

THE IMPACT OF THE PANDEMIC ON EDUCATION: A PERSPECTIVE FROM UNIVERSAL DESIGN FOR LEARNING

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Abstract. The COVID-19 pandemic has led to changes in the field of education, prompting a rapid shift towards innovative teaching and learning methods. This article explores the impact of the pandemic on studies and underscores the need to embrace change and innovation in education. Although the principles of Universal Design for Learning (UDL) are not widely explored, this article highlights the lessons learned during the pandemic and encourages the adoption of UDL-inspired approaches. From remote learning experiences to issues of equality, personalization, lecturer development, assessment, adaptability, and hybrid models, this article underscores the need for educational institutions to harness the potential of these experiences for the benefit of future generations. It underscores the importance of incorporating flexibility, inclusivity, and adaptability into educational practices to better prepare for and navigate accessibility challenges. The article presents an analysis of statistical data from the MOODLE virtual learning environment of KTU and presents the importance of UDL in higher education.

Keywords: Universal Design of Learning, Distance learning, Hybrid learning, Higher education, VLE MOODLE.

INTRODUCTION

As COVID-19 infection began to spread and became a pandemic, the educational system faced the great challenge of changing practices that had been established for many years. Not only students had to adapt to the current situation, but also the entire higher education system: the quarantine forced universities to close their doors to students, and in just a few weeks, universities had to transfer their studies to the virtual space.

The pandemic forced the community, lecturers, and students of Kaunas University of Technology to adapt to the current situation, too. When analyzing the statistics of MOODLE, the virtual learning environment used at the university, a growth trend can be observed in all sections. The number of courses (e-modules) and the number of registered lecturers and students grew. The courses (e-modules) became full of life: the number of discussion forums and their announcements increased, the number of group messages increased significantly, and MOODLE tests and assignments were actively used and became perhaps the main form of assessment. Links to video conferencing systems and other external resources in courses have increased the use of the MOODLE resource URL.

When the learning process moved to the virtual space, a problem arose that needed to be solved urgently - checking the originality of written papers. The coincidence-checking systems installed and offered at the university have been actively used.

Lecturers were not prepared for distance learning; their understanding of online learning was sometimes limited to sending manuals, slides, sample assignments, and tasks to students by email and setting deadlines for assignments (Didenko et al., 2021). The new challenges encourage lecturers to improve their digital skills and their use of e-learning tools in studies so

far. They always need support and training. The Erasmus+ project Scaffolding Online University Learning (SOULSS) aims to contribute to the definition of a better strategy for scaffolding the activities of university lecturers and students, focusing on one of the most valuable pedagogical frameworks in the field: Universal Design for Learning.

1. STATISTICAL ANALYSIS OF KTU MOODLE

Although the virtual learning environment MOODLE has been used quite actively at the university for more than 10 years, the indicators of its use have increased since the beginning of the quarantine. The number of active courses in 2019 and 2020 in which students were enrolled is presented in the table below (*Table 1*). We see that active the number of e. modules increased by a third in 2020 (129%). It can be assumed that the lecturers, who previously did not use or inactively used their courses in the study process, started to do so.

TABLE 1. Active moodle modules (where students have been enrolled)

Year	Semester	Active e. modules
2019	Spring	1033
2020	Spring	1332

Comparing the spring semesters, we can see that the number of users registered with lecturer rights has increased (*Figure 1*). The data shows that the number of active e-modules increased by a third in 2020 (129%).

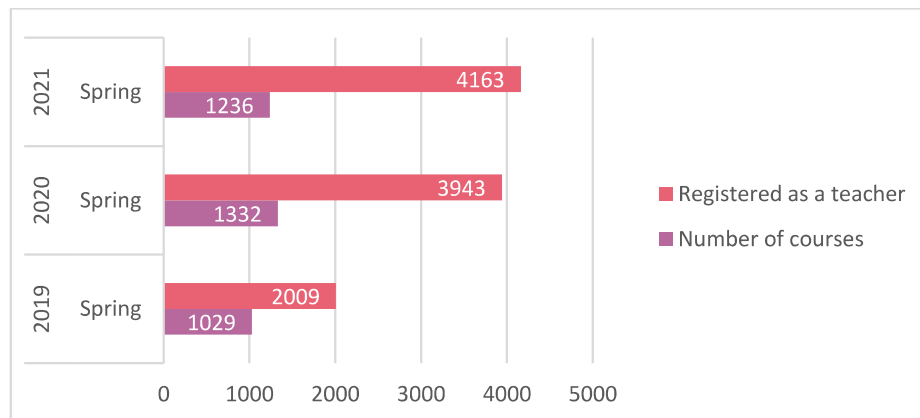


Figure 1. Dynamics of MOODLE courses and lecturers in spring semesters

A similar trend prevails when comparing the autumn semesters (*Figure 2*).

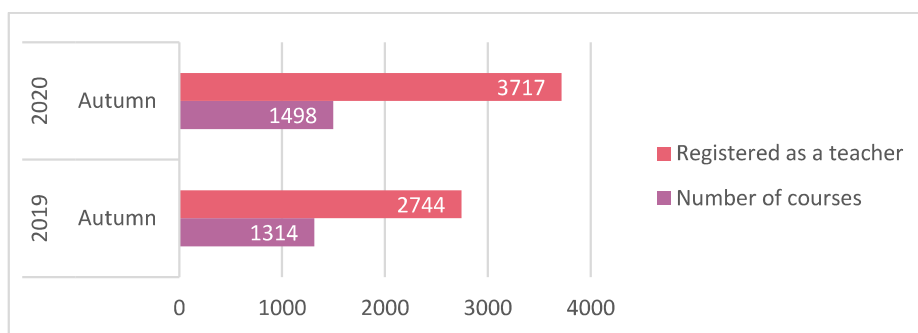


Figure 2. Dynamics of MOODLE courses and lecturers in autumn semesters

It can be assumed that lecturers who have not visited the MOODLE environment before and did not use it as a supplement to classroom work, registered and created courses based on the subjects taught.

Compared to the 2019 and 2020 spring semesters, the activity of using MOODLE activities is noticeable (Figure 3). The number of quizzes attempts and lecturers' announcements has doubled, and the number of quizzes and files submitted by students has almost doubled.

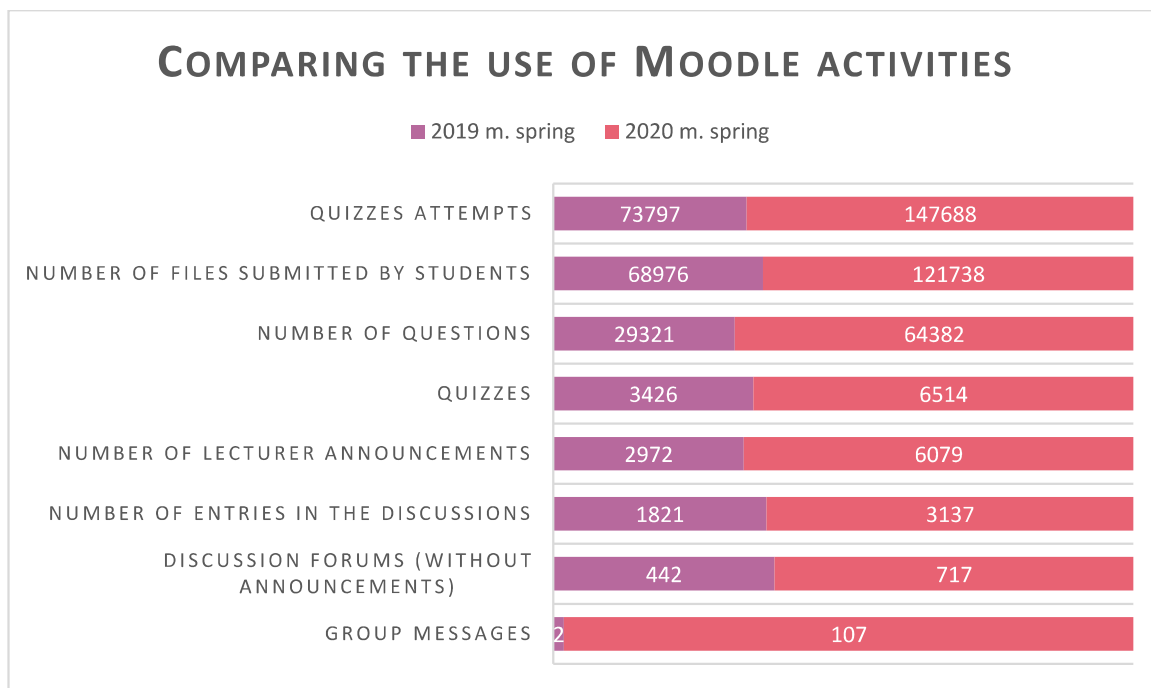


Figure 3. Growth dynamics of Moodle activities in spring semesters

The lecturers had to upload significantly more learning materials: slides, outlines, descriptions of assignments and laboratory works, and additional resources. The usability of MOODLE resources grew ~140 percent. compared to the 2019 and 2020 spring semesters: Files 134%, e. Book 118%, Folder 169%, Page 142%, URL 161%.

It can be assumed that most inactive courses have become active, various activities and assessments have been moved from classrooms to virtual learning environments, and courses have included more digital learning materials and resources.

The move of distance learning and academic activities to virtual space has increased the use of video conferencing systems. If before the pandemic, only a dozen modules used Adobe Connect and MS Teams systems, then from the spring of 2020 all modules used one of the video conference systems (in order of popularity): Zoom, MS Teams, BigBlueButton, Adobe Connect. The university purchased 500 Zoom licenses, and some lecturers shared licenses because they were in short supply. In 2020 autumn, more lecturers started broadcasting video lectures in the MS Teams environment and Moodle's integrated BigBlueButton system, which reduced the need for Zoom. Additionally, some of the studies have returned to auditoriums.

2. SIMILARITY CHECK

After the settlements moved from classrooms to virtual space, it became even more relevant to ensure academic honesty and reduce cases of fraud and plagiarism. Since 2018, a plagiarism check plugin for the Moodle environment has been installed in the Moodle environment of the University, which performs the similarity check through the eLABa electronic similarity check system ESAS. Almost three times more papers were submitted for similarity checks during the pandemic in the 2020 spring semester, compared to the same in the 2019 semester, and two times more papers in the 2020 fall semester compared to the 2019 fall semester (*Table 2*). The growing need for similarity checking led the University to purchase the similarity and grading system Turnitin, which has been successfully implemented since the 2021 spring semester.

TABLE 2. Similarity check (uploaded files)

The tool	2018 autumn	2019 spring	2019 autumn	2020 spring	2020 autumn	2021 spring
ESAS	2622	3436	7321	9882	14691	12607
Turnitin	x	x	x	x	x	8561

3. REVIEW OF LITERATURE SOURCES

3.1. Distinguishing emergency remote teaching (ERT) from online learning

Emergency remote teaching typically involves a rapid transition from traditional face-to-face instruction to an online format due to unforeseen circumstances such as natural disasters, public health emergencies, or other crises, however, “well-planned online learning experiences are meaningfully different from courses offered online in response to a crisis or disaster” (Hodges et al., 2020). In emergency remote teaching (ERT), the primary focus is often on maintaining continuity of instruction rather than comprehensive pedagogical redesign. As a result, teachers just adapt materials and activities for the online environment and this does not

always align with best practices for online learning, potentially resulting in reduced student engagement and learning outcomes.

Online learning is characterized by intentional design and pedagogical approaches, specifically for the digital environment. Online learning courses are carefully designed, including clear learning objectives, the creation of multimedia content, and the implementation of interactive learning activities. In addition, online courses are typically designed to promote active learning, collaborative problem-solving, and critical thinking skills using a variety of instructional strategies such as discussion forums, multimedia presentations, and interactive models or simulations. In general, the pedagogical approach to online learning prioritizes student-centered learning and flexibility to facilitate deep learning experiences regardless of physical location or time constraints. Although both ERT and online learning involve digital learning, their approaches to pedagogy, design, and technological support differ, emphasizing the importance of considering these factors in the educational process.

The rapid approach necessary for ERT may diminish the quality of the courses delivered. A full-course development project can take months when done properly. The need to "just get it online" is in direct contradiction to the time and effort normally dedicated to developing a quality course. Online courses created in this way should not be mistaken for long-term solutions but accepted as a temporary solution to an immediate problem. This is but one reason that universal design for learning (UDL) should be part of all discussions around teaching and learning. UDL principles focus on the design of learning environments that are flexible, inclusive, and student-centered to ensure that all students can access and learn from the course materials, activities, and assignments. (Hodges et al., 2020)

3.2. Universal Design of Learning - UDL

The UDL principles have been talked about for a long time, but the pandemic has forced us to reconsider the application of these principles more widely. Not only are technology devices necessary for success in the online environment, but the design of the online program, including the instructor, the curriculum, and student support services accompanied by a strong sense of community and connectedness within the program, are significant as well (Barr & Miller, 2013).

UDL is defined as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (North Carolina State University Center for Universal Design, 1997).

The principles of UDL play a very important role in adapting learning materials to accessibility in distance learning. Lecturers should be encouraged to use technology even more to reach students of different abilities and ensure that content is available in multiple formats, such as video, interactive material, and others.

To effectively implement UDL strategies, lecturers need professional development and training. We need to recognize the need for ongoing support to help lecturers adapt to the new teaching landscape. Traditional assessment methods were challenged during the pandemic. UDL encourages diverse assessment techniques that accommodate different learning styles and abilities. UDL is instrumental in designing flexible curricula that cater to both in-person and remote learners while ensuring an inclusive learning environment.

Overall, the findings suggest that UDL through the principle “Provide Multiple Means of Engagement” has value in its own right in recruiting and sustaining student interest and engagement through the establishment of connections between students and their learning materials, their instructors, and each other (Seymour, Mairead, 2023).

4. THE SOULSS PROJECT

The SOULSS project (Scaffolding Online University Learning: Support Systems) aims to provide needs-based training to tertiary-level lecturers to help them move forward from “emergency remote teaching” to the next stages on the road to the digital transformation of Higher Education Institutions. There are a range of innovative tools that lecturers can use to support the learning of students with different learning needs. To achieve this goal, the project’s main objective is to build tertiary-level lecturers’ capacity to “think like an expert instructional designer” and progress towards optimal online teaching and learning.

The project will provide, among others, a multiple-tool learning platform and a training course kit consisting of five mutually reinforcing units. The project is implemented by a consortium of seven partners from six countries. (SOULSS project website, 2023)

5. CONCLUSIONS

In conclusions, the analysis of MOODLE statistics at Kaunas University of Technology reveals a growth trend across various aspects of online education. The COVID-19 pandemic prompted an increase in the number of courses, registered lecturers, and enrolled students on the MOODLE platform. Additionally, the platform saw a surge in dynamic activities, such as discussion forums, announcements, group messages, and MOODLE tests and assignments. Furthermore, there was a substantial increase in the upload of learning materials and resources, indicating the integration of digital content into courses. The coincidence-checking systems installed at the university have been actively used.

The pandemic also accelerated the adoption of Universal Design for Learning (UDL) principles, emphasizing flexibility, inclusivity, and adaptability in education. Ensuring equitable access to education became a priority, leading to investments in technology and resources to accommodate students with special needs. UDL promoted personalized learning experiences and encouraged the exploration of adaptive learning technologies and diverse assessment methods. Professional development for teachers to effectively implement UDL strategies became essential.

However, as the transition to distance learning was rapid, many lecturers faced challenges in adequately preparing or adapting learning materials. The need for training and support for lecturers remains pressing and, in most cases, the courses remain emergency online learning with a lack of quality of online learning.

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