completed it 3 times and 40 pupils completed it 4 times. The participants were pupils in grades 1-8. In total, 542 questionnaires were completed for the Leanlab platform and 435 for Eduten Playground. The participants were pupils from 11 schools in Klaipėda, Neringa, Raseiniai, Šiauliai and Vilnius. In total, 397 pupils were surveyed. The participants were pupils in grades 1-8. The highest number of participants was in Year 6 - 28% and in Year 3 - 20%. The lowest participation rate was 5.29% for first graders. During the survey, students were asked to indicate which platform they worked with during the lesson. There was an uneven distribution of responses. In the first and second rounds, the highest number of completed questionnaires was on Learnlab, and in the third round on Eduten Playground.

The first time the students answered, they said they had worked with the software at school, in a computer class. In contrast, the third time around, there is a trend towards more students working in their classroom. This change was since during the school project, the schools purchased more devices to work with the platforms, which could be used already in their classrooms (see Figure Nr. 1)

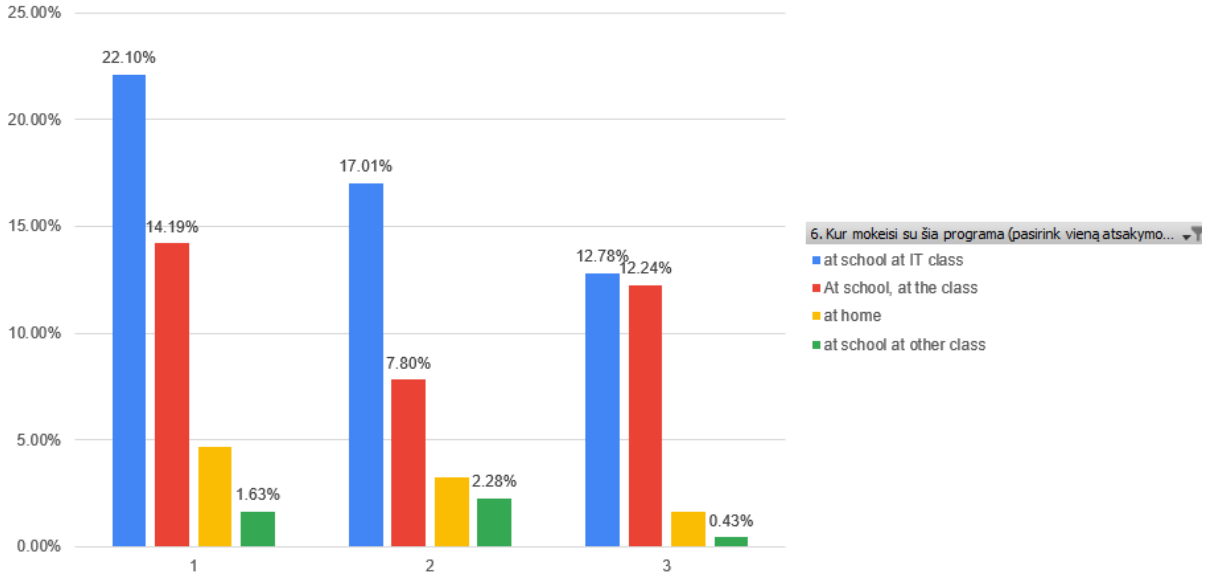

Figure1 ***Places where students used online learning platforms*** *(created by authors)*

When asked about the number of people, students indicated that 1 person was sitting at the device on the first and second time they worked with the online learning programs (on the first occasion: 83% working alone, 17% working with 2 people; on the second occasion: 79% working alone, 21% working with 2 people). However, for the third time, they worked on the online learning platform with a classmate or peer (63% indicated that they worked with a classmate/peer and 37% that they worked alone) (See Figure 2). This change could also be since more schools have purchased devices that could be used in the classroom, but which were used by two students. Among the responses, pupils had indicated that they worked in threes or in groups.

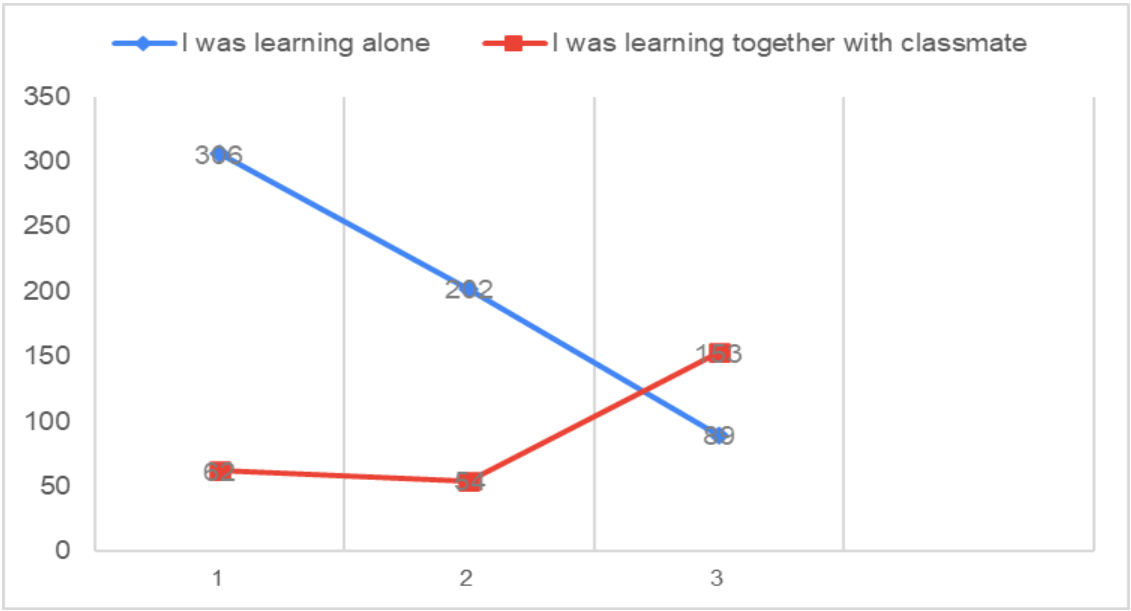

Figure 2 ***Learning conditions*** *(created by authors)*

The students were asked to answer questions related to distractions and engagement with the platform. For the question "I found it easy to connect to the computer/tablet during the lesson", the majority answered Definitely Yes, which increased with each answer (1 time - 75.7%; 2nd time -75.7%3rd time -77.0%) and Yes (1 time - 13.9%; 2nd time - 14.2%, 3rd time -14.2%). In response to the question "I found it easy to join the program", the overwhelming response was Definitely Yes, which increased with each answer (1 time - 75.7%; 2nd time - 74.0%, 3rd time - 80.2%) and Yes (1 time - 13.6%; 2nd time -16.7%, 3rd time - 15.1%) (See Table 1). These results show that each time the students find it easier to join the programme.

Moreover, students were asked to answer the question "In the lesson, I was clear about what to do when to do it, and what tasks to do in the online learning platform. Most of them indicated that it was really easy to use the online learning platform, but not for all logins. This was the case for Definitely Yes (1 time - 76%; 2nd time -82.9%, 3rd time -75.8%) and Yes (1 time - 16.35%; 2nd time - 12.8%, 3rd time -17.5%). It can be assumed that clarity is highly dependent on the topic of the lesson. Especially if the lesson involved trying out new features of the software.

Table 1 ***Students's opinion about working with the online learning platforms*** *(created by authors)*

	1st time		**2nd time**		**3rd time**	
	Definitely Yes	Yes	Definitely Yes	Yes	Definitely Yes	Yes
I found it easy to connect to the computer/ tablet during the lesson	75.7%	13.9%	75.7%	14.2%	77.0%	14.2%
I found it easy to join the program	75.7%	13.6%	74.0%	16.7%	80.2%	15.1%
It was really easy to use the online learning platform	76%	16.35%	82.9%	12.8%	75.8%	17.5%
It interesting to learn with the online learning platform	79.5%	15.6 %	75.8	16.7%	80.2%	13.1%)
I liked learning with the platform	80.2%	13.9%	76.5%	16.4%	82.9%	9.5%
I would like to continue working with the program	78.2%	16.3%	73%	16.7%	74.2%	15.9%

The students who took part in the survey also gave their views on how much fun they found learning with the online learning platform. The vast majority indicated that they found it interesting to learn with the online learning platform

Definitely Yes (1 time - 79.5%; 2nd time - 75.8%, 3rd time - 80.2%,) and Yes (1 time - 15.6 % 2nd time - 16.7%, 3rd time - 13.1%). Very similar answers were given to the question "I liked learning with the platform". The answers were Definitely Yes (1 time - 80.2%; 2nd time - 76.5%, 3rd time - 82.9%,) and "Yes" (1 time - 13.9%; 2nd time - 16.4%, 3rd time - 9.5%).

Once the platforms have been positively evaluated by the students, they would like to continue working with them. The first time around, the majority were particularly positive about the platform, while after the second time around the willingness to learn more with the platform decreased slightly. Definitely yes (78.2% on the first time; 73% on the second time; 74.2% on the third time) and yes (16.3% on the first time; 16.7% on the second time; 15.9% on the third time).

Moreover, students were asked how they feel about working with online learning platforms. They were selecting from several options after they experience with the platform and were allowed to pick several answers from the options. As we can see from the figure Nr. 3 every time, students were interested in learning in the platform and were engaged while working in it. Only 7 students mentioned that they felt insecure while they were working with the platform for the first time, while no one have mentioned the same during the 2nd and 3rd time. However, it is important to mention, that the number of students who mentioned that they were bored have increased from 5 students (1st time) to 17 (3rd time).

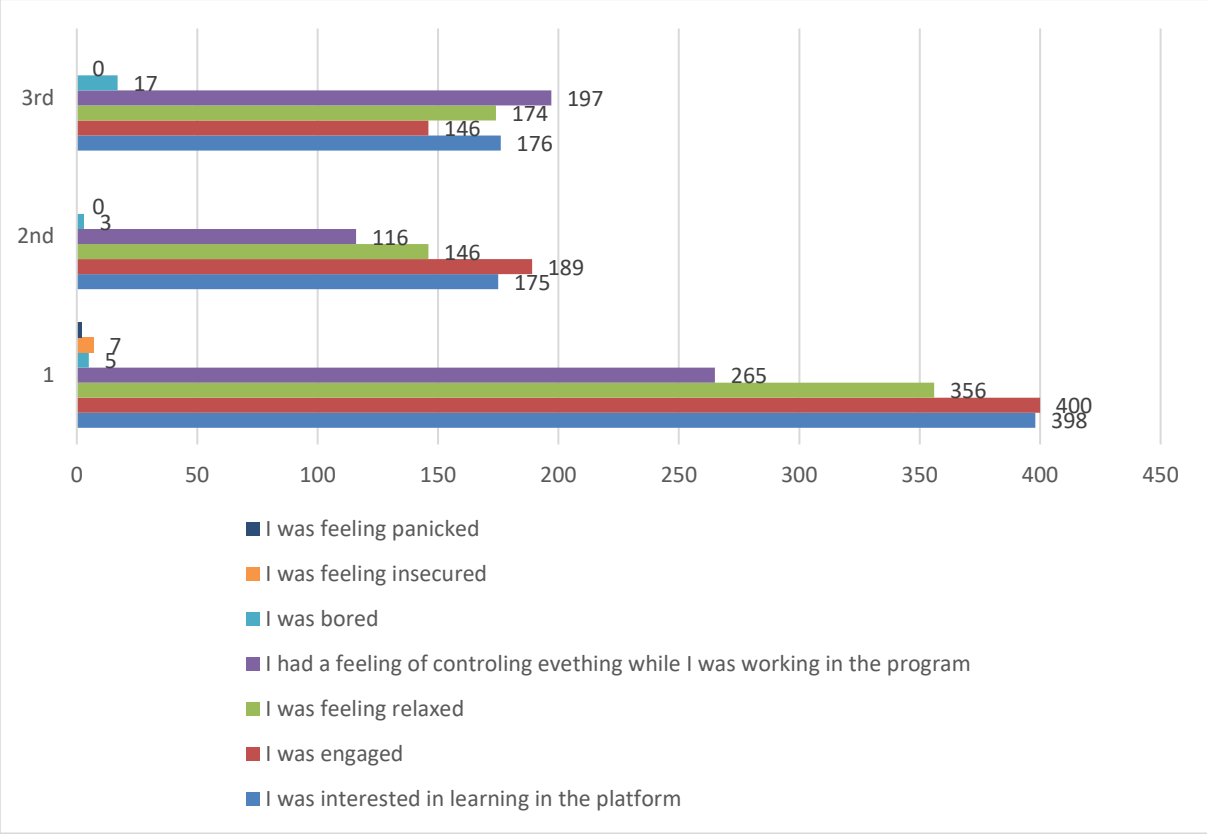

Figure 3 ***Engagement into learning with online learning platforms, number of times*** *(created by authors)*

Conclusions

The results of the survey showed that not all schools were able to collect the required number of responses. The responses showed that most of the students worked with the online learning platforms in schools using school computers or tablets. However, there are still cases where pupils have to use their personal devices or devices not directly dedicated to the platform: mobile phones.

Pupils usually have to go to the computer lab to work with the online learning platforms, but there is already some evidence of classroom use. This change is since during the school project, schools have purchased more devices to work with the platforms, which pupils could already use in their classrooms.

In general, the pupils are very positive about working with the platform and each time they work, it becomes easier to navigate (navigate within the platform) and to manage the platform, e.g. it is clear what to click on and where to tick when I wanted to select colours, pictures, tasks or answers, how to switch, save, etc.). Also, most of them had no difficulties with connecting to the device, which shows that the students know how to use the computer equipment. However, the issue of online connectivity and interference with the internet is still a concern. This aspect, although positive, was translated by fewer students.

In the lesson, the students felt anchored, they were clear about what they had to do and when they had to do it, what tasks they had to do in the software and what they had to learn in the lesson. And they find it interesting and enjoy working with the online learning platforms and that interest came with each one.

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