# INTEGRATING LIVING LAB PRINCIPLES IN TEACHER TRAINING: THE CASE OF THE EDUTECH STEAM LAB AT KLAIPĖDA UNIVERSITY

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ABSTRACT
The EDUTECH STEAM lab, established at the Department of Pedagogy in the Faculty of Social Sciences and Humanities at Klaipėda University, serves as an integral component of teacher training by implementing the principles of a Living Lab, a user-centered, open innovation ecosystem that fosters collaboration between educators, researchers and technology developers. This study explores the best practice case of how the Living Lab model, as implemented in the EDUTECH STEAM lab at Klaipėda University, enhances pre-service and in-service teacher training, facilitating the co-creation, experimentation and validation of emerging educational technologies. In particular, the EDUTECH STEAM lab plays a crucial role in preparing teachers to integrate AI-driven learning analytics, adaptive assessment models, and interactive STEAM education into real-world classrooms. The article was conducted using a systematic approach to identify and analyse relevant scholarly works on teacher education, STEAM integration, digital pedagogy, and Living Lab methodologies. The findings indicate that embedding a Living Lab approach in teacher training enhances technological pedagogical content knowledge (TPACK), promotes formative assessment strategies, and supports personalised learning pathways for students.
KEY WORDS: *Living Lab, EDUTECH STEAM lab, teacher training, digital pedagogy, STEAM education*.

JEL CODES: I21, O33.
DOI: https://doi.org/10.15181/rfds.v46i2.2730

## Introduction

The rapid digital transformation in education necessitates new models of teacher training that integrate technology, pedagogy and interdisciplinary approaches. Responsibility for developing competent and committed teachers rests heavily on higher education institutions that provide teacher training and professional development. These institutions are actively seeking effective models to equip teachers with the skills and competencies required for modern educational environments. A growing body of research explores various models and frameworks for preparing and developing teachers, reflecting diverse approaches to meeting these needs. Traditional studies in this field focus on pedagogical approaches (Grossman, 2005) and methodologies (McPhee, 2002) in teacher education, while others highlight the effectiveness of different pathways in teacher training programmes (Darling-Hammond, 2009). Additional research examines sociological, ma-

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nagement and cultural aspects of teacher education, revealing the multifaceted nature of preparing educators. More recent studies emphasise the significance of collaborative, participatory approaches (Leu et al., 2024; Scott, Millar, McClean, 2024; Mikuska, Keczán, Katona, Szarka, 2024). These approaches recognise the value of social interaction in learning processes, such as learning in networks, teams and communities. Collaboration and participation are increasingly seen as a cornerstone for effective teacher education, leading to the development of innovative models that involve education researchers, teacher educators, aspiring student-teachers, practising teachers, and other relevant stakeholders (Cober et al., 2015). The aim of these collaborative models is to foster the creation of shared knowledge that drives innovation in both educational theory and practice. They highlight the importance of transdisciplinary, co-creative approaches that bridge the boundaries of science, policy and society (Tuhkala, 2021; Holflod, Nørgård, 2025). By integrating diverse perspectives and expertise, these models not only prepare teachers for the complexities of contemporary classrooms but also contribute to the broader transformation of educational systems. This shift underscores the need for education systems to adopt holistic strategies that encourage collaboration and participation as fundamental elements of teacher education.

The Living Lab model has emerged as a widely adopted collaborative-participatory approach to addressing complex challenges in education (Hagy et al., 2017; Rădulescu et al., 2022). These labs are flexible, adaptive frameworks that operate within real-world settings, emphasising practical application and iterative development (Hermans et al., 2013; Bhatta et al., 2023; Holflod, Nørgård, 2025). Designed to foster active collaboration, participation and co-creation, 'Living labs' bring together a diverse group of participants, including stakeholders from the public and private sectors, research institutions, educators, and civil society actors (Unger et al., 2022). In teacher training, Living labs offer aspiring educators the opportunity to directly address educational challenges by working collaboratively with experienced practitioners, researchers and policymakers (Nuci, Shatri, 2024). For instance, aspiring teachers might participate in projects that evaluate digital teaching tools, investigate inclusive pedagogical approaches, or develop curricula tailored to societal demands. This iterative, hands-on process not only helps teachers acquire essential skills and competencies, but also ensures that their training is grounded in practical, real-world experience aligned with current educational priorities. Living labs also promote the co-creation of knowledge, where educators and stakeholders collaborate to design and implement innovative solutions. By fostering such collaboration, they bridge the divide between theoretical knowledge and practical application. This equips teachers with the capacity to navigate and adapt to the complexities of contemporary educational environments. The Living Lab model emphasises a holistic, participatory approach to teacher education. It ensures that future educators are not only well-prepared professionals but also proactive innovators capable of driving meaningful change within their communities. This transformative framework highlights the power of collective action, interdisciplinary learning, and real-world engagement in shaping a responsive and dynamic education system.

In Lithuania, the strategic modernisation of education highlights the importance of developing digital competencies and fostering innovative pedagogical practices among teachers. The 'Lithuanian Education Development Strategy 2021–2030' underscores the need to enhance the quality of teacher training through interdisciplinary approaches, digital innovation, and evidence-based practices (Švietimo, mokslo ir sporto ministerija [ŠMSM], 2021). Similarly, the 'National Progress Plan 2021–2030' emphasises the role of educational institutions in preparing professionals capable of responding to rapidly evolving technological and societal demands (Vyriausybė, 2021). Initiatives such as EdTech Lietuva further advocate for the integration of educational technologies into classroom practice, and the establishment of collaborative networks between researchers, educators and technology developers to ensure effective digital transformation (ŠMSM, 2022). These national frameworks align with global trends that call for participatory, practice-oriented models of teacher education, such as the Living Lab approach. By embedding innovation within authentic educational contexts and involving multiple stakeholders, 'Living labs' respond directly to Lithuania's policy priorities of ensuring high-quality, future-ready education.

The EDUTECH STEAM lab at Klaipėda University addresses these challenges by implementing Living Lab principles: an open innovation ecosystem where users co-create, test and refine educational technologies

and teaching methodologies. Hence, this paper explores how the Living Lab model, embedded within the EDUTECH STEAM lab, enhances teacher training programmes, fosters innovative teaching methods and promotes evidence-based practices in digital learning. Despite the growing interest in collaborative, user-centered innovation models such as 'Living labs', there is limited empirical research on their systematic application in teacher education, particularly in the context of digital transformation. While existing studies highlight the theoretical potential of co-creative environments (Almirall, Wareham, 2011; Liedtke et al., 2012), few examine how these models function in real-world educational settings to develop teacher competencies and integrate digital tools. This study addresses this gap by exploring how the EDUTECH STEAM lab at Klaipėda University implements the Living Lab methodology to enhance teacher training.

The aim of this study is to explore how the Living Lab model, as implemented in the EDUTECH STEAM lab at Klaipėda University, enhances teacher training by fostering collaborative, participatory and interdisciplinary approaches to developing innovative teaching practices and integrating digital learning technologies.

Objectives of the study:

- To examine the theoretical foundations and practical applications of the Living Lab model in the context of teacher education.
- To analyse how collaborative, co-creative and interdisciplinary strategies within 'Living labs' contribute to the development of teacher competencies aligned with contemporary educational challenges.
- To investigate the role of the EDUTECH STEAM lab in facilitating the co-creation, testing and integration of AI-driven assessment tools and digital pedagogical innovations.

The structure of this paper is as follows: Section 1 reviews the theoretical foundations of the Living Lab model and its relevance to teacher education. Section 2 outlines the methodological approach of the study, including the data collection and analysis processes. Section 3 presents key findings from the implementation of Living Lab activities in the EDUTECH STEAM lab, focusing on teacher competence development, digital tool integration, and interdisciplinary collaboration. Section 4 discusses these findings in relation to existing research and policy frameworks. Section 5 concludes with implications for future practice, policy and research.

## 1. The Living Lab approach as a basis for the EDUTECH STEAM lab

The Living Lab approach is a widely recognised framework for user-centered innovation, facilitating collaboration between academia, industry and educational institutions. This model emphasises experimentation, iterative testing, and direct user engagement in real-world educational settings (Zdybel, Morilla, Fuentes, 2024; Durkaya, 2024). By integrating research, practice and technological innovation, 'Living labs' create dynamic environments where educational tools and methodologies can be co-developed, tested and refined in authentic learning contexts (Bertoncello, Moretto, Battistella, 2024; Koplin, Schleker, 2024; Nuci, Shatri, 2024).

At Klaipėda University, the EDUTECH STEAM lab, established in the Department of Pedagogy at the Faculty of Social Sciences and Humanities, embodies this approach by serving as an innovation hub for teacher education and pedagogical research. Rooted in the European Network of Living Labs (ENoLL) principles (https://enoll.org/), the laboratory is designed as a user-centered, open innovation ecosystem that bridges scientific research and practical implementation in education. Its vision is to empower teachers, researchers and industry partners in co-creating and implementing cutting-edge education technologies, analysing best practices, and promoting evidence-based innovations. By fostering a participatory approach, the EDUTECH STEAM lab ensures inclusive, adaptable and sustainable educational solutions that meet the evolving demands of modern learning environments.

1.1. Key principles of the Living Lab approach in the EDUTECH STEAM lab

The EDUTECH STEAM lab applies these principles to enhance teacher training:

- Co-creation: teachers, students and researchers participate actively in developing and refining educational technologies.
- User-centricity: educators are not passive adopters but active co-creators of pedagogical tools and methodologies.
- Iterative development: solutions undergo continuous testing and refinement based on real classroom feedback.
- Open innovation: the lab fosters collaborative partnerships with local, national and international education stakeholders.

The EDUTECH STEAM lab effectively applies the Living Lab approach by integrating co-creation, user-centricity, iterative development and open innovation into teacher education. By actively engaging teachers, students and researchers in the development and refinement of educational technologies, the lab ensures that innovations align with real-world pedagogical needs. The commitment to continuous testing and adaptation fosters a dynamic learning environment, while collaborative partnerships take place at local, national and international levels.

1.2. Vision and objectives of the EDUTECH STEAM lab

The laboratory's mission is to enhance teacher education and STEAM learning through a research-driven and technology-enhanced framework. Its key objectives include:

- Developing advanced teaching tools and methodologies for educators at all levels, from early childhood education to lifelong learning.
- Promoting transformative, technology-enhanced learning experiences that address both individual and societal needs.
- Strengthening the STEAM education ecosystem in the west Lithuanian region by fostering interdisciplinary collaboration.
- Providing a collaborative platform for educators, researchers and industry stakeholders to co-create and experiment with innovative educational solutions in real-world contexts.

This means that the EDUTECH STEAM lab advances teacher education by integrating research-driven and technology-enhanced approaches. Through innovative tool development, interdisciplinary collaboration and real-world experimentation, the lab fosters transformative learning experiences and strengthens the STEAM education ecosystem, ensuring a meaningful impact on both educators and society.

1.3. Research and practical applications

The EDUTECH STEAM lab actively engages in a wide range of research and practical activities aimed at improving teacher competencies and fostering innovative pedagogical practices:

- Conducting interdisciplinary studies on the integration of digital tools and their application across various educational levels;
- Developing innovative methodologies to enhance teacher competencies, particularly in digital pedagogy and STEAM education;
- Organising workshops, seminars and professional development programmes to familiarise educators with the latest teaching technologies and pedagogical strategies;
- Partnering with schools and educational institutions to implement and evaluate project-based learning, interactive digital platforms and sustainable teaching practices.

Therefore, the EDUTECH STEAM lab enhances teacher competencies by integrating digital tools, innovative methodologies and professional development programmes. Through interdisciplinary research, hands-on training and partnerships with educational institutions, the lab fosters modern pedagogical practices and support the effective implementation of technology in education.

Equipped with state-of-the-art educational technologies, the laboratory provides an interactive space for students, educators and researchers. This includes:

- A virtual lab environment for testing and refining digital tools;
- Facilities for collaborative research and practical experiments;
- Opportunities for teachers to engage in hands-on experiences with modern pedagogical methods, thereby enhancing their ability to adapt and innovate in their teaching practice.

Hence, the EDUTECH STEAM lab serves as an interactive hub for educators, students and researchers, providing cutting-edge tools, collaborative research opportunities, and hands-on experience that enhance teaching innovation and adaptability.

To sum up, The EDUTECH STEAM lab exemplifies a holistic approach to teachers' education, combining the principles of collaboration, innovation and real-world application. By actively engaging stakeholders from academia, industry and the public sector, the lab not only advances teacher competencies but also contributes to the broader goal of transforming education through co-creation and evidence-based practice. The Living Lab approach offers a powerful framework for modernising teacher education by fostering co-creation, experimentation and evidence-based decision-making. As demonstrated by the EDUTECH STEAM lab at Klaipėda University, integrating Living Lab principles into teacher training enhances educators' ability to engage with emerging technologies, apply innovative teaching methodologies, and continuously adapt to the changing educational landscape. By providing a research-driven, practice-oriented environment, the EDUTECH STEAM lab represents a scalable model for sustainable, technology-enhanced teacher education.

## 2. Methodology

This article is based on a descriptive and conceptual case analysis of the EDUTECH STEAM lab at Klaipėda University, applying the lens of the Living Lab methodology to examine how participatory innovation can enhance teacher training and digital pedagogy. Rather than reporting the results of a formal empirical study, this paper synthesises insights drawn from the lab's ongoing activities, internal project documentation, reflective practice, and experience-based analysis accumulated between 2022 and 2025. The methodology follows a practice-oriented, interpretive approach, commonly used in educational innovation research to document and analyse institutional models, implementation strategies, and context-specific pedagogical developments (Denzin, Lincoln, 2018). In doing so, the paper draws conceptually from design-based research (DBR) and Living Lab frameworks (McKenney, Reeves, 2012; Almirall, Wareham, 2011) to describe how iterative, co-creative and interdisciplinary processes are enacted in a real institutional setting.

### 2.1. Data sources and stakeholder roles

The description of the EDUTECH STEAM lab's model is informed by multiple sources:

- Internal documentation of lab activities (e.g. workshop agendas, training materials, implementation plans);
- Project reports and evaluations (e.g. DIMA_LT, ProMo_LT);
- Reflective notes and narratives from participating researchers and teacher trainers;
- Records of school-university collaboration and feedback from partner institutions.

Although no systematic empirical data collection was conducted, the roles of key stakeholder groups (researchers, in-service teachers, pre-service teachers, and EdTech developers) are described based on their

active participation in these documented activities. The roles of participants are outlined to illustrate the application of the Living Lab methodology in practice.

### 2.2. Limitations

Several limitations are acknowledged. First, the article does not present findings from formal empirical research such as interviews, surveys and experimental studies. As such, the analysis remains descriptive and interpretive. Second, the documented activities reflect the Lithuanian context, and while conceptually transferable, they may not be generalisable across systems. Third, the Living Lab approach itself presents constraints, including challenges in scaling the model, sustaining stakeholder engagement over time, and maintaining consistency in co-creation cycles across institutions.

### 2.3. Contribution to theory

Despite these limitations, this article makes a valuable theoretical and conceptual contribution to the field of educational innovation. By articulating how Living Lab principles are applied in the context of teacher training, the paper proposes a model for participatory, design-informed professional development. It contributes to the growing body of literature that views teacher education as an evolving, collaborative process embedded in real-world experimentation and interdisciplinary exchange (Cober et al., 2015; Holflod, Nørgård, 2025). The insights derived from the EDUTECH STEAM lab experience provide a foundation for future empirical studies and practical applications in similar educational contexts.

## 3. The Living Lab model in action

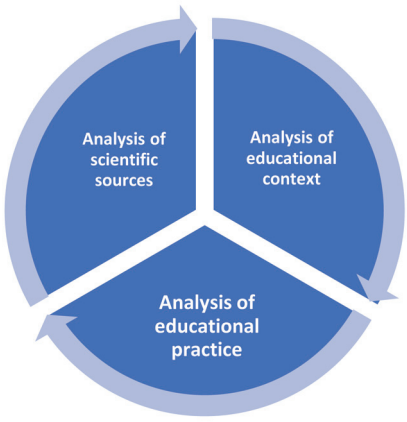
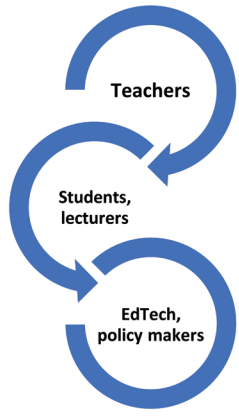
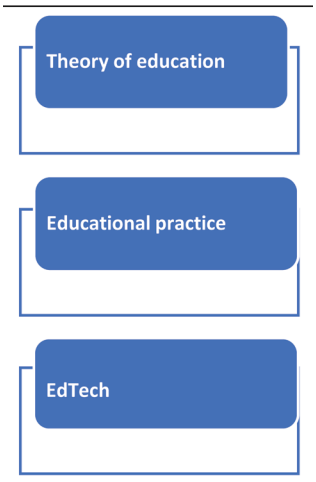
The EDUTECH STEAM lab operates through a structured, three-stage process that supports needs assessment, collaborative problem-solving, and iterative evaluation of educational tools and methodologies. This framework is designed to ensure a holistic, flexible approach to integrating technology and innovative teaching strategies in education. See Table 1.

*Table 1.* The Living Lab model in action

| Exploration | Experimentation | Evaluation |
|---|---|---|
| Identifying challenges and needs in teacher education | Co-developing and testing educational technologies in real classroom settings | Assessing the effectiveness of educational innovations through data-driven learning analytics |
| Analysing existing technological and pedagogical gaps | Implementing AI-driven formative assessment models and interactive digital tools | Iteratively refining tools and methodologies based on feedback and empirical evidence |
| Engaging stakeholders (teachers, researchers, industry partners) in co-defining objectives | Facilitating teacher-student collaboration in technology-enhanced learning environments | Scaling up successful implementations for broader educational impact |

Therefore, the EDUTECH STEAM lab's structured three-stage process, namely exploration, experimentation and evaluation, ensures a systematic and adaptable approach to integrating technology and innovative teaching strategies. By continuously identifying challenges, testing solutions in real classrooms, and refining methodologies through data-driven evaluation, the lab fosters effective, scalable and research-backed educational innovations. Table 2 summarises the main activities of the EDUTECH STEAM lab.

*Table 2.* Key activities of the EDUTECH STEAM lab

| Exploration | Experimentation | Evaluation |
|---|---|---|
|  |  |  |

By embedding the Living Lab methodology based on a collaborative participatory approach in teacher education, Klaipėda University exemplifies how collaborative innovation can transform pedagogical practices, prepare teachers for digital and societal challenges, and ultimately enhance educational outcomes in diverse learning environments (Fig. 1).

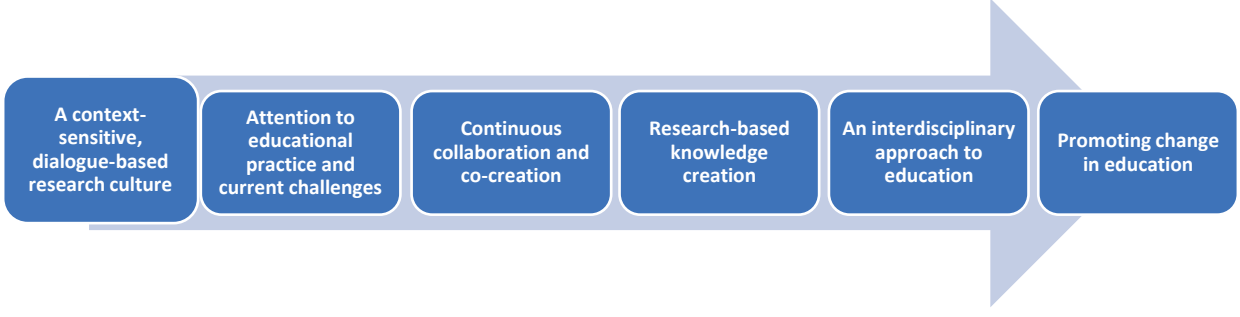



*Figure 1.* The Living Lab methodology based on a collaborative participatory approach

The EDUTECH STEAM lab at Klaipėda University actively engages in a diverse range of research-driven, pedagogically innovative, and technology-enhanced activities. These initiatives apply Living Lab methodologies to enhance teacher education, digital pedagogy and STEAM learning, while fostering collaboration between educators, researchers and technology developers. Below are some of the most impactful examples of the lab's activities: DIMA_LT Project: Artificial Intelligence and Learning Analytics for Personalized Education (https://di-ma.lt).

The objective of the project was to investigating the integration of artificial intelligence (AI) and learning analytics in primary and general education. The project employed an action research approach, incorporating iterative design cycles and active participation from teachers, students and EdTech developers; see Table 3.

*Table 3.* The implementation and outcomes of AI integration in primary and general education

| Implementation | Outcome |
|---|---|
| More than 40 teachers across 11 schools participated | Developed an interactive methodological tool for AI-assisted formative assessment |
| Classroom testing included AI-driven adaptive assessments and learning analytics tools | Created policy recommendations for AI integration in Lithuanian education |
| Teachers provided real-time feedback to improve the system | Demonstrated how data-driven insights improve student engagement and learning outcomes |

**ProMo_LT Project: Pedagogical Model for Project-Based Learning (PBL) via E-learning Platforms (promo-projektas.lt).** The objective of the project is developing a digital model for PBL in primary education to promote interactive, collaborative learning. The project used a design-based research (DBR) approach, engaging teachers, students, researchers, and EdTech developers in iterative co-creation; see Table 4.

*Table 4.* The implementation and outcomes of the Digital PBL project in primary education

| Implementation | Outcome |
|---|---|
| Stakeholders participated in workshops, focus groups and iterative testing | Developed a validated pedagogical model for integrating PBL into digital learning environments |
| Digital tools were piloted in real classrooms | Created educational resources and policy recommendations |
| | Provided insights into the role of AI in PBL evaluation |

**STEAM Junior Projects via eTwinning: Cross-Border Collaboration for Digital Education.** The objective of the project is engaging students and teachers in international, technology-enhanced STEAM projects through the eTwinning platform; see Table 5.

*Table 5.* The implementation and outcomes of international technology-enhanced STEAM projects via the eTwinning platform

| Implementation | Outcome |
|---|---|
| Teachers and students co-created game-based learning activities | Increased student engagement in complex STEAM concepts |
| Participants tested prototypes in real classrooms and provided feedback | Enhanced teacher competencies in digital pedagogy |
| Teachers implemented AI-based content generation tools | Strengthened cross-border collaboration in EdTech research |

To sum up, the EDUTECH STEAM lab exemplifies how Living Lab methodologies can drive pedagogical innovation by combining research, technology and real-world classroom application. Through its diverse research projects, interdisciplinary collaboration and AI-enhanced learning solutions, the lab actively contributes to the advancement of teacher education, digital pedagogy and STEAM learning. These initiatives not only equip educators with modern teaching tools, but also help shape evidence-based policies for digital education at national and international levels.

## Discussion

The Living Lab approach has gained prominence in recent years as an effective, user-driven methodology for fostering educational innovation. Rooted in principles of real-life experimentation, iterative development and interdisciplinary collaboration, Living Labs serve as open innovation ecosystems where diverse stakeholders co-create, test and refine solutions in authentic settings (Almirall, Wareham, 2011; Hagy et al., 2017). Despite the absence of a universally accepted definition, the core values of Living Labs consistently emphasise user involvement, contextual relevance and collaborative knowledge generation.

The current literature on teacher education increasingly emphasises the importance of innovation, interdisciplinary practices and real-life learning environments (Darling-Hammond, 2009; Scott et al., 2024). However, a clear gap remains in the operationalisation of these principles within structured innovation ecosystems like Living Labs. Most research focuses on general descriptions of Living Lab practices, or their application in sectors such as healthcare or urban development (Schuurman et al., 2016), with little attention paid to how such models support digital pedagogy and professional development in teacher education. This study contributes to the literature by presenting an in-depth case of the EDUTECH STEAM lab, which is a Living Lab that applies a structured, iterative approach to teacher training.

The EDUTECH STEAM lab at Klaipėda University exemplifies this approach by embedding educational research and innovation in real classroom contexts. Through the co-creation of digital tools and pedagogical strategies, the lab bridges the persistent gap between theoretical research and practical application, which is often defined as a key limitation of traditional teacher education models (Liedtke et al., 2012). Teachers, student-teachers, researchers and EdTech developers collaborate to design and test AI-driven formative assessment models, interactive STEAM methodologies and adaptable learning environments. This stakeholder-rich environment enhances both the relevance and the sustainability of innovations by ensuring that solutions are tailored to actual educational challenges (Nuci, Shatri, 2024; Unger et al., 2022).

One of the Living Lab model's defining strengths is its ability to improve the validity of educational research. By situating innovation in real-life learning environments, the model allows for iterative refinement based on user feedback, which increases both the usability and scalability of the tools developed (Brankaert, 2016). The EDUTECH STEAM lab adopts a cyclical development process, consisting of three studies, namely exploration, experimentation and evaluation, which aligns with established models of participatory research and design-based implementation (Bhatta et al., 2023; Cober et al., 2015). This iterative methodology not only strengthens the evidence base for digital education tools, but also supports teacher competency development by embedding innovation in daily teaching practice.

Furthermore, Living Labs play a crucial role in fostering multi-sectoral collaboration, which accelerates innovation and increases policy and market impact. As Schuurman et al. (2016) and Leminen et al. (2012) note, involving actors from public institutions, academia and industry helps align educational technologies with both pedagogical objectives and commercial viability. In the case of the EDUTECH STEAM lab, partnerships with policy bodies and private EdTech companies support the co-design of tools that are not only educationally sound but also scalable and aligned with broader system-level goals. This enhances the potential for policy uptake and systemic change in teacher education.

The participatory ethos of the Living Lab also ensures that innovations are grounded in authentic user needs. Teachers and students are not passive recipients of new tools, but active contributors to their design and evaluation. This model aligns with recent calls in the literature for more democratic and co-creative approaches to teacher education (Tuhkala, 2021; Holflod, Nørgård, 2025), where professional learning is deeply contextual, social and transformative.

## Conclusions

The EDUTECH STEAM lab at Klaipėda University exemplifies a dynamic and research-driven implementation of the Living Lab model within the context of teacher education. Through its commitment to interdisciplinary research, practical experimentation and collaborative co-creation, the lab has established itself as a leading example of how innovation ecosystems can support the digital transformation of education.

By embedding the principles of participatory innovation, the lab addresses both theoretical and practical challenges in teacher training. The EDUTECH STEAM lab's work in projects such as DIMA_LT and ProMo_LT demonstrates how AI and learning analytics can be effectively integrated into formative assessment and project-based learning. These initiatives not only yield tangible outcomes, such as validated pedagogical models, policy recommendations and adaptive learning tools, but also strengthen teacher competencies in digital pedagogy and evidence-based practice. Furthermore, through international collaboration, such as the eTwinning-based STEAM Junior projects, the lab fosters transnational learning, teacher upskilling, and the co-creation of digital learning resources that enhance engagement with complex STEAM topics. These examples highlight the lab's capacity to contribute to both national educational reforms and global EdTech advancements.

The Living Lab model, as applied in the EDUTECH STEAM lab, demonstrates a robust framework for educational innovation and teacher development. Its emphasis on iterative co-creation, interdisciplinary knowledge exchange and real-world application ensures that both technological tools and pedagogical models are fit for purpose, scalable and sustainable. This approach not only supports the professional growth of future educators, but also contributes to broader systemic transformation in digital education. Future research should focus on longitudinal analyses of teacher outcomes in Living Lab environments, and examine how such models can inform international practices and policy reforms in teacher training.

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# „GYVOSIOS LABORATORIJOS“ PRINCIPŲ INTEGRAVIMAS RENGIANT MOKYTOJUS: *EDUTECH STEAM* LABORATORIJOS ATVEJIS KLAIPĖDOS UNIVERSITETE

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Santrauka

Sparčiai tobulėjančios edukacinės technologijos neatsiejamos nuo inovatyvaus požiūrio į mokytojų rengimą, ypač kai siekiama į pedagoginę praktiką integruoti skaitmeninius įrankius ir STEAM metodikas. Atliepiant šiuos iššūkius, Klaipėdos universiteto Socialinių ir humanitarinių mokslų fakulteto Pedagogikos katedra įkūrė EDUTECH STEAM laboratoriją, kuri tapo neatsiejama mokytojų rengimo dalimi. Šioje laboratorijoje taikomi „gyvosios laboratorijos“ (angl. *Living lab*) principai. Tai yra atvira inovacijų ekosistema, kurioje vartotojai (mokytojai, tyrėjai, technologijų kūrėjai) kartu kuria, testuoja ir tobulina edukacines technologijas bei mokymo metodikas.

Šio straipsnio tikslas – pagrįsti, kaip į EDUTECH STEAM laboratoriją integruotas „Gyvosios laboratorijos“ modelis prisideda įgyvendinant mokytojų rengimo programas, skatina inovatyvių mokymo metodų diegimą ir remia įrodymais grįstą skaitmeninio ugdymo praktiką. Siekiant šio tikslo aptariama, kaip laboratorijos veiklose kuriami, testuojami ir diegiami dirbtiniu intelektu grįsti vertinimo modeliai, skaitmeninio mokymosi įrankiai bei bendradarbiavimu grindžiamos pedagoginės strategijos.

Tyrime taikyta sisteminė mokslinės literatūros analizė. Duomenys rinkti iš pagrindinių tarpdisciplininių akademinių duomenų bazių (*Google Scholar*, ERIC, *Scopus*, *Web of Science*, *ScienceDirect*). Daugiausia dėmesio skirta 2020–2025 m. atliktiems tyrimams, kuriuose praktiškai taikomi „Gyvosios laboratorijos“ principai. Analizuoti tiek recenzuoti straipsniai, tiek tarptautinių konferencijų (pvz., EDULEARN, ITHET, PaTHES) publikacijos. Gauti rezultatai tapo teoriniu EDUTECH STEAM laboratorijos atvejo analizės pagrindu.

EDUTECH STEAM laboratorijoje integruotas „Gyvosios laboratorijos“ modelis sudaro prielaidas šiuolaikiškai, į vartotoją orientuotai mokytojų rengimo praktikai. Taikant dalyvaujamuoju principu grįstą mokytojų, mokinių, tyrėjų ir švietimo technologijų kūrėjų bendradarbiavimą, sudaromos sąlygos kurti ir tobulinti dirbtiniu intelektu grįstas vertinimo priemones, STEAM metodikas bei skaitmeninės pedagogikos modelius realiomis mokymosi aplinkos sąlygomis. EDUTECH STEAM laboratorijoje taikomas ciklinis trijų etapų procesas – tyrinėjimas, eksperimentavimas ir vertinimas – užtikrina nuolatinį grįžtamąjį ryšį ir sprendimų praktinį aktualumą. Įtraukdama viešojo, privataus ir akademinio sektorių partnerius, EDUTECH STEAM laboratorija didina kuriamų inovacijų tvarumą bei sudaro prielaidas jas integruoti į švietimo politiką. Visa tai leidžia teigti, kad „Gyvosios laboratorijos“ modelis šioje aplinkoje ne tik skatina edukacinių technologijų diegimą, bet ir sudaro pamatus tvariai švietimo transformacijai, kuri grindžiama praktiniu technologijų pritaikymu.

Taigi EDUTECH STEAM laboratorijoje taikomas „Gyvosios laboratorijos“ modelis remia švietimo inovacijas visuose jų plėtros ciklo etapuose. Dėmesys bendrakūrai, tarpdisciplininiam bendradarbiavimui ir nuolatiniam tobulinimui sudaro sąlygas plačiai taikomai ir paveikiai skaitmeninio ugdymo transformacijai. Ateities tyrimai turėtų būti orientuoti į ilgalaikių poveikio tyrimų vykdymą ir strategijų paiešką, kaip išplėsti šio modelio taikymą tarptautiniame mokytojų rengimo bei švietimo politikos kūrimo kontekste.

RAKTINIAI ŽODŽIAI: *„Gyvoji laboratorija“, EDUTECH STEAM laboratorija, mokytojų rengimas, skaitmeninė pedagogika, STEAM ugdymas.*

JEL KLASIFIKACIJA: I21, O33

*Received: 2025-03-05*

*Revised: 2025-04-21*

*Accepted: 2025-05-20*