Flipping Public Administration Teaching by Adoption of online technologies

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Abstract

As technology advances, we can expect constant changes in the way people live, work, and learn. The digital transformation of private and public sector and society enables and even requires a new way of collaborating, communicating, and doing business. Citizens, familiar with digital technologies from their private lives, are demanding the use of such technologies when dealing with public sectors such as social security, healthcare or education. Therefore, current and future public sector employees need adequate digital knowledge and skills, which can be acquired through training or formal education. Education has also changed and adapted to the new digital environment over the last decades. Online learning, blended learning, and other new methods seek to make the best use of information and communication technology (ICT) to support the learning process and achieve better results.

This article addresses the challenge of introducing a new way of teaching at the higher education level, namely flipped learning. Although flipped learning (sometimes referred to as "flipped classroom") can be a hybrid method consisting of an inductive online learning space and a classroom group space, we have focused on a fully online flipped classroom that takes advantage of recent advances in technology and teaching. The challenge in preparing for such an implementation lies in the hands of faculty, who must not only have digital skills, but also teaching methods that are appropriate for this type of instruction. In addition, social studies courses have different approaches and thus different challenges than technical courses that dominate the field of online and MOOC courses.

Based on existing theoretical and empirical research, ways to integrate the Flipped Classroom into an online learning environment in higher education institutions are proposed. The roadmap is based on the results of interviews with lecturers developing such courses at the Faculty of Public Administration, University of Ljubljana. The findings focus on the structure and tools for creating learning materials and group activities in an online environment, as well as the challenges and obstacles that faculty face when preparing their first flipped learning courses. Using semi-structured interviews, we discussed the challenges teachers face in preparing social studies courses, particularly public administration courses. Using a qualitative research case study, we seek to answer a research question: what challenges do social studies instructors face when "flipping" their courses?

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The results show that while general digital skills are necessary, teachers need specific skills to teach in digital environments, which is definitely the case with the Flipped Classroom. While DigCompEdu is a useful starting point to learn about teachers' digital skills, additional efforts are needed to identify and collect more data on digital teaching maturity in the selected environment in order to act accordingly.

Keywords: Flipped learning, Flipped classroom, Digital skills, Teachers, Higher education

1 Introduction

The rapid changes in global society, driven by the constant development of information technology, force educational institutions to adapt to these changes and provide teaching and learning processes according to the needs of today's society. Even in the public sector, current and future employees need to be equipped with digital skills and competencies. Moreover, these technological advances can further improve teaching and learning processes and increase outcomes. Educational institutions are not only incorporating ICT into their programs and activities to support processes but are also making changes to educational ecosystems to improve them. At the instructional level, concepts such as active learning, lifelong learning, blended learning, flipped learning, and others are gaining popularity and importance.

Flipped learning is a teaching strategy that uses traditional class time for active learning instead of passive lectures. It was first mentioned in a study published in 2000 (Talbert & Bergmann, 2017, p. 47) and builds on the availability of advances in ICT. In addition, the term "flipped classroom" or "classroom flip," which first appeared in 1997 by Baker (Talbert & Bergmann, 2017), was later defined in 2000 as a fully realized concept for "flipped learning" (Baker, 2000). The core idea is to switch from live ex cathedra instruction to pre-recorded video lectures or other digital learning objects. In a flipped classroom, students watch video lectures or learning resources (on paper or online) independently before class, following the predetermined but variable structure of learning (Bishop & Verleger, 2013). Then, class time is used to work on problems and projects in the form of group activities, with teacher guidance and support to enhance the quality of class time (Nolan et al., 2021). This allows students to become familiar with a topic and study it before class and work on it individually. Then, class time is used to reinforce that knowledge. The goal of flipped learning is to make the most of face-to-face time with the teacher and allow students to take an active role in their own learning (Strelan et al., 2020).

In addition, modern technologies enable group activities to be shifted to online activities. In particular, the COVID-19 crisis, which had a tremendous impact on the shift of educational activities to the Internet (Pokhrel & Chhetri, 2021; Yao et al., 2022), demonstrated the diversity of opportunities at different levels of education. Even software providers of online videoconferencing and other digital collaboration tools, as well as cloud solutions, have leaped forward in developing these technologies (Tudor, 2022). Although the crisis has largely passed in many countries around the world, and the positive and negative consequences remain to be explored, many of the benefits can already be reaped today. Students and teachers now know and can immediately benefit from learning and teaching technology. Therefore, the Flipped Classroom has the potential not only to shift instruction, but also to leverage online tools and systems for activities such as discussion, collaboration, teamwork, and the like.

So the first step would be for teachers to "flip" their thinking and radically change the way they teach. Then they should start thinking about adapting learning content, instructions, learning activities, and grading of courses to the flipped way. There are several challenges they face in such a process and questions that need to be answered. The next step would then be to implement the flipped activities, especially the group activities. This paper will therefore attempt to find answers to the following questions: What challenges do teachers face in terms of digital literacy and teaching in a digital environment? How do they perceive the challenge of flipping their lessons? How can flipping be implemented in social studies or more specifically in public administration courses and how?

Using existing scholarly resources, we sought to identify the real challenges teachers face in flipping their courses. The research focus was on selected courses in the Public Administration program at the Faculty of Public Administration, University of Ljubljana, Slovenia. First, this paper reviews the current state of research on the Flipped Classroom, focusing on the benefits, challenges, and practices of this teaching method. Second, a flipped learning project at the selected higher education institution is presented in the form of a case study, explaining and examining the methodological approach, the data collected, and the results of the project. Third, the project and its limitations are discussed, and recommendations for future implementation of flipped classrooms in online teaching are provided.

The goal of this paper is to address the development process of flipped classroom and challenges that teachers face. By implementing flipped classroom, providing and using high-quality educational content with the support of advanced digital tools and pedagogical methods, we want to detect obstacles in such challenges.

2 Theoretical background

For decades, technological advances have been changing the landscape of education, including higher education. Not only in STEM courses, but also in the social sciences, the changes are evident and in line with policies such as the Sustainable Development Goals (SDGs) for quality education, gender equality, and the like. Even in public sector education, topics such as gamification (Stare et al., 2022), project-based learning (Márquez Lepe & Jiménez-Rodrigo, 2014), and similar new approaches are attempting to use digital technologies to enhance learning. New paradigms such as blended learning, Massive Open Online Courses, flipped learning, or self-organized learning environments appear as attractive alternatives or complements to face-to-face instruction.

In addition, the COVID -19 pandemic had a significant impact on education systems. Educational institutions around the world have moved to online learning to contain the spread of the virus and ensure student safety while continuing the educational process. This sudden shift to online learning has highlighted the importance of educational technology. As a result, many educational institutions have invested in distance learning platforms and digital tools to support student learning and engagement, such as (massive) open online courses, virtual classrooms, learning management systems, and interactive digital resources. In addition, many faculty and students who are behind in their digital skills are faced with the need to quickly develop digital skills to keep up (Vishnu et al., 2022). Those who had previous experience were able to more easily meet the challenge (Divjak et al., 2022). In general, the COVID -19 pandemic accelerated the adoption of educational technology and highlighted the need for schools and universities to invest in digital tools and platforms that can support learning (Mouratidis & Papagiannakis, 2021).

Today, these advances offer the opportunity to improve the use of technology in education and even create more equitable access to learning opportunities for all students. In addition, future jobs will require graduates to use digital tools in their work environments. Data from the United States show that up to 77% of office workers teleworked full-time in the first months of the pandemic, compared to only 9% before; 45% of workers teleworked at least some of their hours (Hylton et al., 2022). 82% of companies will continue to allow employees to telework at least some of their work time. 47% of companies intend to allow employees to telework full-time on a permanent basis (Baker, 2020). Therefore, we do not want students to use technology for the superficial approach to learning, copying notes from others, focusing on fragmented facts, or jumping to conclusions quickly (O'Flaherty & Phillips, 2015). The goal is to engage students in deep learning and equip them with knowledge and skills in their field of study and for working effectively and safely with technology in their future jobs.

2.1 Flipped theory, background and practice.

Advances in ICT have enabled new educational strategies and approaches, such as blended learning, in which students typically receive new information in class (lectures) and engage in individual activities outside of class (e.g., at home) using ICT, usually a learning management system (LMS). The problem arises when students face challenges and need help from someone who can identify and correct errors in their thinking. This problem is addressed by the flipped or inverted classroom approach, which first emerged in K-12 education (Ash, 2012). In the early stages of concept development, flipped learning proposed pre-recording (via video) lectures (i.e., teacher-led instruction) so that students could work through them outside of class, on their own time (asynchronously), and at their own pace. The freed-up classroom time was then used for synchronous learning activities. Later, the method evolved and the various approaches to "flipped were further defined. Although flipped learning is associated with many different educational theories, it is considered a "grassroots movement" that has only recently become more systematic and scientific (Lindeiner-Stráský et al., 2022).

Historically, the concept has been developed and tested primarily in the United States, and most of the work published prior to 2015 originated there, while literature from Europe is largely lacking (O'Flaherty & Phillips, 2015). However, in the last decade, scholars from other countries have begun to publish articles on flipped learning and flipped classrooms. Figure 1 shows the evolution based on the bibliometric analysis of 660 articles from the database SCOPUS. Flipped learning has been researched and implemented in various disciplines, such as nursing (Bernard, 2015; Betihavas et al., 2016; Presti, 2016) and STEM (Giannakos et al., 2014; Seery, 2015), as well as in various other fields (Bishop & Verleger, 2013; Zainuddin et al., 2019; Zuber, 2016). Moreover, it has been used in various educational contexts, i.e., primary (Lo & Hew, 2017), secondary, tertiary, and higher education (O'Flaherty & Phillips, 2015). Although flipped learning is an important trend, especially with advances in online learning tools and technologies, there are opportunities for further research. Most notably, the literature review by O'Flaherty and Phillips (2015) showed that there was a notable absence of literature from Europe, but this has improved significantly in recent years (Figure 1).

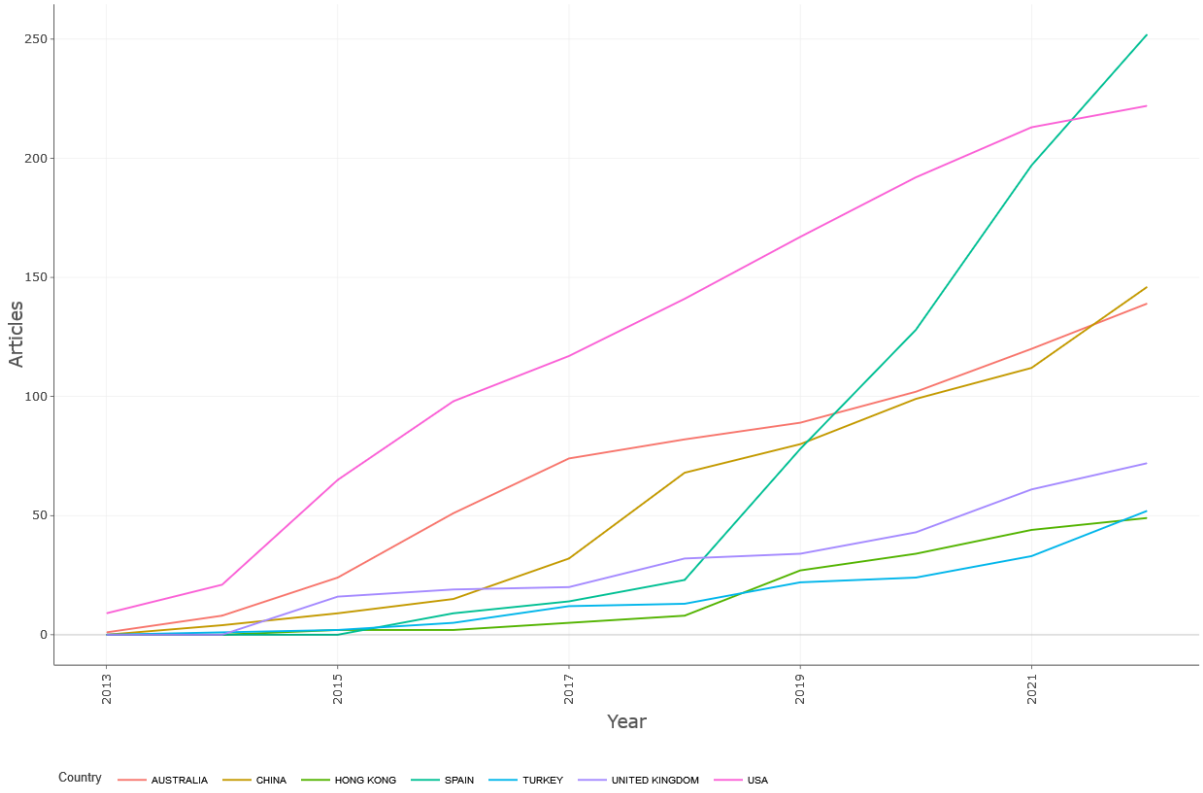

Figure 1: Countries' Production of scientific papers on the topic of flipped learning and flipped classroom over time

Nowadays, flipped learning or flipped classroom can be defined as a strategy that transforms the traditional educational environment in such a way that the information transfer component of a traditional face-to-face lecture (ex-cathedra) is removed from class time (Divjak et al., 2022). The concept requires teachers to prepare materials for students that help them learn new concepts individually but in a structured and guided manner. Teachers also prepare group activities for later classroom discussion, practice, clarification, and application activities. Therefore, learning materials must be prepared in advance so that students can prepare for class.

Learning materials can be in a variety of formats, including text, video, web content, paper books, etc. Learning materials prepared for LMS, i.e., online materials, should incorporate appropriate technology that is familiar to students. In particular, instructor-recorded video lectures are highlighted not only as content that can be viewed repeatedly as needed, but also as a tool that connects the instructor with students (Bergmann & Sams, 2014, p. 116). Although there are videos online from many authors explaining the same topics related to the course (e.g., YouTube videos), Bergmann and Sams (2015, p. 22) assert that instructors should record their own videos to build rapport with students they know. Students also recognize and appreciate the investment and effort. In addition, videos need to be interactive because watching videos is associated with leisure, movies, etc., which discourages students from active learning. Interactivity can be implemented in a variety of ways, such as pause – answer a quiz - continue (often implemented with SCORM packages) or by taking notes and writing reports or responses in the online forums. Although videos can be published on various online platforms such as YouTube, Vimeo and others, an LMS is the perfect place to go for such content. LMSs often include gamification elements, performance assessments, badge rewards, etc. LMSs also allow teachers to track student activity and adjust lessons accordingly. However, it should be emphasized that video materials are time-consuming, not only to create but also to update

over the years. Of course, individual learning can and should include the use of textbooks (paper or digital), online sources (articles, papers, websites, etc.), or online simulations, and students should preferably be able to choose from these. When multiple learning pathways are available, the teacher's effort is significantly higher. However, sharing knowledge gained and other discoveries made during group time can therefore be of greater benefit to all.

The structure and guidance of the learning materials are critical and help students easily navigate the content and even check for understanding through surveys or polls and customize the learning path to their needs. Materials must be clearly structured, provide detailed instructions, and be manageable within a specific time frame so that students can prepare for later group activities. While we assume that students know how to read course books, scientific papers, or interactive video lectures, this is often not the case. Therefore, it is necessary to teach them to do so. Bergmann and Sams (2015, p. 35) suggest watching some videos together with students and discussing what they focus on, how they interact, take notes, etc.

As Lindeiner-Stráský et al. (2022) noted, individual learning in advance gives students "responsibility and empowers them to take charge of their own learning." However, these same authors also note that "the flipped classroom shifts responsibility for learning and engagement with content to students, thus encouraging or requiring learners to take responsibility for their own learning." Waring and Evans (2014) point out that having 80% of students prepare in advance is a desirable outcome and a good preparation rate. However, a teacher must do much to achieve such an outcome.

Regardless of the pre-class activities, what happens in class is much more important than "watching videos". Group work must include activities that allow students to clarify misunderstandings and misconceptions and improve their knowledge. The teacher must be there for them during this time, observing the groups and helping those who ask for help, those who look like they need assistance, and those who want to know more. This is an educationally challenging activity, and teachers need some practice to master it. Especially when it comes to locating those who could not grasp the content on their own at home but would have done so if the presentation had taken place in the classroom (raise hands and ask immediately or ask a nearby classmate). The importance of group activities is based on social constructivist theories that learning is most effective when it occurs through social interaction with others, students, teachers, and the world. Among other things, students learn to transfer their understanding and ideas to others, generalize their knowledge (the set of facts, principles, theories, and practices related to an area of study), and build deeper understanding. In addition, the benefits of group work include not only lively discussions and exercises, but also motivation, team building, and other program or course skills. McCallum et al. (2015) found that students highly value the expanded opportunities to relate to peers, get to know each other, etc. Group activities can be conducted in the classroom or online, but always with the goal of developing higher order learning skills.

Flipped learning also works well with Bloom's taxonomy (Bloom, 1956). Bloom's familiar lower levels of recall and understanding are achieved outside the classroom in "individual space." This then allows teachers to spend more time in the classroom on activities that benefit from group work, discussions, presentations, and critical thinking, thus allowing students to build skills for lifelong learning and their workplace context (O'Flaherty & Phillips, 2015). Therefore, Bloom's levels of "apply, analyze, evaluate, and create" can be more easily achieved in the classroom (Blau & Shamir-Inbal, 2017). Furthermore, by linking individual and group instruction, the

Flipped Classroom approach is linked to the concept of active learning, which focuses on inquiry and discovery learning. Therefore, in addition to listening in class, the students' role is to read, write, discuss, and solve problems (Chickering & Gamson, 1987).

The benefits in general show that flipped learning stimulates and supports autonomous learning and can help promote a variety of teaching and learning strategies (Lindeiner-Stráský et al., 2022). Enfield (2013, p. 27) views flipped learning as "a possible step toward a more individualized learning environment" that can also contribute to the development of student metacognition (van Vliet et al., 2015). By emphasizing the role of technology, flipped learning also supports the development of core digital skills for successful learning and functioning in the digital age (Blau & Shamir-Inbal, 2017). The flipped classroom also has positive effects on student learning activities, such as social interaction and the ability to engage in self-directed learning (Torres-Martín et al., 2022; Zainuddin et al., 2019).

As defined by Bergmann and Sams (2015, p. 10), flipped class involves direct instruction outside of class so that time within class can be used for group work and individual attention. The process is not easy, however, as "flipping" requires resources, technology, time, and training. Since many higher education teachers are used to (or like) being the center of attention when it comes to delivering information, the question for them is what to do in class when the class is flipped. In addition, there are several other challenges to flipping learning. First, students need to know what is expected of them as more individual work is required. Often, the increased workload is a major reason for dissatisfaction with blended learning, as students are not used to this type and amount of learning from their previous education (Monzonís et al., 2021; Talbert & Bergmann, 2017, p. 223). Second, more self-discipline is required due to the more autonomous learning process (Evseeva & Solozhenko, 2015; Zainuddin et al., 2019). Especially during individual learning time, students find it difficult to review prepared materials (e.g., recorded lectures) before class (McCallum et al., 2015). Consequently, this could lead to a decrease in participation in class activities (Giannakos et al., 2014). Third, ICT plays an important role in the learning process, and digital skills are necessary since most learning materials are available online. Moreover, the level of digital skills increases through the flipped classroom approach, as stated by Monzonís et al. (2021), who studied students' perceptions during the crisis COVID -19. Fourth, students need to know how to learn efficiently and develop appropriate learning strategies that are not otherwise needed when lectures are live in the classroom (Jovanović et al., 2017). During actual class time, students need to be more interactive and participatory, which requires more effort and energy.

For teachers, this also means using more engagement strategies that, if successful, will increase students' motivation to engage in learning before class (Nel, 2017). Teachers also need to fundamentally change their "thinking and doing" First, they need to move away from the "watch me and listen to me" approach and let students take control of learning, i.e., flip their thinking. Since almost all information can be found on the Internet, classroom instruction needs to be different. Second, they need to change the tools they use for individual and group instruction, i.e., they need to change their methods and technologies. Consequently, teachers need new (digital) skills. Sánchez-Cruzado et al.'s (2021) findings from Spain show that neither COVID -19 nor increased general digital literacy have sufficiently improved teachers' digital skills and that a training program is urgently needed to reach an optimal level of digital skills and implement a necessary paradigm shift (Zuber, 2016). Third,

more time is needed to prepare learning materials, as actual class time is now devoted to discussion and problem solving. However, this still requires the full-time presence of a teacher. Also, more time is needed to prepare group activities in the classroom. All of this also has financial implications, particularly high initial costs, especially with regard to the production of instructional videos (Giannakos et al., 2014; O'Flaherty & Phillips, 2015) and ICT cost. Finally, all the effort could be for naught if students do not prepare for class, making group activities are completely ineffective.

Finally, student achievement, grades, and other unmeasured effects are what matter most. O'Flaherty and Phillips (2015) examined the literature and found indirect evidence of improved academic performance and student and faculty satisfaction with the flipped approach. The same authors noted that there is a lack of conclusive evidence that flipped learning contributes to the promotion of lifelong learning and other 21st century skills in undergraduate and postgraduate education, so these aspects need additional consideration in such contexts. Torres-Martín et al. (2022) showed statistically significant differences in improving academic performance in the flipped classroom environment, as well as in fostering students' interest, their capacity for autonomous learning, and their personal and collaborative relationships. However, it is important to further explore the impact of flipped learning. The effects of "flipped" learning could simply be due to the active learning style of instruction and activities and nothing else (Jensen et al., 2015). In addition, Lo and Hew (2017) compared the flipped classroom approach to traditional instruction and found that the flipped classroom approach may have a neutral or negative impact on student achievement. Therefore, more research is needed to fill the research gap.

2.2 Digital competences

According to Murawski and Bick (2017), the definition of digital competences lacks scientific depth. However, already in 1994, Nordhaug (1994) defined it as "a combination of abilities, (work-related) knowledge and skills held by an individual", where abilities are properties of an individual, knowledge is represented by a theoretical understanding of a concept, and skill represent a capacity of practical application of the knowledge. According to Vieru et al. (2015), "digital" represents "the ability to adopt and use new or existing information technologies to analyze, select, and critically evaluate digital information to investigate and solve work-related problems and develop a collaborative body of knowledge while engaged in a particular organizational context." As Zhao et al. (2021) point out, digital competences are one of the most important factors of the knowledge society that distinguish it from the previous information society. Reisoğlu and Çebi (2020) see it as a prerequisite skill to fully and actively participate in today’s societies and economies, and to deal with social and economic changes as individuals.

Digital literacy and digital competencies are often used as synonyms, which they are not. The differences were investigated by Spante et al. (2018) in the past, but no clear consensus about them was found. Most authors define digital literacy around cognitive skills, competences, or functional access in adopting various digital technologies. Chan et al. (2017) defines it as "the ability to understand and use information in multiple formats with emphasis on critical thinking rather than information and communication technology skills." UNESCO (2018) has structured digital literacy around the following pillars: Information and data literacy, Communication and collaboration, Digital content creation, Safety, Problem solving, and Career-related competence. Madsen et al.

(2018) also found out that in some countries the distinction between digital competence and digital literacy is blurred, mainly because of translation issues.

More than a decade ago, the EU established a Digital Competence Framework for Citizens (DigComp) to create a common understanding of what digital competences are, and thus provide a basis for framing digital skills policy (Ferrari & Punie, 2013). Later, the DigComp framework adopted the aforementioned UNESCO pillars, and its most recent version, the integrated DigComp 2.2 framework, provides new examples of knowledge, skills, and attitudes that help citizens engage with existing and emerging digital technologies, such as artificial intelligence (AI) (Vuorikari et al., 2022). Within this framework, digital skills are a narrower concept than digital competences. The latter is a complex concept that encompasses many skills, that are used effectively in the digital world, such as cognitive, emotional, and sociological (Røkenes & Krumsvik, 2014). These general digital skills should therefore be integrated into various course implementations for students to develop. The program of study should be carefully planned to accomodate the teaching of the required digital skills in different courses.

In September 2020, the EU adopted the renewed Digital Education Action Plan, which builds on the first Digital Education Action Plan 2018-2020 and includes actions for the digital inclusive and high-quality instruction and training for all EU countries. For the period 2021-2027, it sets priorities and corresponding actions to improve digital literacy and the use of technology in schools across Europe (European Union, 2020). It focuses on the longer-term digital change in education and training and the delivery of "digital skills for all," given the strategic importance of digital and green transitions for the EU. The principles are divided into four areas: ethos; leadership and investment; digital skills, literacy, and competences; digital education content. The framework provides examples to motivate education and training providers to update their curricula and course materials to meet today's challenges.

However, digitally competent teachers are needed to implement such goals. The European Digital Competence Framework for Teachers (DigCompEdu) was therefore developed by the EU, to define a set of required digital skills for teachers (Redecker & Punie, 2017). The framework includes six competence areas: (1) professional engagement (focusing on the professional environment), (2) digital resources (sources of creating and disseminating digital resources), (3) teaching and learning (how to manage and orchestrate the use of digital tools in teaching and learning processes), (4) assessment (digital tools and strategies for improving assessment), (5) empowering learners (using digital tools to empower students), and (6) facilitating learners´ digital competence (how to facilitate student digital competence). Lucas et al. (2021) state that the big challenge for teachers is not how to use digital technology, but how to implement it for teaching and learning which was recognized by DigCompEdu. Therefore, these areas were the focus of our research. Since flipped classrooms in our case study are conducted exclusively online, the focus is mainly on the pedagogical and methodological aspects specific to the teaching process (competence areas 2–6). In particular, area 5, placing students at the center of the teaching and learning process, is important.

3 Empirical research

The setting of the study was the blended and online learning environment of the Faculty of Public Administration at the University of Ljubljana (FPA). The challenges are addressed by implementing flipped classrooms using the Moodle learning management system and other online learning and communication tools. The case study presented focuses on developing and improving FPA courses in terms of digital skills development and integration with other content students learn in their degree programs. The faculty selected for this case study needed to develop 2 courses to be offered to students as first-cycle electives in the 2023/24 academic year and adapt 1 additional mandatory course. Based on the already demonstrated benefits of flipped learning, this method was chosen as the form of course implementation for the above courses. It is the first time that this method is implemented at the FPA and the first time that an online flipped course is offered to students from different faculties of the University of Ljubljana. Such an online form with a more flexible way of studying will be beneficial for students who have other courses with fixed schedules offered in a classical form at their faculties.

3.1 Methodology

We conducted a semi-structured interview with HE teachers who have more than 10 years of teaching experience, have developed and designed many courses over the years, and already use IT (Moodle and other tools) in their teaching (blended learning). Interviews were conducted face-to-face, recorded, converted to written text, and then analyzed. All teachers interviewed also completed an online DigCompEdu evaluation questionnaire. The results of the questionnaire were used to analyze the consistency with the responses from the interviews.

The questions were as follows:

1) What is the biggest challenge today in developing and delivering a course in HE?
2) What didactic features do you notice in public administration courses?
3) What do you think are the challenges facing students in universities today?
4) You teach with blended learning. What challenges have you noticed with blended learning?
5) How competent do you consider yourself to be in digital literacy, given your previous experience with blended learning?
6) What are your weaknesses?
7) Where do you see the biggest challenges in using IT in the classroom (equipment, skills, support)?
8) What do you know about flipped learning and what is your opinion about it?
9) In flipped learning, teachers prepare the learning materials and students engage with them individually.
    a) What do you think are the challenges in preparing the different interactive learning materials?
    b) How do you think teachers should motivate students for their individual learning at home?
10) In flipped learning, the main classroom activities are group work, discussion, active learning, and student-centered learning.
    a) How is this different from what you currently do in the classroom? How can you incorporate instruction and interactivity in this process?
    b) What do you see as the biggest challenges in preparing and implementing group activities?

11) What digital tools do you plan to use to develop a flipped classroom?
12) What do you see as the biggest obstacles to implementing a flipped classroom later?

Detailed feedback on a variety of aspects was obtained through qualitative analysis of the interviews and the "debriefing' session in which all interviewees participated and which consisted of a lively 60-minute discussion on a variety of aspects related to the topic.

3.2 Results

First teachers were asked to complete an online DigCompEdu survey, to self-evaluate their digital competencies. Results on topics of areas 2-6 are presented in Table 1.

Table 1: The results of the DigCompEdu evaluation survey for participated teachers.

Area	Subarea	Mean	Area mean
1. Professional engagement	1.1 Organisationalcommunication	74,29	80,71
	1.2 Professional collaboration	77,14	
	1.3 Reflective practice	85,71	
	1.4 Digital Cont. Profess. Development	85,71	
2. Digital resources	2.1 Selecting	80,00	75,24
	2.2 Creating and modifying	74,29	
	2.3 Managing, protecting, sharing	71,43	
3. Teaching and learning	3.1 Teaching	68,57	72,14
	3.2 Guidance	74,29	
	3.3 Collaborative learning	74,29	
	3.4 Self-regulated learning	71,43	
4. Assessment	4.1 Assessment strategies	74,29	72,38
	4.2 Analyzing evidence	68,57	
	4.3 Feedback and planning	74,29	
5. Empowering learners	5.1 Accessibility and inclusion.	74,29	67,62
	5.2 Differentiation and personalization	54,29	
	5.3 Actively engaging learners	74,29	
6. Facilitating learners' digital competence	6.1 Information and media literacy	65,71	67,43
	6.2 Communication	71,43	
	6.3 Content creation	68,57	
	6.4 Responsible use	68,57	
	6.5 Problem solving	62,86	

In their professional engagement (Area 1 with the highest mean of all six), interviewed teachers feel competent to use digital technologies to improve organizational communication with learners, parents, and third parties, as well as with other educators, and to share and exchange knowledge and experiences. They are well able to reflect on, critically evaluate, and actively develop their own digital practice and personal professional development. There is an abundance of digital resources available today, and most teachers surveyed feel competent to identify and select their digital resources (Area 2 has the second highest mean score) to comply with learning objectives and

even teaching styles. Their digital skills also enable them to create or modify digital resources. However, skills in managing, protecting, and sharing digital resources (Subarea 2.3) are much lower, suggesting that teachers need to be educated about these issues. While sharing data with LMS is relatively straightforward, identifying and protecting sensitive data is often a burden for the IT department. In addition, the complicated issue of privacy and copyright regulations, licenses, etc. is recognized as a problematic issue that needs to be addressed. With the increasing amount of easily accessible online content, the fact that licenses and copyright regulations apply is often overlooked, even for content that is only used in the classroom. The mean score for teaching competence is actually slightly lower (Area 3 mean score 72.14). Teachers feel more confident in the competencies of instruction and collaborative learning, shifting the focus of the instructional process from teacher-directed to learner-centered (Subarea 3.1). They feel less competent in using digital technologies to design, plan, and implement the use of digital technologies at different stages of the learning process (Subarea 3.2 and 3.4). A similar area-level mean is found for Area 4. Teachers rate their ability to use digital technologies for formative and summative assessments and to provide targeted and timely feedback to learners higher than their ability to generate, select, critically analyze, and interpret digital evidence of learners' activities, performance, and progress to inform teaching and learning. With a much lower mean score, the teachers rated Area 5, specifically the ability to address learners' diverse learning needs by enabling them to progress at different levels and speeds. This could be due to the traditional environment where large classrooms do not allow for such differentiation. The lowest scores were found in Area 6 (mean score 67.43), which focuses on teachers' ability to transfer and promote their digital skills to students.

The results of the interview show that teachers are concerned about Generation Z, in whom they find low motivation to study. Motivation in the flipped classroom is even more problematic than in the physical classroom. As Teacher 2 said "Flipped learning requires self-disciplined and motivated students, and that's my main concern." From their experience, teachers find that students do not know how to learn. Teacher 3 explains, "Students come to the university without knowing how to learn." Especially learning from online resources, scientific articles and other advanced materials can cause problems. In addition, teachers emphasize the need for good and constant IT support, both in course development and especially in the implementation phase. Teacher 1 expresses this by saying, "We need even more, faster, and 24/7 ICT support for flipped learning." They are also aware of the challenging and time-consuming task of preparing the course. For example, Teacher 2 says, "I think it's really difficult and time-consuming to prepare good online learning materials." Some of them are also aware of the change in their role. Teacher 5 admits, "It would be really hard for me to change my role in lectures. I like to talk and explain."

4 Discussion

The results of this study provide a comprehensive overview of the current state of digital competences among the teachers surveyed in our study and their attitudes toward the development of the flipped classroom. We present the identified challenges and opportunities that arise from integrating technology into flipped learning. The findings are consistent with the theoretical background and previous research and confirm the significant role of digital competencies in a flipped learning environment.

The high level of digital competencies among the teachers surveyed, particularly in the areas of professional engagement and digital resources, is encouraging. This suggests that teachers are well equipped to use digital technologies to improve communication, share knowledge, and select appropriate digital resources. However, the lower level of competency in managing, protecting, and sharing digital resources suggests that further training in these areas is needed. This is particularly important given the increasing reliance on digital resources in education and the need to ensure the privacy and security of these resources.

There are both challenges and opportunities in implementing flipped learning. Teachers expressed concern about student motivation and self-discipline, reflecting previous research highlighting these as potential barriers to the success of flipped learning (Giannakos et al., 2014; McCallum et al., 2015). However, teachers also recognized the potential of flipped learning to shift the focus of the instructional process from the teacher's guidance to the learner, which is consistent with the tenets of social constructivist theories and active learning (Chickering & Gamson, 1987; Lindeiner-Stráský et al., 2022).

The findings also make clear that teachers implementing flipped learning need ongoing support and resources. The findings also highlight the need for ongoing support and resources for teachers implementing flipped learning. Preparing online learning materials is time-consuming, especially if the video lectures are created by the teachers themselves, as Bergmann and Sams (2015, p. 22) suggest. This underscores the importance of providing teachers with adequate resources and support, including support from the IT department and professional development opportunities. In addition, teachers must adapt to new roles and teaching methods. The new role of facilitator, moderator, and supporter allows students to build relationships with peers, get to know each other, etc., which is highly valued by students (McCallum et al., 2015).

The lower level of competence in transferring and promoting digital literacy to students is an important finding. This suggests that teachers may have digital skills themselves but have difficulty effectively transferring these skills to their students. Given the importance of digital skills for future careers and participation in society, this is an important area for further research and action.

As suggested by Sánchez-Cruzado et al. (2021), three levels of training for teachers are advisable: basic digital skills training, contextualized training focused on the digital technology used in the specific setting, and training on the methods and didactic strategies used, e.g., flipped classroom, that are associated with digital technology. In particular, the latter training proved to be important for teachers who already have basic digital skills and need to adapt their teaching to a blended or aniline environment.

5 Conclusion

The flipped classroom is known as a student-centered learning approach in which students gain knowledge individually and actively participate in group activities in the classroom (Zainuddin et al., 2019). It is an instructional strategy and a type of blended learning in which students access lecture-like content at home before class, typically online via video or text, and then use classroom time for higher-order thinking activities such as problem solving, discussion, projects, and assessments. In this way, teachers can provide more individualized instruction during class time. To accomplish this, teachers must redesign or flip their instructional strategies,

develop different learning materials, and implement different instructional activities. These are new and challenging for them.

The benefits of flipped learning include improved learning outcomes, greater student autonomy, self-directed progress, overcoming the constraints of instructional time, increased motivation to learn, greater meaningful engagement/participation, and collegial collaboration.

This study provides valuable insights into the current state of teacher digital competences of flipped learning implementation. The results show the potential of these approaches to improve education, but also the challenges that need to be addressed. A digitally competent teacher is not necessarily competent in digital instruction, so context-specific research on the required instructional digital competencies is needed. As noted, linking digital technology and pedagogy is a challenge. The flipped (online) classroom is a powerful "tool" that must be based on an appropriate digital/pedagogical/organizational ecosystem, including support from the IT department support, rules and guidelines for faculty, and support from top management. Student motivation and self-discipline are identified as major concerns by faculty. Therefore, it is crucial to motivate and train students so that they are able to learn efficiently on one hand and participate, cooperate, and collaborate on the other. Further research is needed to explore effective strategies to improve teachers' and students' digital literacy and to build a successful flipped learning ecosystem that supports the successful implementation of flipped learning.

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Appendix

Interview - Flipping a course.

1. Ali pri pripravi predmeta, ki bo potekal v obliki obrnjenega učenja, razmišljate o spremembi učnih ciljev in zakaj?
2. Katere izzive vidite pri postavitvi vsebin za samostojno spoznavanje in učenje snovi s strani študenta?
3. Kakšne dodatne izzive vidite, ker mora biti zgoraj omenjeno v online obliki.
4. Katere izzive vidite pri postavitvi vsebin za skupinsko delo študentov?
5. Predvidevate, da dovolj poznate online obliko dela, tehnologije, da boste uspešno pripravili in izvedli predmet v obliki online obrnjenega učenja.

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