Identification and prediction of the factors (big data solutions, sustainability) influencing digital learning platform development in a digital environment

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The problem

What are the factors that influence the development of digital learning platforms in a digital environment, with a focus on big data solutions and sustainability, and how can these factors be predicted to inform future platform development?

The research problem will address the key components of the research topic “Identify and predict the factors (big data solutions, sustainability) influencing digital learning platform development in a digital environment”, for example, the factors that influence digital learning platform development in a digital environment, specifically big data, and sustainability.

The problem also highlights the need to predict the factors to inform future platform development, based on what this research will contribute to the broader field of educational technology by providing insights that can be used to optimize platform design and development.

Literature Supporting the Current Research

According to Moldavan A.M. et al (2022) digital learning platforms can be used to develop digital skills and support five well-being dimensions. Researchers discovered a lack of interaction between the users of the platform - the teachers was one of the drawbacks of the technical side of the platform and concluded that enhancements to the design of the platform can give more freedom and improve the well-being of the platform's users - in this case teachers.

A digital twin is a relatively new concept that has been dominating the manufacturing field (Toivonen V., et al 2018) but in the context of e-learning digital twins can be used to create virtual replicas of educational environments, such as classrooms, laboratories, and equipment. According to Jones D., et al (2020), a digital twin can exist in a virtual environment and have a virtual entity instead of a physical entity.

Digital twins in e-learning can be used for remote learning. A digital twin of a classroom or a laboratory can be used to provide students with a virtual environment that mimics the real-world setting. Digital twins can also be used for monitoring and tracking purposes. For example, a digital twin of a student's performance can be created to monitor their progress, identify areas of weakness, and provide personalized feedback.

Jankovskis, D., Cirule, I., Carbone, A. (2024) have researched how Digital Twin technology can be related to E-learning systems and management and what are the main use cases for DT technology in E-learning and what could be the biggest challenges.

Inference of the Literature and Pointing Out the Research Gap

This proposed research aims to address the research gap by identifying and predicting the factors like big data and solutions and sustainability that can influence digital learning platform development in a digital environment.

A digital twin technology can be applied to monitor students' performance on a particular digital learning platform, identify their weaknesses and provide personalized feedback. For that, we need to interpret the Digital Twin as a different form of technology that we have called E-Twin. For that, we need to build an AI-Personalized platform, define performance indicators and utilize DT technology for enhanced user engagement.

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Research Novelty

Research novelty would be to identify and predict the factors that can influence the digital learning platform development and improve its usability. Furthermore, using the newest technology it would be possible to track students' activity and monitor their progress, that way providing continuous personalized feedback using an E-Twin.

Necessity and Importance of the Research

Due to the increased focus on mental health and wellness, there is a growing recognition of the importance of both in education, with many schools and universities implementing programs and resources to support the well-being of students (Moldavan et al., 2022).

The results of this research will provide valuable insights into the impact of digital learning platforms on student learning outcomes and inform the design and implementation of more effective platforms in the future.

Research Aim and Objectives

Aim: Identify and predict the factors (big data solutions, sustainability) influencing digital learning platform development in a digital environment

Objectives:

1. Identify the factors influencing online learning platform development in a digital environment
2. Predict the factors influencing online learning platform development in a digital environment
3. Measure the impact of the existing factors influencing online learning platform development in a digital environment
4. Predict the impact of existing and also non-existing (forthcoming) factors influencing digital learning platform development in a digital environment

Research Methodology

This research aims to use a mixed approach by using both quantitative and qualitative research methods. For quantitative research methods, surveys will be used and for qualitative research methods expert interviews, Qazi experiments, and comparative case studies will be used.

Surveys will be held with some well-known platform managers and people who are related to the sustainability content on these platforms.
Expert interviews are planned to be held with digital learning platform course content creators, and platform owners, as well as experts in the e-learning field.

Research also aims to case study an existing digital learning platform and analyze its user base behavior. Furthermore, using the Qazi experiment method research aims to experiment with a digital learning platform (either an existing or a new one) by proposing different types of technical and design solutions to the visitors and analyzing their behavior based on the changes in the digital learning platform.

The research will explore the opportunity to develop a predictive model based on the findings of the case study and Qazi experiment.

Work so far

Literature review, DT Technology importance in the research -

Jankovskis, D., Cirule, I., Carbone, A. (2024). Digital Twins and E-Learning: Navigating Challenges and Opportunities. In: Casalino, G., et al. Higher Education Learning Methodologies and Technologies Online. HELMeTO 2023. Communications in Computer and Information Science, vol 2076. Springer, Cham. https://doi.org/10.1007/978-3-031-67351-1_12

Work so far

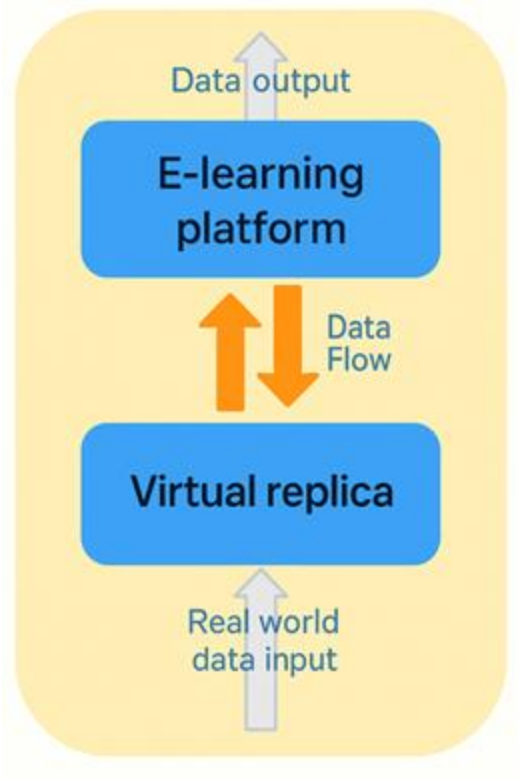

Fig. 1. E-learning platform layout concept. Data exchange between E-learning plat form and it's virtual replica, created by authors (2023).

Work so far

AI-Based Personalization in E-Learning: Defining Performance Indicators and Utilizing Digital Twin Technology for Enhanced User Engagement

Estonian Entrepreneurship University of Applied Sciences the 12th Annual Entrepreneurship and Innovation Conference „Smart Machines and Systems at the Service of Mankind“

Work so far

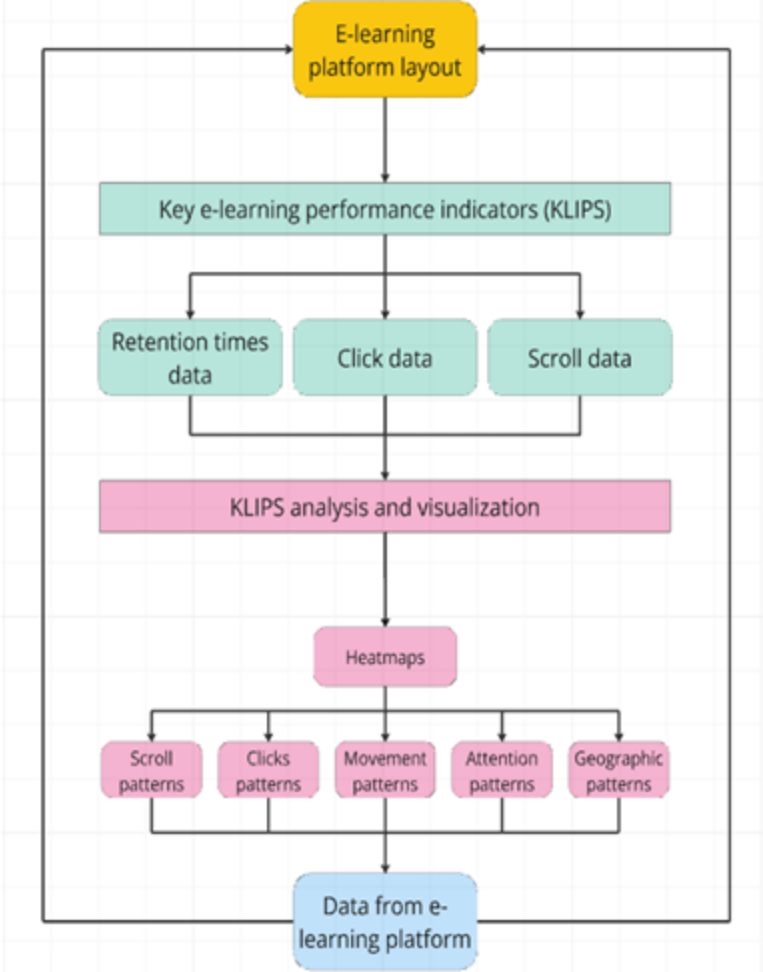

Fig.3. E-learning platform DT technology architecture

What’s next

1. Finish and publish article - AI-Based Personalization in E-Learning: Defining Performance Indicators and Utilizing Digital Twin Technology for Enhanced User Engagement
2. Survey well-known platform managers
3. Expert interviews with digital learning platform course content creators
4. Case study an existing digital learning platform and analyze its user base behavior
5. Qazi experiment with a digital learning platform (either an existing or a new one) by proposing different types of technical and design solutions to the visitors and analyzing their behavior based on the changes in the digital learning platform
6. Research article based on experimental findings

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Discussions & Conclusions so far

DT concept has the potential to transform e-learning by providing realistic and interactive learning experiences, personalized instruction, collaborative learning opportunities, and remote access to educational resources. While challenges related to virtual model development, integration, and infrastructure exist, addressing these challenges can pave the way for the widespread implementation of DT in e-learning. By harnessing the power of this technology, educators can create engaging and immersive learning environments that empower students and prepare them for the demands of the digital age (Jankovskis, D., Cirule, I., Carbone, A. 2024)

The application of DT technology, augmented by AI, demonstrates significant potential in optimizing e-learning platforms. It offers actionable insights for the strategic placement of critical information, content structuring, and identifying elements requiring redesign or further development. (Jankovskis, D., Cirule, I., 2024)

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Thank you for your attention!

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