

# LESSONS LEARNED FROM PANDEMICS IN THE CONTEXT OF DIGITAL TRANSFORMATION OF EDUCATION

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## ABSTRACT

2020 brought the world huge challenges in almost every field when the new COVID-19 virus began to spread rapidly. Digitalization made it possible to use innovative solutions to ensure access to various services, to continue working, and to learn from a distance, but it made the situation different from the one we all were familiar with and raised questions on how to ensure qualitative education for all. The situation where the whole world had to move education to the digital environment at the same time posed many challenges for teachers, students, and parents. The aim of the present research was to find out how the COVID-19 crisis contributed to the digital transformation of education. Several complementary research methods were used to obtain results, one of which was used to analyze the functionality and degree of interactivity of learning platforms, providing an educational perspective to this research. The second method was focus group discussions with experts in technology-enhanced learning to gather ideas for overcoming the crisis and to outline future directions for the digital transformation of education in the context of remote learning. The third method was a survey of teachers who work with students of compulsory education. This material provides an overview of methods used by the WP6 working group "Education System Transformation: Consequences of the COVID-19 Crisis and Possible Solutions" (VPP-COVID-2020/1-0013), part of the National Research Program project.

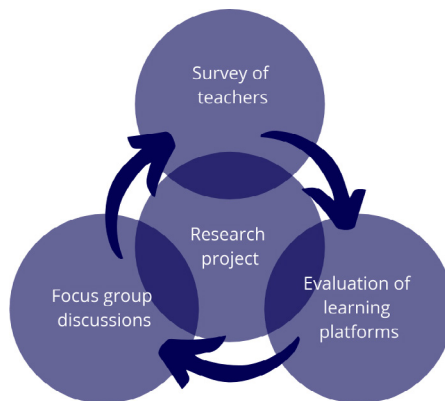
**Keywords:** *assessment of remote learning process, evaluation criteria, digital transformation, focus group discussions, learning platform, research methodology.*

## Introduction

The novelty of the research project was based on its orientation towards the creation of new knowledge, methodologies, guidelines, and recommendations for policy-makers in Latvia. The project is based on global research results as well as research done locally in Latvia related to transformative digital learning, changes in the field of education, and interaction between

young people and digital technologies, although there is no strong theoretical background on pedagogical approaches to remote learning (Alsaif & Masrai, 2019; Wardrip, 2020; Daniela, Rubene, & Rūdolfā, 2021; Daniela, Rūdolfā, & Rubene, 2021). For a comprehensive situation overview, the study used a mixed research design. Learning platforms used in Latvia were analyzed to understand what materials are available for remote learning. Three focus group discussions with experts in technology-enhanced learning were organized, and a survey related to the challenges of remote learning faced by teachers of compulsory education was also conducted. This paper provides insight into the methodology used in this research project and consists of three mutually connected research directions (see Fig. 1):

1. Evaluation of learning platforms
2. Focus group discussions with experts in technology-enhanced learning
3. Survey of teachers working with compulsory education level students

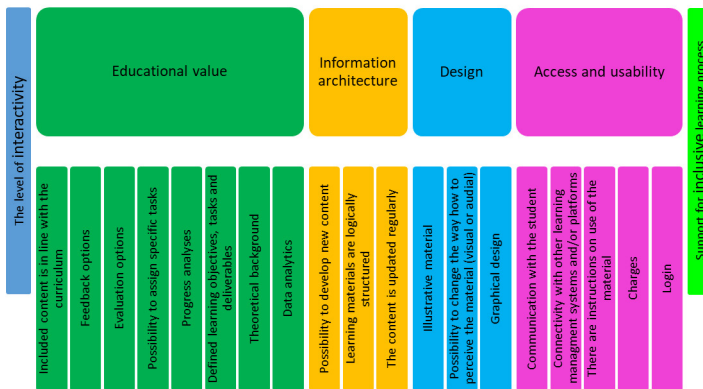


**Figure 1.** Research design

### **Evaluation of learning platforms**

Various digital solutions can be used to provide remote learning, which allows the organization of both synchronous and asynchronous learning processes (Statti, 2021) and allows learners to access knowledge without being in a specific place. Digital tools can be used to provide remote learning with an emphasis on increased knowledge, or on the way to access the knowledge, or on highlighting the acquisition of specific skills that can help to construct new knowledge. Digital solutions are also used to store a variety of learning materials and whose main function is to provide a place where these materials can be stored and from which they can be retrieved. There are solutions that have been designed to organize the learning process remotely and allow the provision of real-time communication (classroom,





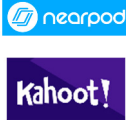
group, individual) that can be used to work with students synchronously. During our evaluation of the learning platforms, we aimed to evaluate the functionality of the existing digital learning platforms available in Latvia, performing this evaluation from an educational perspective, and to circulate our findings in the academic community and among the wider public to help scientists as well as policy-makers and government authorities to develop efficient communication plans and reach broader audiences. We also worked on the development of recommendations for the implementation of digital learning platforms in order to provide technology-enhanced learning at a general education level, based on the research done in the project evaluating their functionality. For the purposes of the study, an evaluation tool (rubric) has been developed that includes 6 sets of criteria (see Fig. 2) for a functional evaluation of existing digital learning platforms as well as recommendations for the implementation of these platforms in order to provide a technology-enhanced learning process. Two of these sets of criteria have no additional criteria, and these are *level of interactivity of the digital learning tool* and its *usability for inclusive education*. In turn, the other 4 sets of criteria, divided sequentially into 19 subcriteria, can be evaluated at 3 levels. In total, 7 learning platforms and 6 digital learning materials with interactive learning content that are used in Latvia have been evaluated.

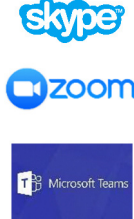



**Figure 2.** The evaluation structure (Daniela, Rūdolfā, Rubene, 2021)

As the research continued with practical work, and based on the results of this research, an expanded database was created to compile the teaching materials used in Latvia and the tools widely used in the world. All platforms, materials, and tools for the remote learning process were divided into seven categories (see Fig. 3 and Table 1), as each of them is designed and used in different ways and for different purposes.

Table 1. Categories of digital learning materials/tools

No.	Category	Definition	The image only as a visual aid
1	<b>Learning platform with interactive learning content included</b>	The learning platform is a digital, interactive online learning and methodological tool that incorporates <b>both</b> the content necessary for the implementation of the educational program and the theoretical materials necessary for its acquisition, training assignments and tests, while also <b>providing instant feedback</b> to the registered user.	
2	<b>Digital learning tool with interactive learning content included (with or without content creation capabilities)</b>	An interactive online learning tool, material or content that includes what is needed to implement the curriculum (exercises, schemes, worksheets, examples, etc.) and gives a limited degree of feedback.	
3	<b>Electronic learning resources (without interactivity)</b>	Electronic learning resources that include the content necessary for the implementation of the educational program. These resources do not provide user feedback and are based on passive information perception (PowerPoint presentation, PDF document, audio or video format, etc.).	
4	<b>Learning process management systems (with or without content creation capabilities)</b>	Learning process management systems provide the ability to manage and organize the learning process in a digital environment and provide the following options – creation of virtual classes or groups, exchange of documents, content posting and structuring, adding ratings or comments, setting deadlines for tasks, sending specific tasks to a class/group, chat functionality, progress analysis for classes or individuals.	
5	<b>Tool platform for curriculum development</b>	A tool for creating digital interactive learning content, such as online presentations, tests, interactive videos, games, polls, and various tasks with feedback and engaging degrees of interactivity.	

No.	Category	Definition	The image only as a visual aid
6	<b>Tool for communication and organization of remote learning</b>	A tool for distance communication between the teacher and students that provides the possibility of synchronous visual, audio, or textual communication in a real-time virtual learning process – video conferences, group work, individual video consultations, video recording, online conversations, chats, and screen sharing functionality.	
7	<b>Tool for storage and cooperation platform</b>	Widely available software used for learning educational content, collaboration, information acquisition and compilation, and the storage of materials for various practical tasks.	

The criteria (see Fig. 3) for the seven above-mentioned categories have been developed at three levels:

1. Filter criteria (the same for all categories).
2. User experience criteria (the same for all categories).
3. Custom criteria (different for each category).

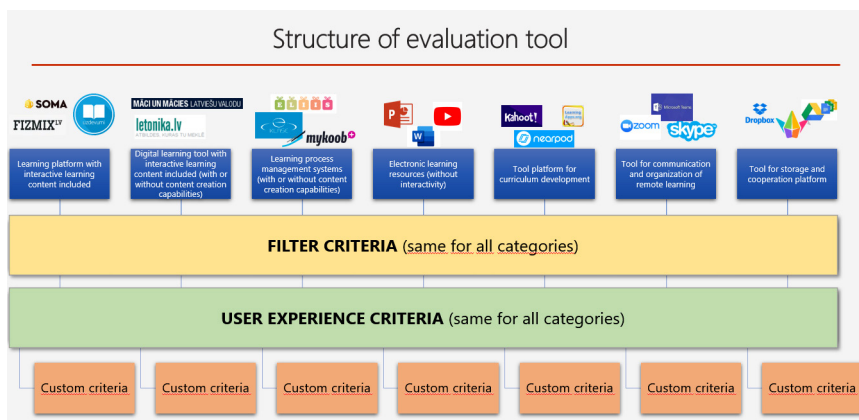


Figure 3. Structure of evaluation tool

At the end of the evaluation process, recommendations for the use of these platforms in the learning process have been provided to ensure remote learning in crisis conditions when learners cannot participate in face-to-face learning and instead learning platforms can be used to diversify the learning process, provide access to education, and facilitate self-directed learning for the post-crisis situation.

### **Focus group discussions with experts in technology-enhanced learning**

The Delphi method was chosen to gather the opinions of various experts in the field of technology-enhanced learning, to conceptualize the recommendations for policy-makers on the digital transformation of education, and to analyze the results and conclusions obtained in the research process. It is characterized as a method for structuring group communication processes, so it is effective in allowing a group of individuals to deal with complex problems. The Delphi method is often termed as the 'Delphi technique' because it provides a design for undertaking research that is underpinned by theoretical explanations. This makes it more than just a data collection mechanism (Cohen et al., 2007; Williamson, 2002). The Delphi method is often used as a method of systematic interactive prognosing which is based on expert opinion. Assessing the consequences of the COVID-19 crisis and conceptualizing guidelines for future education is a complex issue that requires the collaboration of experts from multiple fields to solve, so we considered the Delphi method to be appropriate for reaching this aim.

8–10 experts took part in each discussion. Among them were educators from preschool (2–3), school (2–3) and higher education (2–3), as well as school and high school management representatives of both state-funded and privately funded institutions and a representative of the business of education technology field. Focus group discussions were organized using the particular method mainly to reach a consensus on the possibilities and challenges of remote learning. Before the focus groups, participants were asked to answer a few questions about the topic to be discussed to allow them to focus their opinions and to start the discussion with summarized answers, and quotes from the answers were also included in discussion presentations. In the first step, participants were introduced to the results of the evaluation of learning platforms and the analysis of survey responses, and then a moderator organized discussions among them using both research results and survey analysis. All conversations were videotaped and transcribed for later analysis and the formation of the most important theses about each topic discussed. Discussions took place online and each discussion was 2 hours long, including presentations of research results and participant survey analyses. As a result of the focus group discussions, the

experts reached a consensus on proposals and recommendations for policy-makers on how to organize a remote learning process.

### **Survey of teachers working with compulsory education level students**

The survey was conducted from August 25 to September 15, 2020 online, and 559 respondents answered questions anonymously. The respondents were teachers of compulsory education from all regions of Latvia, and they were asked to answer questions that were divided into 5 groups:

- 1) profile questions
- 2) assessment of the frequency of use of digital tools and learning platforms
- 3) assessment of statements about remote learning
- 4) self-assessment of the existence and necessity of digital competencies
- 5) open-ended questions on recommendations at a governmental level, at the level of school management, and at the level of each class and teacher

The quantitative data obtained in the teachers' survey were coded and processed in the program SPSS 25.0. The following methods were used for data analysis:

- Frequency test to identify statistical data
- One-way ANOVA test to identify differences depending on the profile of the respondents

The open questions were analyzed using content analysis. Using Raosoft's calculation, the number of respondents exceeds the minimum recommended size. In turn, the Cronbach's alpha coefficient ( $\alpha = .955$ ) indicates good internal coherence of the questionnaire and stability of measurements over time.

## **Results**

Summarizing the results of the study, recommendations were prepared for the successful implementation of blended learning and remote learning after the end of the COVID-19 crisis:

1. It is important to distinguish between the crisis period, when it is not possible to organize face-to-face learning, and the post-crisis period, when it will be possible to choose which activities can be used in blended learning and distance learning, i. e. different technology-enhanced learning solutions can be used to promote learning.
2. Emphasizing that face-to-face learning will again be considered a basic form of compulsory education after the end of the COVID-19 crisis, it was added that blended and remote learning can complement face-to-face learning and can be used to a certain extent and in situations where it is an effective solution to strengthen self-directed learning skills.

3. In the blended learning process and remote learning, it is particularly important to communicate clear learning objectives, such as the development of digital competencies, the promotion of self-directed learning, taking responsibility for one's own work, etc.
4. The analysis of international research shows that the implementation of fully remote learning for students under 12 is not considered suitable outside the crisis context because social learning is especially important for students of this age due to the need for care, teacher mediation in the learning process, potential risks to their cognitive development, etc. However, the gradual implementation of blended learning to a certain extent for students under the age of 12 promotes the development of self-directed learning and the development of digital skills, as well as the personalization of the learning process.
5. Remote learning can raise some challenges like the decline of skills such as social skills, relationship building, verbal communication, acceptance of different opinions, recognition of false news, etc. A separate group of risks is related to the psychological challenges caused by social isolation and loneliness.
6. In the process of implementing blended learning, especially remote learning, specific attention should be paid to the prevention of early school leaving for students who are older than 12, which is mentioned in international studies as the most significant risk for this age group.
7. Where objectively necessary, the school and/or parents of students should be able to choose blended learning to meet the needs of a particular student or group of students (for example, long-term illness or absence due to the student's or his/her parents' professional activity, homeschooling).
8. The successful implementation of remote learning requires the reduction of regional disparities.
9. At present, researchers in the world have not yet reached evidence-based conclusions and a common view on the proportion of blended learning for students of different ages, so the necessity for future research into the implementation of blended learning for students of different ages is emerging.
10. Support measures and materials for teachers are needed as it is not possible to develop high-quality remote learning solutions and implement remote learning at the same time while maintaining the existing workload.



## Acknowledgement

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