

Innovative Teaching Methods in Higher Education: The Case of University of Primorska

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The paper addresses the use of innovative teaching methods in higher education, specifically at the University of Primorska (UP). In the last decades, the use of digital technologies in teaching has undoubtedly changed both, teaching and learning process. However, not much research has focused on using innovative teaching methods in higher education settings, so the aims of the study were to (i) determine how frequently higher education professors use different teaching strategies and methods and tools, digital tools and generative AI tools, (ii) what kind of challenges they face in this context and (iii) which competences would they need to better implement innovative teaching methods into their teaching. Data was gathered with questionnaire which was administered in spring 2024. A total of 74 academic staff members of UP participated in the study. The results in general show that higher education professors frequently use as problem-based learning, team-based learning, and scenario-based learning, while gamification, design thinking, and cooperative learning are underutilized. They frequently use Google Drive and YouTube. The major barriers for using more innovative teaching strategies and methods are time constraints, limited access to resources and technology, and lack of pedagogical and digital skills, so they express the need for targeted training in digital tools, AI, and innovative teaching methods, as well as strategies for engaging students and managing large groups.

Keywords: higher education, innovative teaching methods, challenges, digital tools

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Introduction

Over the past two decades, Europe has focused on establishing a unified higher education area aimed at both the mutual recognition of qualifications and enhancing the quality and relevance of learning and teaching, exemplified by initiatives like the Bologna Process. However, despite efforts at both international and national levels, the shift from traditional teacher-centred

education to a more flexible, student-centred approach has been slower than anticipated by policymakers (Navickienė et al., 2017, p. 8).

One of the four main goals of the EU's Education and Training 2020 (ET2020) strategy is fostering creativity, innovation, and entrepreneurship in higher education. The European Education Area aims to develop specialised programmes in advanced digital skills, focusing on emerging technologies like artificial intelligence and high-performance computing. Key priorities include inclusion, innovation, connectivity, digital and environmental readiness, and global competitiveness OECD

Despite many advantages of using digital technologies in a student-centered approach, several challenges persist. These challenges include time constraints, limited accessibility to educational technology, and lack of knowledge and motivation among teachers and students (Bond et al., 2020; Panakaje et al., 2024). Research shows that innovative teaching methods supported by digital technologies can significantly enhance student engagement and in higher education (Durrani et al., 2023).

The integration of digital technology in higher education positively influences teacher learning, pedagogical strategies, teacher performance, and student engagement, with institutional support playing a crucial role in these outcomes (Panakaje et al., 2024). The educational technology use in higher education primarily fostered behavioral engagement, followed by affective and cognitive engagement (Bond et al., 2020). The implementation of gamification and flipped classroom approaches through digital applications like CrossQuestion has also proven effective in enhancing student learning (Durrani et al., 2023).

The shift towards a student-centered approach in European higher education, supported by the use of digital technologies, represents an important step towards improving the quality of higher education (Bond et al., 2020; Panakaje et al., 2024). Despite the challenges, investing in the professional development of academic staff and adapting educational systems to the digital age is crucial for the successful implementation of this approach.

Theoretical Framework

As noted, innovation is a cornerstone of the European Education Area's objectives. Broadly defined, innovation involves creating or improving products or processes that differ significantly from previous versions and are either made available to users or adopted in practice (OECD, 2018). In education, organisations such as schools, universities, and training centres contribute to product innovation by introducing new or enhanced syllabi,

textbooks, educational resources, pedagogies, or learning experiences, including e-learning and new qualifications (Vincent-Lancrin et al., 2019). They also engage in process innovation by transforming organisational practices, such as teacher collaboration, student grouping, and learning management. These transformations may involve partnerships, marketing strategies, communication methods, or other process changes, which can blur the distinction between products and processes in educational services (Vincent-Lancrin et al., 2019).

The Bologna Process, through its Rome Ministerial Communiqué (2020), has set a goal of adopting student-centred learning and teaching by 2030, thereby emphasising innovative teaching methods. However, innovation in teaching does not always equate to using the latest technologies. Instead, it involves the proactive application of novel strategies and methods tailored to classroom needs. Effective teaching relies on aligning methodologies with student needs and content relevance (Hashim et al., 2019). Innovation is understood as a process where new ideas are generated, applied, and refined to enhance outcomes. Zhang (2012) stressed the importance of reforming traditional models and building innovation-focused education systems. Ultimately, innovation may also involve adapting existing ideas to effectively meet the needs of a target audience (Hashim et al., 2019).

The Resolution on the National Higher Education Programme until 2030 emphasises that student-centred teaching is a key component in achieving the strategic objectives. It emphasizes aligning education with future professions through the integration of professional, research, and artistic work into teaching practices. Key priorities include ensuring student well-being, fostering learning and teaching motivation, and strengthening the competencies of higher education staff to support active learning and critical thinking. This approach aims to prepare students for emerging challenges while ensuring excellence in teaching and research (Resolucija o nacionalnem programu visokega šolstva do 2030 (ReNPVŠ30), 2022).

The UP actively promotes the use of modern communication tools also by updating its information infrastructure through different projects. However, technology alone is insufficient; it is essential to empower users with the skills and knowledge for responsible and competent use, focusing on student-centered teaching strategies, to fully realize its potential. Since 2010, the UP Faculty of Education has been delivering programme PAI for higher education teachers and staff, focusing on student-centered teaching strategies. As part of the 'Internationalization in Higher Education' project (2016/2017), a module on teaching methods for integrating national and foreign stu-

dents was introduced, recognized in the habilitation process. Additionally, Digital PAI program now provides training in digital competencies for the digital transition. From 2018 to 2020, the 'InoTez – Innovative Knowledge with Technology' project established technical and pedagogical support for digital technology in teaching, introducing the Open UP platform to foster student-centered learning. The 'INOVUP – Innovative Learning and Teaching in Higher Education' project (2018–2022) further improved teaching quality with flexible learning methods, pedagogical training, and open-access publications. Currently, the UP Faculty of Management (2021–2024) is enhancing blended learning through the project 'Improving the Quality of the Pedagogical Process by Incorporating Blended Learning into the Study Process', including the piloting of a hybrid course, 'Using Data for Proper Decision-Making', integrating smart boards, cameras, microphones, and video conferencing systems. These initiatives collectively strengthen the University of Primorska commitment to modern, student-centered, and technology-enhanced higher education.

According to Rutar (2022) innovative teaching refers to any original method or approach to teaching that is intentionally developed, organized, and implemented (by the teacher alone or in collaboration with colleagues) to enhance, improve, or transform the educational process. The goal is to ensure academic success and promote the psychological well-being of students.

In this context, the roles of the teacher include:

- Facilitating and enabling insight into the development and role of knowledge in society;
- Facilitating and enabling understanding of the content and structure of a discipline or field;
- Facilitating and enabling the development of knowledge important to individuals within a learning community;
- Assessing prior knowledge and connecting it with new knowledge while reflecting on new insights;
- Providing feedback to students to support effective self-regulation in their studies;
- Encouraging active learning by incorporating all communication skills.

The educational process is often organized in a way that promotes collaborative and cooperative learning between students and teachers (e.g., inquiry-based learning or research) and/or collaboration with the surrounding environment. This may involve applying knowledge and adapting the struc-

ture and content of the educational process based on interaction with the broader community.

University of Primorska (UP) has been a member of the alliance Transform for Europe since 2023 and has therefore committed to implement innovative teaching methods in teaching. There are different definitions of the methods, however, on the level of alliance, mutual definitions have been adapted. Teaching strategies are understood as a collection of different methods the teacher uses to teach the subject material, which may vary from lesson to lesson. Meanwhile, teaching methods are considered to be a selection of methods (e.g. Jigsaw) used by the teacher to teach the subject material (Nedzinskaitė-Mačiūnienė & Jurgilė, 2024).

Active Teaching Strategies and Innovative Teaching Methods

Active Teaching Strategies

Below we present the definitions of the teaching methods agreed within Transform for Europe Alliance.

Team-based learning is defined as a structured form of small-group learning that emphasises student preparation out of class and application of knowledge in class. Students are organised strategically into diverse teams of 5–7 students that work together throughout the class (Burgess et al., 2020).

Flipped classroom is an organisational instructional content approach, which balances didactic and active learning modalities. Students review information-rich materials (e.g., lectures, reading, etc.) in advance and use class time for active application of concepts and creative engagement with the subject matter (Awidi & Paynter, 2019).

Gamification and game-based learning is an approach where instructional materials are designed like games to make learning fun and engaging for students (Dicheva et al., 2015).

Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. It is most beneficial to tackle ill-defined or unknown problems and involves five phases: Empathise, Define, Ideate, Prototype and Test (Chon & Sim, 2019).

Problem-based learning is a student-centred approach in which students learn about a subject by working in groups to solve an open-ended problem. This problem is what drives the motivation and the learning (Schwartz et al., 2007).

Scenario-based learning is an immersive training environment where learners meet realistic work challenges and get realistic feedback as they

progress since everything that happens reflects the learner's choices (Seren Smith et al., 2018).

Cooperative learning involves students working together in small groups on a structured activity. The members of the groups learn to work as a team to accomplish a specific goal, to solve a problem, to complete a project, or to develop a product. Teachers hold students accountable individually but also assess group work. Students are responsible not only for learning the material but also for ensuring that the other members of the group also learn the material (Slavin, 1980).

Innovative Teaching Methods

Also, the definitions of innovative teaching methods are presented as agreed within Transform 4 Europe Alliance.

Brainstorming aims to develop creative solutions to problems. It enables the students for generating new, useful ideas and promoting creative thinking (Jarwan, 2005).

Case studies are usually defined as a teaching method which requires students to actively participate in real or hypothetical problem situations, reflecting the kinds of experiences naturally encountered in the discipline under study (Ertmer & Russell, 1995).

Concept maps are a verbal or graphic presentation designed to assist the learner in developing a clear and useful mental representation of whatever is being studied (Lefrancois, 1997).

Cooperative learning can be defined as a set of teaching and learning strategies promoting student collaboration in small groups (two to five students) in order to optimise their own and each other's learning (Johnson & Johnson, 1999).

Debate is defined as the process of considering multiple viewpoints and arriving at a judgement, and its application ranges from an individual using debate to make a decision in his or her own mind to an individual or group using debate to convince others to agree with them (Freeley & Steinberg, 2005).

Games-based learning can be defined as learning that is facilitated by the use of a game. This can be at any academic level from preschool through to lifelong learning, from simple memorization and recall to high level learning outcomes such as evaluation or creativity. The use of the game can be intrinsic or supplemental, played face-to-face with physical objects or online, with a computer. Where the difficulty arises is in the exact definition of the term 'game,' because there is not a single accepted classification and definitions

depend on the disciplinary background of those who create them (Whitton, 2012).

Group investigation is defined as a learning process involving four fundamental stages. This technique consists of the stages of determination of instructional goals, establishment of groups, implementation of the group investigation and evaluation of the group investigation. It is one of the techniques of the cooperative learning method (Baki, 2008).

Interactive lecturing implies active involvement and participation by the audience so that students are no longer passive in the learning process. Interactive lecturing also implies a different way of approaching the teacher's role (Snell, 2009).

I-Search is an approach to research that uses the power of student interests, builds a personal understanding of the research process, and encourages stronger student writing. The key element of this approach is that students select topics of personal interest. This model also stresses metacognitive thinking. Students are asked to keep a log of their action, thoughts, and feelings as they move through the process. In addition, students are asked to reflect on their previous research experiences to set the stage for an appreciation of the research process (Tallman & Joyce, 2006).

Jigsaw structure is meant to provide students with the chance to learn a material from their peers. A material is divided into sections and one section is for each student to take care of. The students who are responsible for the same section get together and form a new group of which the goal is for the students to master the section of the material and to enable them to teach the other members in their original learning group later (Aronson, 2006).

A learning contract is the final result of an ongoing process of negotiation between a teacher and a student with the purpose of developing a learning program that meets both the learning and the teaching agendas. Students negotiating their learning goals, the methods by which those goals will be met, the means by which the achievement of the goals can be assessed, and at what level (Brewer et al., 2007).

A learning diary is based on a written explication of one's own learning processes and outcomes. When this occurs over an extended period of time, it is called a 'learning diary'. Parameters, such as the extensiveness or the degree of structure of the protocol may considerably vary depending on the concrete instructional setting where the method is applied (Rambow & Nückles, 2002).

Peer learning is the acquisition of knowledge and skill through active helping and support among peers who are equals in standing or matched com-

panions. Peer learning occurs among peers from similar social groupings, who are not professional teachers, helping each other to learn and in doing so, learning themselves (Topping & Ehly, 1998).

Problem-based learning is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. In addition to course content, PBL can promote the development of critical thinking skills, problem-solving abilities, and communication skills. It can also provide opportunities for working in groups, finding and evaluating research materials, and life-long learning (Duch et al., 2001).

Project-based learning is a student-driven (student-centred) approach to learning in which students are required to take part in a real project by developing a question or inquiry and under the supervision of teachers in order to create a project to share with the select audience (Challenge 2000 Multimedia Project, 1999).

Roleplaying is a teaching technique based on the pedagogical psychodrama, which requires the participants' dedication and interest to complete every stage, but also, teacher supervision to avoid participants' extreme reactions that could emerge as a result of the group problem-solving (Rojas et al., 2017).

Simulation and modelling refer to the representation of a small part of a real complex system through a model for understanding and discussing the complex phenomena that are part of the system. In an educational context, its use may aim to motivate the student to test hypotheses about reality, to represent systems through schemas, or to develop mental models, among others. In this context, a modelling activity is based on the use of a model that represents a phenomenon or system more simply and where certain aspects have been suppressed in order to make it easier to understand (Repenning et al., 1998).

Storytelling is the use of stories or narratives as a communication tool to value, share, and capitalize on the knowledge of individuals. Stories provide a powerful metaphor, framework, and set of practical processes for resolving issues, educating ourselves, and pursuing our goals. Storytelling can be a powerful element of communication process, being equally as textbooks and essays (Ohler, 2013).

In summary, innovative teaching methods are not necessarily the latest approaches but rather those that remain untried in addressing specific challenges, such as improving student engagement. Incorporating innovative teaching and learning strategies into higher education is a key responsibility

of modern educators. Studies, including those by Freeman et al. (2014) and Deslauriers et al. (2019), highlight the potential of such methods to enhance the teaching process. Nonetheless, adopting innovative strategies can be difficult, as it may provoke student resistance, lead to setbacks, or fall short of intended goals. Despite these challenges, exploring new approaches can boost student engagement, motivation, and performance. Consequently, investing in the professional development of academic staff is essential. The European Commission's renewed EU agenda for higher education (2017) emphasizes that many higher education professors still require pedagogical training.

Aims of the Study

The aims of the present study were:

- a) To find out how frequently higher education professors use different teaching strategies and methods and tools, digital tools and generative AI tools and whether there are differences in the frequency according to academic position, scientific field, teaching experience and the average number of students in one semester through the last two academic years and
- b) To determine if and which are the concerns and obstacles, regarding using innovative different teaching strategies and methods and tools, digital tools and generative AI tools, perceived by higher education professors.
- c) To determine which competences would higher education professors need to better implement innovative teaching methods into their teaching

Methodology

Method

Based on the aims of the research it was decided to use the quantitative approach.

Sample

A total of 74 academic staff members of UP participated in the study.

As it can be observed from Table 1, the majority of respondents (32,4 %) are assistants/lecturers, followed by associated professors (31.1 %), senior lecturer/Assistant Professors (25,8%) and professors (10.8 %). Regarding the scientific field, the majority (32,2 %) of respondents come from Social Sciences,

Table 1 Characteristics of Respondents

Characteristics	f	f%	
Academic position	Assistant/lecturer	24	32,4
	Senior Lecturer/Assistant Professor	19	25,8
	Associated Professor	23	31,1
	Professor	8	10,8
Scientific field	Natural Sciences/life science (e.g. biology, chemistry, physics)	18	27,3
	Social Sciences (e.g. economics, psychology, sociology)	24	32,3
	Humanities (e.g. philosophy, cultures, languages)	8	12,2
	Formal sciences (e.g. mathematics, theoretical computer science)	9	13,6
	Technical sciences (e.g. engineering)	7	10,6
Teaching experience	Less than 10 years	28	37,8
	Between 11–20 years	28	37,8
	More than 21 years	18	24,3
Number (average) of students in one semester through the last two academic years	Less than 50	9	12,2
	Between 51–70	14	18,9
	Between 71–99	20	27,0
	More than 100	31	41,9
Dominated form of study	Blended	4	5,4
	Hybrid	4	5,4
	Face-to-face (on campus)	65	87,8

27,3 % from Natural Sciences, 13,6 % from Formal, 12,2 % humanities and 10,6 % from Technical Sciences. A total of 28 respondents (37,8 %) have less than 10 years of teaching experience, and the same share of respondents have between 11 and 20 years of teaching experience. 18 (24,3 %) of participants have more than 21 years of teaching experience. The vast majority of participants (41,9 %) usually teach more than 100 students per semester, followed by the ones who teach between 71–99 (27,0 %) and between 51–70 (18,9 %). Only 12,2 % respondents report that they teach less than 50 students per semester. The majority of respondents (87,8 %) mainly teach face-to-face, while only 5,4 % percent report that they mainly use hybrid or blended mode.

Procedure

Data was gathered with the questionnaire that was developed within the alliance Transform4Europe. The questionnaire consists of:

- a) a set of close-ended questions (academic position, scientific field, teaching experience, average number of students in in one semester through the last two academic years, dominated form of study),
- b) a set of four points scale of frequency (always, often, sometimes, never) on teaching strategies and methods, on digital technologies, generative AI tools.
- c) two open-ended questions on perceived concerns and obstacles to innovative teaching methods and on topics respondents would suggest to include in teacher training programmes

In this paper we only present the results of UP.

All UP academic staff was invited to complete the online questionnaire. The invitation with the link was first sent on 17 March 2024 and the reminder was sent on 4 April 2024.

Results

Active Teaching Strategies and Teaching Methods

According to Table 2 problem-based learning, team-based and scenario-based learning are the most widely used strategies among respondents, also design thinking is increasingly recognised and applied in the academic field. Chi-square test were carried out to test whether there are differences in the frequency of using active teaching strategies according to academic position, scientific field, teaching experience and the average number of students in one semester through the last two academic years. However, the results revealed no statistically significant differences.

As it can be observed from the table 3, respondents most often use discussion and teamwork. Discussions are always used by 45.9 % respondents and 35.1 % use them often. Debates are also often used: 20.3 % respondents use them always, and 37.8 % use them often. Teamwork is frequently used as well,

Table 2 The Application of Active Teaching Strategies

Active teaching strategy	Always		Often		Sometimes		Never	
	f	f%	f	f%	f	f%	f	f%
Team-based learning	8	10,8	26	35,1	31	41,9	9	12,2
Flipped classroom	3	4,1	9,0	12,2	42	56,8	20	27,0
Gamification and game-based learning	0	0,0	9,0	12,2	29	39,2	36	48,6
Design thinking	3	4,1	17	23,0	16	21,6	38	51,4
Problem-based learning	14	18,9	31	41,9	26	35,1	3	4,1
Scenario-based learning	3	4,1	23	31,1	24	32,4	24	32,4
Cooperative learning	3	4,1	12	16,2	27	36,5	32	43,2

Table 3 The Application of Teaching Methods

Teaching method	Always		Often		Sometimes		Never	
	f	f %	f	f %	f	f %	f	f %
Games	2	2,7	10	13,5	30	40,5	32	43,2
Study visits	0	0,0	14	18,9	33	44,9	27	36,5
Peer Learning	4	5,4	23	31,1	36	48,6	11	14,9
Simulation and modelling	3	4,1	23	31,1	29	39,2	3	4,1
Teamwork	12	16,2	36	48,6	23	31,1	19	25,7
Case study	6	8,1	31	41,9	29	39,2	8	10,8
Project	9	12,2	21	28,4	31	41,9	13	17,6
Role-playing	5	6,8	22	29,7	26	35,1	21	28,4
Brainstorming	12	16,2	22	29,7	31	41,9	9	12,2
Learning diaries	0	0,0	6	8,1	22	29,7	46	62,2
Experimentation	5	6,8	19	25,7	25	33,8	25	33,8
Discussions	34	45,9	26	35,1	12	16,2	2	2,7
Critical review method	3	4,1	15	20,3	42	56,8	14	18,9
Video review and discussion	3	4,1	15	20,3	42	56,8	14	18,9
Concept maps	3	4,1	6	8,1	25	33,8	40	54,1
Interactive strategies/lecture	6	8,1	19	25,7	25	33,8	24	32,4
Learning stations	4	5,4	7	9,5	25	33,8	38	51,4
Group investigations	5	6,8	19	25,7	30	40,5	20	27,0
Jigsaw	0	0,0	2	2,7	20	27,0	52	70,3
I-Search	1	1,4	3	4,1	25	33,8	45	60,8
Learning contracts	0	0,0	4	5,4	14	18,9	56	75,7
Peer-assisted learning	1	1,4	19	25,7	40	54,1	14	18,9
Learning centres	0	0,0	7	9,5	16	21,6	51	68,9
Storytelling	2	2,7	16	21,6	30	40,5	26	35,1

as 16.2 % of respondents use it always and 48.6 % use it often. They report to moderately use role-playing, case studies, and brainstorming show moderate adoption. The results show that 36.5 % use role-playing frequently (6.8 % always and 29.7 % often), case studies are used by the half of respondents and brainstorming is regularly used by nearly 46 % of respondents. Methods such as games, experimentation, and group investigation show the most different frequencies of use. Games are sometimes or never used by 83.7 % respondents, experimentation and group investigations are sometimes or never used by 67.5 % of respondents. However, some methods are really rarely used, these are: jigsaw, learning contracts, and I-Search are seldom used, possibly due to constraints in resources, time, or training. According to the results in Table 3, 62.2 % never use learning diaries, 70.3 % never use jigsaw, 75.7 % never use learning contracts, 60.8 % never use I-Search, and 68.9 % never use Learning Centres.

Chi-square test were carried out to test whether there are differences in the frequency of using active teaching strategies according to academic position, scientific field, teaching experience and the average number of students in one semester through the last two academic years. The results of chi-square tests only show statistically significant differences ($p = 0.028$) in frequency of using learning centres according to scientific field and in the frequency of using role-playing ($p = 0.002$) according to length of teaching experience and according to academic position ($p = 0.020$). Regarding the frequency of using learning centres, the analysis show they are most frequently used in natural and technical science. Related to role-playing, the results show that they are more often used by assistants and assistant professors compared to associate or full professors. Also, role play is most often used by professors with 10 or less years of work experience.

Digital Tools and AI Generated Tools

The EU Digital Education Action Plan (2021–2027) (European Commission, 2020) is a renewed European Union (EU) policy initiative that sets out a shared vision of high-quality, inclusive, and accessible digital education in Europe and aims to support the adaptation of Member States' education and training systems to the digital age. Following this Action Plan, we sought to collect data on digital learning technologies embedded in higher education teaching and learning.

The results in Table 4 show, that Google Drive and YouTube are the most frequently utilized tools across all categories. Interactive and gamified tools (e.g., Kahoot, Quizlet) have some engagement but could be better integrated to maximize educational benefits. Tools like Brainscape, Socrative, and Educaplay are underutilized, possibly due to lack of awareness, accessibility, or perceived usefulness.

Chi-square test were carried out to test whether there are differences in the frequency of using digital tools according to academic position, scientific field, teaching experience and the average number of students in one semester through the last two academic years. However, the results revealed no statistically significant differences.

As it can be observed from Table 5, ChatGPT is the most popular among AI tool in terms of adoption, with a sizable number of respondents using it at least 'sometimes' or more frequently. Mendeley shows relative utility among academic tools, likely due to its niche in citation management and research support. Visual AI tools like DALL-E 3 have some usage, but creative tools like Midjourney and music AI tools (Soundful, AIVA) are barely used. Adoption of

Table 4 The Application of Digital Tools

Digital tools	Always		Often		Sometimes		Never	
	f	f %	f	f %	f	f %	f	f %
Mentimeter	1	1,4	4	5,4	25	33,8	44	59,5
Socrative	0	0,0	0	0,0	3	4,1	71	59,9
Elever	0	0,0	0	0,0	5	6,8	69	93,2
Preguntados					1	1,4	73	86,6
Cerebriti					3	4,1	71	95,9
Kahoot	1	1,4	3	4,1	24	32,4	46	62,2
Brainscape					1	1,4	73	98,6
Educaplay					5	6,8	69	93,2
Quizlet			2	2,7	13	17,6	59	79,7
Google Drive	9	12,2	25	33,8	25	33,8	15	20,3
YouTube	9	12,2	26	35,1	26	35,1	13	17,6
Prezi	1	1,4	3	4,1	17	23,0	53	71,6

AI tools like Google Bard, SciSpace, and Otter.ai remains limited, possibly due to competition with similar tools or lack of awareness. Chi-square test were carried out to test whether there are differences in the frequency of application of AI tools according to academic position, scientific field, teaching experience and the average number of students in one semester through the last two academic years. However, the results revealed no statistically significant differences.

Perceived Concerns and Obstacles for Using Innovative Teaching Methods

Respondents were asked to list the obstacles to use innovative teaching methods in classrooms.

The main obstacle seems to be the time. It was listed 31 times. Respondents report that they have lack of time to learn about these methods and to use them in the classroom. The later mainly because to the pedagogical overload, to reduction of contact hours and because of big groups of students. Many (15) also point to the low accessibility to educational technology, poor classroom equipment and software available and lack of resources. Some respondents (12) also point out their lack of knowledge in the field and lack of motivation-on both sides-teachers and students. One of the obstacles on the list is also the lack of technical support and the belief that innovative methods are not applicable to each subject and that they are used just for fun, as they do not affect students' knowledge.

As one of the respondents summarised: 'One of the primary obstacles is resistance from faculty members or administrators who are accustomed to

Table 5 The Application of AI Tools

AI tools and resources	Always		Often		Sometimes		Never	
	f	f %	f	f %	f	f %	f	f %
ChatGPT	3	4,1	9	12,2	35	47,3	27	36,5
Bing AI			1	1,4	4	5,4	69	93,2
Google Bard					5	6,8	69	93,2
Copilot	1	1,4			5	6,8	68	91,9
DALL-E 3					9	12,2	65	87,8
Midjourney					1	1,4	73	98,6
ASReview Lab					1	1,4	73	98,6
ResearchRabbit					3	4,1	71	95,9
SciSpace			1	1,4	5	6,8	68	91,9
Invideo			1	1,4	3	4,1	70	94,6
AIVA					1	1,4	73	98,6
Soundful					1	1,4	73	98,6
Mendeley	1	1,4	5	6,8	15	20,3	53	71,6
Otter.ai	1	1,4	1	1,4	5	6,8	67	90,5

traditional teaching methods. Implementing innovative teaching methods often requires investment in training, technology, and infrastructure, which some institutions may struggle to allocate due to budget constraints. Faculty members may feel overwhelmed by their existing workload and find it challenging to invest time in learning and implementing new teaching methods effectively.

However, it also needs to be stressed, that 12 respondents clearly stated they see no obstacles for implementing innovative teaching methods.

Higher Education Professors Training Needs Regarding Better Implement Innovative Teaching Methods into their Teaching

A total of 36 respondents stated they need courses in which they would gain the knowledge of using digital skills and digital tools used for teaching, with 11 of them specifically pointing to the use of AI in teaching. They also expressed the need to learn about digital and cyber security teaching methods, innovative didactics, introducing games into course teaching, using digital content in teaching, using digital technologies to adjust curriculum and how to adopt innovative method to subjects they teach. Interestingly, teachers also suggested topic which are not directly connected to innovative teaching methods in sense of using digital tools, but are more generally related to pedagogy and didactics. These are: efficient student management, participatory teaching methods, methods that are appropriate to use to teach with new generations,

how to manage exams when someone has big numbers of students, how to engage students, general teaching strategies, effective learning.

They also stated they need more trainings on innovative methods and strategies to save time or how to stretch day from 24 to 28 hours. Some (7 participants) stated they do not need additional courses and some (6) do not really know what they need. One stated that he/she prefers traditional ex-cathedra approach. Two respondents also point out that would need technical support to learn innovative teaching methods.

Conclusion

The study highlights that active teaching strategies such as problem-based learning, team-based learning, and scenario-based learning are the most frequently adopted among UP academic staff, while methods like gamification, design thinking, and cooperative learning remain underutilized due to time constraints, lack of resources, or limited training.

Regarding teaching methods, it was determined that discussion and teamwork are the most frequently used methods. Respondents moderately use role-playing, case studies and brainstorming. On the other hand, jigsaw, learning contracts and I-Search and used very rarely.

Digital tools such as Google Drive and YouTube are frequently used, whereas gamified tools and AI applications like ChatGPT show moderate adoption, reflecting potential for further integration. Major barriers include time constraints, limited access to resources and technology, and lack of pedagogical and digital skills, alongside resistance to change and perceptions that innovative methods are not universally applicable as significant challenges. Respondents emphasized the need for targeted training in digital tools, AI, and innovative teaching methods, as well as strategies for engaging students and managing large groups. These findings underscore the importance of institutional support and professional development to enhance the effective use of innovative teaching methods in higher education.

Specifically, they point to the need for systematic organisation and delivery of trainings for higher education professor, focusing on specific teaching strategies and methods, as well as on general pedagogical knowledge. In order to overcome prejudices and reservations about the use of digital technology for learning and teaching, trainings should also provide informed experience of the use of different teaching strategies and methods and digital tools. The university also needs to ensure access to the necessary equipment, as well as to provide professors with the possibilities with additional training, especially in terms of time and decreasing teaching load.

Limitations

The ability to make broader conclusions from this study is restricted because the participants were exclusively drawn from a single university in Slovenia, which, like all universities, has its unique setting and socio-cultural context. As a result, the findings cannot be directly applied to higher education professors in other contexts. Additionally, the study's sample size is limited to 74 participants, indicating that future research could focus on including a larger sample.

References

- Aronson, E. (2006). *Jigsaw classroom*. <http://www.jigsaw.org>
- Awidi, T., & Paynter, M. (2019). The impact of a flipped classroom approach on student learning experience. *Computers and Education*, 128, 269–283.
- Baki, A. (2008). *Mathematics education from theory to practice*. Harf Educational.
- Bond, M., Bedenlier, S., Buntins, K., Kerres, M., & Zawacki-Richter, O. (2020). Facilitating student engagement in higher education through educational technology: A narrative systematic review in the field of education. *Contemporary Issues in Technology and Teacher Education*, 20(2), 315–368.
- Brewer, G., Williams, A., & Sher, W. (2007). Utilising learning contracts to stimulate student ownership of learning. *Proceedings of the 2007 AAEE Conference, Melbourne, Australia, December 9–13, 2007*. https://aaee.net.au/wp-content/uploads/2018/10/AAEE2007-Brewer_Williams_Sher-Learning_contracts_to_stimulate_student_learning_ownership.pdf
- Burgess, A., Van Diggele, C., Roberts, C., & Mellis, C. (2020). Team-based learning: Design, facilitation and participation. *BMC Medical Education*, 20(S2). <https://doi.org/10.1186/s12909-020-02287-y>
- Challenge 2000 Multimedia Project. (1999). *Why do project-based learning?* San Mateo County Office of Education.
- Chon, H., & Sim, J. (2019). From design thinking to design knowing: An educational perspective. *Art Design and Communication in Higher Education*, 18(2), 187–200.
- Deslauriers, L., McCarty, L. S., Miller, K., Callaghan, K., & Kestin, G. (2019). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences*, 116(39), 19251–19257.
- Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Educational Technology and Society*, 18(3), 75–88.
- Duch, B. J., Groh, S. E., & Allen, D. E. (Eds.). (2001). *The power of problem-based learning*. Stylus.

- Durrani, U., Al Naymat, G., Ayoubi, R., Kamal, M. M., & Hussain, H. (2023). Gamified flipped classroom versus traditional classroom learning: Which approach is more efficient in business education? *International Journal of Management Education*, 20(1), 100595.
- Ertmer, P. A., & Russell, J. D. (1995). Using case studies to enhance instructional design. *Educational Technology*, 35(4), 23–31.
- European Commission. (2017). *Communication on a renewed EU agenda for higher education*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52017DC024>
- European Commission. (2020). *Digital education action plan 2021–2027: Resetting education and training for the digital age*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0624>
- European Higher Education Area. (2020). *Rome Ministerial Communiqué*. http://www.ehea.info/Upload/Rome_Ministerial_Communique.pdf
- Freeley, A., & Steinberg, D. (2005). In-class debates: Fertile ground for active learning and the cultivation of critical thinking and oral communication skills. *International Journal of Teaching and Learning in Higher Education*, 19(2), 183–190.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410–8415.
- Hashim, H., Saharani, M., Zulkifli, N., Mokhtar, M., & Yunus, M. (2019). Conception of innovative teaching methodologies among lecturers at selected polytechnics in Malaysia. *Creative Education*, 10(5), 874–881.
- Jarwan, F. (2005). *Teaching thinking: Definition and applications*. Dar Al-fkir.
- Johnson, D. W., & Johnson, R. T. (1999). Making cooperative learning work. *Theory Into Practice*, 38(2), 67–73.
- Lefrancois, G. R. (1997). *Psychology for teaching* (9th ed.). Wadsworth.
- Navickienė, V., Salienė, V., Urnėžienė, E., Valantinaitė, I., & Leonavičienė, V. (2017). Substantiation of need for educational competences of higher education lecturers: Document analysis. *Pedagogika*, 126(2), 5–17.
- Nedzinskaitė-Mačiūnienė, R., & Jurgilė, V. (2024). *Inventory of innovative teaching methods*. Transform4Europe.
- OECD. (2018). *Oslo Manual 2018: Guidelines for collecting, reporting and using data on innovation* (4th ed.).
- Ohler, J. B. (2013). *Digital storytelling in the classroom: New media pathways to literacy, learning, and creativity*. Corwin.
- Panakaje, N., Rahiman, H. U., Parvin, S. M. R., Pa, S., Madhura, K., Yatheend, & Irfana, S. (2024). Revolutionizing pedagogy: Navigating the integration

- of technology in higher education for teacher learning and performance enhancement. *Cogent Education*, 11(1), 2308430.
- Rambow, R., & Nückles, M. (2002). Der Einsatz des Lerntagebuchs in der Hochschullehre. *Das Hochschulwesen*, 50, 113–120.
- Repenning, A., Ioannidou, A., & Ambach, J. (1998). Learn to communicate and communicate to learn. *Journal of Interactive Media*. <https://jime.open.ac.uk/articles/10.5334/1998-7>
- Resolucija o nacionalnem programu visokega šolstva do 2030 (ReNPVŠ30). (2022). *Uradni list Republike Slovenije*, (49). <https://www.uradni-list.si/1/objava.jsp?sop=2022-01-0984>
- Rojas, M. A., Villafuerte, J., & Soto, S. (2017, 16–18 August). *Collaborative work and technological means for improving learners' English language writing production* [Conference presentation]. International Teacher Education Conference (ITEC), Cambridge, Massachusetts, United States.
- Rutar, S. (2022). Povezanost inovativnega poučevanja z vlogami visokošolskega učitelja v na študenta osredinjenem študijskem procesu. In Mezgec, M., Andrejašič, A., & Rutar, A. (Eds.), *Inovativne prakse v visokošolski didaktiki* (pp. 97–102). University of Primorska Press.
- Schwartz, P., Meninnin, S., & Webb, G. (2007). *Problem-based learning*. Routledge.
- Seren Smith, M., Warnes, S., & Vanhoestenbergh, A. (2018). Scenario-based learning. In J. P. Davies & N. Pachler (Eds.), *Teaching and learning in higher education: Perspectives from UCL* (pp. 144–156). UCL Institute of Education.
- Slavin, R. E. (1980). Cooperative learning. *Review of Educational Research*, 50(2), 315–342.
- Snell, L. (2009). Interactive lecturing: Strategies for increasing participation in large group presentations. *Medical Teacher*, 21(1), 37–42.
- Tallman, J., & Joyce, M. (2006). *Making the writing and research connection with the I-Search process*. Schuman.
- Topping, K., & Ehly, S. (1998). *Peer-assisted learning*. Erlbaum.
- Vincent-Lancrin, S., Urgel, J., Kar, S., & Jacotin, G. (2019, 5 March). *Measuring innovation in education 2019: What has changed in the classroom?* OECD.
- Whitton, N. (2012). Games-based learning. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (pp. 1337–1340). Springer.
- Zhang, S. G. (2012). Higher education research and practice of college students' innovative exploration. *Hudson Normal University (Humanities and Social Sciences)*, 1, 168–170.

Inovativne metode poučevanja v visokem šolstvu: primer Univerze na Primorskem

Prispevek obravnava uporabo inovativnih učnih metod v visokem šolstvu, s posebnim poudarkom na Univerzi na Primorskem (UP). V zadnjih desetletjih je uporaba digitalnih tehnologij pri poučevanju nedvomno spremenila tako učni kot učiteljski proces. Kljub temu raziskave le redko obravnavajo uporabo inovativnih učnih metod v visokošolskem okolju. Cilji raziskave so bili (i) ugotoviti, kako pogosto visokošolski učitelji in sodelavci uporabljajo različne učne strategije, metode, orodja, digitalna orodja in generativna orodja umetne inteligence, (ii) s kakšnimi izzivi se soočajo pri tem ter (iii) katere kompetence bi potrebovali za uspešnejše uvajanje inovativnih učnih metod v svoje poučevanje. Podatki so bili zbrani s pomočjo vprašalnika, na katerega se je odgovarjalo spomladi 2024. V raziskavi je sodelovalo skupno 74 visokošolskih učiteljev in sodelavcev UP. Rezultati kažejo, da visokošolski učitelji in sodelavci pogosto uporabljajo metode, kot so problemsko učenje, učenje na podlagi timskega dela in učenje na podlagi scenarijev, medtem ko so igrifikacija (angl. *gamification*), dizajnersko razmišljanje (angl. *design thinking*) in sodelovalno učenje premalo izkoriščeni pristopi. Med orodji se najpogosteje uporabljata Google Drive in YouTube. Glavne ovire za širšo uporabo inovativnih učnih strategij in metod so časovne omejitve, omejen dostop do virov in tehnologije ter pomanjkanje pedagoških in digitalnih spretnosti. Udeleženci izražajo potrebo po ciljno usmerjenih usposabljanjih za uporabo digitalnih orodij, umetne inteligence in inovativnih učnih metod ter strategij za aktivno vključevanje študentov in upravljanje večjih skupin.

Ključne besede: visokošolsko izobraževanje, inovativne učne metode, izzivi, digitalna orodja