

THE ROLE OF PEER LEARNING AMONG UNIVERSITY TEACHERS IN INTEGRATING DIGITAL TECHNOLOGIES INTO HIGHER EDUCATION TEACHING

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ABSTRACT

The article is based on research aimed at exploring how teachers from the Faculty of Arts at Masaryk University integrated digital technologies into their teaching in connection with the transition to emergency remote teaching. The main research question was aimed at identifying the role played by peer learning among university teachers in integrating digital technologies into higher education teaching. The data were collected through in-depth semi-structured interviews with 34 teachers from the Faculty of Arts at Masaryk University in the fall semester of 2020. The results indicate that although teachers valued the support of a technological workplace, they more strongly considered consultations with and advice from their colleagues. I identified four main roles played by peer learning among university teachers in integrating digital technologies into higher education teaching. The roles are: offering emotional support, understanding needs, providing intelligible advice, and mediating experience. I also address two limitations to peer learning that need to be considered: the limited variety of technological tools and fragmented and unsubstantiated procedures. Studies have repeatedly shown that peer learning plays a long-term role in the process of integrating and adapting technologies into higher education; however, until now we have lacked information on the significance of peer learning for teachers in integrating digital technologies and on its limitations, both of which I address in this study.

KEYWORDS

COVID-19 pandemic, emergency remote teaching, higher education, university teachers, peer learning, digital technologies

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Introduction

The integration of digital technologies into higher education teaching has been a long and gradual process in which, until recently, some teachers participated willingly and others participated less readily or not at all (Naylor & Nyanjom, 2021). In the spring of 2020, there was a swift and extensive transition to distance learning as a result of measures to manage the COVID-19 pandemic, and digital technologies suddenly became a key tool for educators. This sudden shift has been referred to as “emergency remote teaching (ERT)” (Bozkurt & Sharma, 2020; Weidlich & Kalz, 2021). Scherer et al. (2021) used an international survey of university teachers to determine that the vast majority of teachers were explicitly instructed by their schools to switch to online teaching, with an average of less than seven days to prepare for this transition. In this study, I focus on how teachers approached the integration of technologies during the very difficult period of transition to ERT. I present the fact that although teachers valued the external support of a technological workplace, they gave greater consideration to consultations with and advice from their colleagues. I focus on the significance that individual peer learning roles have in integrating digital technologies, and I discuss their limits.

1. Integration of digital technologies into higher education teaching

The integration of technologies into teaching before the COVID-19 pandemic appears to have been low and therefore ineffective (Gronseth et al., 2010; Tondeur et al., 2012). Teachers have played and continue to play a vital role in incorporating technology into teaching. The integration of digital technologies into higher education has long been discussed (Baran, 2016; Buchanan et al., 2013; Ertmer et al., 2015; Schneckenberg, 2009) and teachers’ lack of interest in e-learning and their reluctance to adopt online teaching have often been criticized and considered to be major obstacles (Rakes & Dunn, 2015).

Courses and workshops that are insufficiently designed to provide teachers with skills in the field of information and communication technologies were marked as a possible reason that teachers do not involve technologies in their teaching (Chukwunonso & Oguike, 2013; Wentworth et al., 2009). This reason was supported by a study by Baran (2016) indicating that workshops focused on strengthening IT competencies seem to be disconnected from the authentic teaching contexts of teachers. The results of a study by Mercader and Gairín (2020) indicated that the most widespread barriers are professional, and that the most obstacles are perceived in the arts and humanities.

This raises the question of how teachers can be encouraged to meet technological challenges and at the same time achieve the most benefit for themselves and their students. Downing and Dymont (2013) reported that the most beneficial strategy for learning with ICT was individual support from a technological workplace, followed by self-directed (informal) learning such as reading articles and books. It can be assumed that self-directed learning includes (or may include) activities involving peer learning between teachers, which could be beneficial for teacher development in this area (Baran & Correia, 2014). Georgina and Olson (2008) suggested maximizing teacher technology training by using the strategy of small group forums with a trainer. Collaboration in teacher teams is an important approach for facilitating the transition to distance learning (Downing & Dymont, 2013; Naylor & Nyanjom, 2021). Studies conducted by Ramlo (2021) and by Englund et al. (2017) offered different approaches, looking at how subjective teacher beliefs and teaching concepts interconnect with work with technology.

During the spring semester of 2020, teachers at universities faced an unprecedented situation in which full-time in-person teaching was cancelled and teachers and students had to look for ways to teach and learn effectively in unusual conditions. In their study based on an online questionnaire survey of 401 instructors, Alqabbani et al. (2020) reported that the majority of instructors at Princess Nourah Bint Abdulrahman University were actually ready to shift to ERT, which led to high perceived effectiveness. On the other hand, Scherer et al. (2021) assessed readiness for online teaching during the pandemic on a sample of 739 university teachers. Their study showed that most teachers lacked confidence, institutional support, or both. Alvarez et al. (2009) argued that in virtual teaching environments, teachers' roles increase, including planning and design roles, social roles, and instructive roles. They claimed that each of these roles has its own set of required competences, which explains why teachers felt that their workload remarkably increased after teaching moved online. The annotated findings of that study indicated that the situation associated with the transition to distance learning was challenging for teachers.

Liu et al. (2020) suggested that tool adoption is a complex process influenced by learning technologies, academics, context, and strategies. Faculty education and digital literacy initiatives, as well as structural factors including resource provision and technical support, need to be taken into account in order to optimally implement learning technologies. It is clear from these studies that the integration of digital technologies into higher education is proceeding, but not yet very successfully. Different expert sources have suggested various ways to support university teachers who have specific training needs in the process of integrating digital technologies into higher education teaching.

2. Peer learning among university teachers in terms of digital technologies

Peer learning is a reciprocal learning relationship among peers who have similar levels of expertise, for their mutual benefit (Boud et al., 2001). Reciprocity has been identified as a key component of peer learning (Boud & Lee, 2005). In this study, I describe peer learning among university teachers in relation to digital technologies; the teachers' ages and lengths of practice may vary. It has been emphasized that teachers learn in (mostly) informal, unplanned interactions with colleagues (Eekelen et al., 2005). Therefore, the importance of peer learning among university teachers has increased and is often associated with peer observations in teaching, the benefits of which have been extensively discussed (Hammersley-Fletcher & Orsmond, 2006; Hendry & Oliver, 2012; Hendry et al. 2013; Tenenber, 2014).

The question now remains of what we know about peer learning in relation to technology. In their quantitative study of 87 faculty members (43 of whom responded), Sahin and Thompson (2007) highlighted self-directed informational sources and collegial interaction as the two most significant predictors of the level of technology adoption. Nicolle and Lou (2008) conducted a mixed methodology study using a quantitative survey ($n = 117$) and qualitative interview ($n = 9$). Their results, using a path model, indicated that peer support had a significant effect on mainstream faculty members' motivation to integrate technology into teaching and learning. Teachers spoke about peer learning as beneficial and enjoyable when the sharing of experience takes place in informal settings. Shattuck and Anderson (2013) discussed peer learning as communities of practice. The authors collected data using online, asynchronous, threaded discussion groups as focus groups and described communities of practice that create networks of practice: formal and informal, as well as internal (peer communities) and external (in workplaces/professional organizations) communities that support educational technology professional development.

Few studies have focused on peer learning in relation to the integration of technologies during ERT. In their study, Le et al. (2022) reported the interaction patterns of pandemic-initiated online teaching and how teachers from the English department at a university in Vietnam adapted to the situation. Those authors collected data from ten teachers and reported that the teachers received limited online training and had to learn by themselves how to engage students remotely. The results showed that teachers hope for support from a learning management system in their courses to provide peer support and mentoring and from an online community for sharing their best practices. A study conducted by Johnson et al. (2020) that focused on faculty experiences and approaches during the first weeks of the COVID-19

pandemic had similar results. In that study, 897 higher education faculty and administrators from the United States responded to a survey. The results indicated that the need for assistance was related to student support, greater access to online digital materials, and guidance for working from home. Peer support and mentoring were mentioned in open-ended comments related to other options that would be helpful during ERT.

These studies show that peer learning plays a long-term role in the process of integrating and adapting technologies into higher education teaching. During ERT in 2020, peer learning became one of the possible supports in technology integration. However, information has been lacking on the significance of peer learning for teachers and on what limitations emerge from this support. My study seeks to address this lack of information in terms of ERT.

3. Methodology

The presented data were acquired in the fall semester of 2020 for the Centre for Information Technologies (CIT) of the Faculty of Arts, Masaryk University (FF MU). The CIT aims to support FF MU teachers in the use of digital technologies for the needs of e-learning, providing them with educational and counselling services in this area. The aim of the research was thus to explore how teachers at FF MU integrated digital technologies in their teaching in connection with the transition to ERT during the spring semester 2020. In-depth semi-structured interviews with teachers across various workplaces and departments at FF MU were chosen as the method of data collection ($n = 34$). The rich data material raised several topics. The approach to teaching and technology integration revealed by this data is described in more detail in a study by Šed'ová et al. (2021). This article focuses on another topic: the role of peer learning among university teachers in integrating digital technologies into higher education teaching.

3.1 Sample

The sample was created using the snowball method. The respondents gradually provided connections to more teachers who were interested in cooperating in this research and talking about their teaching experiences in the spring semester 2020. All the FF MU teaching workplaces except for three that did not respond to the requests for cooperation are included. The sample had one pair of teachers who taught their subject together. Most respondents were heads of individual workplaces at the faculty, but academics were also involved. It is important to emphasize that user competence alone is not a significant challenge for teachers and that they are diverse in their relations to technology, ranging from fascination to rejection. Yet it is possible to trace their inclinations

to one or the other pole, as shown in the table in the section on approach to the integration of technologies into teaching. I divided the teachers into those who had a rather reserved approach to the integration of technologies into teaching and those who perceived the integration of technologies into teaching as an opportunity. The representation of teachers is shown in Table 1.

Table 1
Description of the study sample

		Number of respondents	Anonymized identification of the respondent
Gender	Female	14	Adel, Anna, Ema, Ester, Hana, Karla, Libuse, Mia, Milada, Sarah, Simona, Tana, Vaclava, Virginia
	Male	20	Adam, Adam and Libor, Boris, David, Dusan, Filip, Frantisek, Gabriel, Igor, Johan, Karel, Leonardo, Matous, Patrik, Pavel, Petr, Radim, Tadeus, Vaclav, Vendelin
Position of employment	Managerial position	13	Adam, Boris, David, Ema, Hana, Filip, Leonardo, Matous, Milada, Patrik, Pavel, Radim, Simona
	Ordinary academic	21	Adam and Libor, Adel, Anna, Dusan, Ester, Frantisek, Gabriel, Igor, Johan, Karel, Karla, Libuse, Mia, Petr, Sarah, Tana, Tadeus, Vaclav, Vaclava, Vendelin, Virginia
Approach to the integration of technologies into teaching	Reserved	14	Boris, Dusan, Filip, Gabriel, Hana, Johan, Leonardo, Matous, Pavel, Radim, Tadeus, Tana, Vaclav, Vendelin
	Opportunistic	20	Anna, Adam, Adam and Libor, Adel, David, Ema, Ester, Frantisek, Igor, Karel, Karla, Libuse, Mia, Milada, Petr, Patrik, Sarah, Simona, Vaclava, Virginia

All the information and the respondents were anonymized, as agreed with the respondents at the beginning of the research. The sampling ended at 34 interviews, when each department (except the aforementioned three) was represented in the research group by at least one interview and at the same time the data began to show obvious signs of theoretical saturation, that is, when the emergence of new topics and information had stopped (Strauss & Corbin, 1998).

3.2 Data Collection

Given that the goal was to map the attitudes and thinking of actors in a new and previously undescribed social situation, a qualitative research methodology was chosen. An in-depth semi-structured interview was used for data collection. My colleague Katarína Rozvadská and I were the interviewers. The pre-prepared interview scheme contained a total of 30 questions. The interviews were conducted in the period from August to December 2020. The interviews were conducted face to face (27 interviews) or online via MS Teams (seven interviews). The average length of the interview was 90 minutes. The interviews were recorded on a dictaphone and then transcribed according to a uniform pattern into a text. The resulting data corpus contained more than 350 pages of text.

3.3 Research questions and analytical procedure

The interviews are a very rich source of data. In this study, I do not attempt a comprehensive analysis of the collected material, but focus on the following research questions:

- 1) What roles does peer learning among university teachers play in integrating digital technologies into higher education teaching?

The main research question was divided into two secondary ones:

- 1.1) What significance do these roles have for teachers?
- 1.2) What limitations emerge from peer learning?

I processed the data in ATLAS.ti software (version 8.0) using several coding procedures. First, I encoded several interviews using the inductive open coding method. I then divided the codes into two categories: *peer learning as support* and *teacher approach to learning with technology*. At the same time, I maintained the level of inductive coding and I marked all passages with more narrow codes chosen ad hoc in the process of open coding: *peer learning: mutual sharing; peer learning: content knowledge; webinars: disconnection from practice; and IT technicians: professional language*.

I then performed a comparative analysis across the interviews. By comparing the statements of different respondents, I identified four key roles of peer learning: *offering emotional support, understanding needs, providing intelligible advice, and mediating experience*. I sought the key aspects in which these roles were beneficial for teachers: *mutual support, saving time*, etc. I also sought to identify limitations, coded as: *limited use of technological tools* and *limited use of technological procedures*.

The results of this study are organized by first introducing the significance that the individual roles of peer learning have for teachers, and by then focusing on the limitations that emerge from peer learning.

3.4 Study limits

When reading the results, several limitations of this study need to be considered. First, teachers were involved in the research on the basis of their own interest and desire to talk about the topic; it can therefore be assumed that the sample mainly represents teachers who perceive themselves as good teachers who approached the pandemic conscientiously and looked for ways and means to learn in this difficult situation.

The second limitation is that the data capture only the teachers' own view of their learning during the pandemic. This is a consequence of the fact that the primary goal of the research was to obtain information about a situation that had already happened at the time of data collection as the intention was to obtain data on teaching in the spring semester 2020, and it was necessary to report on teaching retrospectively.

The third limitation is the lack of observational data from teaching. It is not possible to determine whether the technologies were really integrated. Here, research based on observation of higher education is relatively rare, as academics are afraid of "making" their teaching practices "visible" (Marek, 2009).

4. Results

4.1 Significance of individual roles

Although the teachers consistently asserted that the support from the technological workplace at the time of the emergence of remote teaching was adequate, they also repeatedly stated in their interviews that they turned to their colleagues for support. Although the support of the technological workplace was appreciated, it did not meet all the needs of the teachers. In the results, I elaborate on the individual roles that peer learning plays in integrating digital technologies into higher education teaching and show the importance of those roles for teachers. The roles are as follows: offering emotional support, understanding needs, providing intelligible advice, and mediating experiences.

4.2 Emotional support

Offering emotional support refers to mutual verbal support or sharing concerns during a challenging situation. The importance of this role is considerable for teachers and was repeatedly emphasized by the respondents. The important aspect is that teachers can share their concerns together; they understand each other and therefore they may then dare to take the next step in the process of integration. Tadeus described this importance of this role:

It was difficult. I was quite influenced by an article that a colleague from an American university shared. [...] About not worrying so much about it and that it will definitely not be perfect, and that we should not be stressed. And that helped me, because when I started listing what would change, I was a little scared.

In this statement, Tadeus recalled the early days of teaching affected by the COVID pandemic. It was not important for him to immediately find ways to integrate technology into teaching, but he wanted to share in the fears and anxieties that the new situation brought up. He therefore mentioned an article that his colleague had shared that was focused not on how to integrate technology, but how to “survive” the whole situation. The statement “that it will definitely not be perfect, and that we should not be stressed,” shows that the first step was not to prepare excellent teaching, but to prepare for a challenging situation.

Another aspect to the role of offering emotional support was described by Ema: “We recorded something yesterday and then we couldn’t find it, then we didn’t know what we recorded, where we put it, so it was a bit hilarious... like I cannot say that we did not have a good time after all.” As in the previous situation, we see the power of mutual sharing. This time, the respondent had consulted with her colleagues on the specific procedure of integrating technology into teaching, more precisely, recording the lesson. Even though the situation was difficult (“we couldn’t find it, then we didn’t know what we recorded” etc.) the power of mutual sharing managed to turn a desperate situation into a fun one and Ema was able to continue in the process.

Igor’s statement presents his communication with a colleague about concerns connected with the further use of technology in teaching:

You know what, I still don’t really know if it’s better for me sitting in front of my laptop or if it’s better to be in front of an empty classroom with a camera. [...] I was talking about it with a colleague from Olomouc and I asked him what it was like, and he said: “Absolutely horrible, my friend. [...] You’re talking to the camera, like in an empty classroom, you pretend that there are students, they’re not there, now you’re just nervous about it and now imagine that it’s recorded somewhere.” So... yeah, at this point, I am determined to teach online, synchronously, without recording.

Initially, Igor was not sure if he wanted to record his teaching this way. At the university at one point, the possibility of recording teaching using this approach had expanded. But Igor was considering that this might not be the best way for him. He sought some kind of support for his attitude and

understanding. To find support, he discussed it with his colleague who had a similar attitude and a bad experience. Igor decided not to use this approach, and he found another way to proceed with teaching that fit him better.

4.3 *Understanding needs*

Understanding needs is linked to the fact that teachers either know each other's teaching or, because they teach themselves, they know the context. As a result, they know exactly how to offer tips on dealing with a particular technology or on which technology tool to use. These tips are tailored and are very time-efficient. The situation was described by Mia:

So I attended a webinar, it took an hour and a half and it felt like it wasn't enriching for me at all. [...] So the problem with that is that you just have to spend that real time, an hour and a half, and then you don't find out anything you needed and that just reliably discourages me. I appreciate what my colleague did, for example, that you tell him, I need exactly this, and he'll show you exactly that.

Mia contrasts her participation in a webinar with her experience of getting advice from a colleague. Unlike attending the webinar, which was time consuming and did not meet Mia's teaching needs, consulting with her colleague proved effective. Her colleague knew the context of her teaching and provided the specific procedures she needed. Because there are so many options, it can be very time consuming for teachers to seek the right one for themselves. It is easier to ask a colleague who can provide precise advice and instructions.

Karla commented on the situation in terms of technical as well as pedagogical needs in communication with colleagues:

And we didn't even talk about the technical support; instead, we talked about the pedagogical part. [...] So it was like the bigger challenge than the technical one. That means that when I have a question, I know which colleague to turn to, because he has some kind of mandate to actually advise me.

Karla described a situation in which the sharing of various technological procedures took place within a group of colleagues. As we can see in her statement, the technical problems were not the crucial ones. It was much more important for Karla to link the technical side with the pedagogical side, which was a need that her colleagues could help her with pretty well. At the moment when Karla turned to one of her colleagues, she considered not only whether the person was able to work with technology, but also whether they were able to provide her with advice on the teaching process.

Under these circumstances, it will not surprise most readers that some teachers subsequently proceeded to create guidelines for integrating technologies into teaching according to their experience. Libuse commented on the situation:

At home, I made some instructions for my colleagues on how to click on something in the informatics system. [...] So I actually made them like the printscreen with the red wheel and click here. [...] And I know that some colleagues really did the online lesson, because the students wanted to.

This statement shows that the shared instructions for other colleagues in this case did not concern any sophisticated instructions on how to use specific digital technologies in teaching, but rather instructions and procedures in the information system of Masaryk University. We can also look at the situation from Dusan's perspective: "For us, actually everything was prepared by our colleague, a younger colleague. He began to instruct us because he had experience with it, because he had already worked with it in some way." Dusan described how instructions were prepared for him by a colleague. Filip described a similar experience in which he communicated with secondary school teachers about the tools used online, as he educates future teachers himself and wanted them to learn to work with a platform that they would use in practice later on. Based on the knowledge of their colleagues' teaching practices and the ability to understand their needs, the provided advice could become "tailor-made."

4.4 Providing intelligible advice

Providing intelligible advice refers to advice and procedures that are shared among teachers using "the same language" and avoiding the uncomfortable situation of not understanding the language of IT specialists. Vaclava said:

It's not that I have never hear the word "stream" or that I have never registered the foreign expressions that these young people normally work with, but... [...] For me as a user, the training should probably be, sorry, more human. The IT terminology makes me terribly anxious. [...] Because I always scare myself, "God, what do they want from me?"

It might seem that problems with terminology and technology integration would now typically be experienced more by older teachers for whom the language of the technicians may be distant. However, this was not the case. The problem of mutual understanding repeatedly arose with all ages in the procession. Although Vaclava was a teacher with more than 20 years of experience at the university, the problem was not only in ignorance of the

terms, as described, but in the fact that teachers were not able to think in the IT language, nor to understand it and learn in it. Adam described the situation in a similar way:

Sometimes even in that rhetoric, for example, in the instructive text, I often have to find out what exactly a term means, because after all, it is different when you work in it and develop those things, so it seems very obvious and simple to you, but when the recipient encounters it rarely or for the first time, it is necessary to spend a lot of time understanding how it's done.

Adam, like Vaclava, described how incomprehensible texts are to him and, of course, also time-consuming as individual terms need to be defined. Unlike Vaclava, Adam was speaking of written materials. A colleague's language often seems more user-friendly and comprehensible to teachers, as Libor put it: "I had this mainly from a colleague, therefore pre-chewed, because otherwise I probably wouldn't have made it, as I said, and I still teach at the grammar school." Libor described how the explanations from colleagues became increasingly welcome for him. The comprehensibility of the language presented a time saver for him, as he did not have to spend a lot of time thinking about what each term meant.

4.5 Mediating experience

Mediating experience allows teachers to directly try shared procedures or see their use in teaching. Matous commented: "I have no problem telling him, 'If you have five minutes, come show me' and he tells me, 'Now I tried this here and it just worked for me.' And the little I've picked up, I'll share with my colleagues in turn." Matous described the advantage of being able to meet with a colleague and try the described procedures. At the same time, he described mutual learning and stated that he would not have a problem working in the same way with a colleague. Similar experiences were shared by Gabriel: "I wrote to a few colleagues in person [...] and a couple of times, as colleagues, I helped put some things into the presentations and we started some recording. So yes, we helped each other." The value of the opportunity to try out different technological practices is undeniable.

Peer learning does not necessarily take place in direct interaction. Due to the pandemic, the materials that teachers prepared for teaching became more "visible" to others and their teaching became more accessible. Teachers could therefore share recordings of their teaching and learn from them: "And that's how I managed to create several types of output, which was also practical, and I probably wouldn't have thought of it without looking at what other teachers were doing." (Sarah) Sarah was describing a situation in which she observed a recording of another teacher's teaching and imitated the procedures

she saw, thus integrating not only various technological tools, but also teaching methods. This was also described by Peter:

Such a course was offered for free at the faculty, at the Faculty of Law in Olomouc, and it was just like that, he inspired me with the style that they are like those lessons, such as law, and they are also divided into such short blocks so that one does not have to stare at it. So I was inspired by this, as well.

Peer learning thus takes place not only face to face, but also through the sharing (in this case) of instructional videos, on the basis of which teachers learn intuitively (imitation).

Adam also talked about the possibility of using instructional videos from other teachers for inspiration:

If it were possible to process it with a demonstration or something like that, if it were possible to actually see what can be done, what it looks like, what it leads to if something like this succeeds, I think it would be useful.

Adam thus described a situation in which it would be possible to evaluate what tools could be used on the basis of the recording and to look at what effect the tools have in teaching. Peer observation of teaching can lead to its improvement; at the same time, it is much more understandable for teachers than instructions and recommendations prepared by technicians. This is mainly because teachers understand each other's teaching practices and can subsequently implement the observed procedures or can consult with colleagues. Yet, it is essential to realize that while peer learning has significant benefits, it also has visible limits, as addressed in next section.

4.6 *Limits of peer learning*

In the following lines, I address the two identified limits that peer learning entails and that need to be considered. The *limited variety of technological tools* indicates that although many teachers in the sample were not technological dilettantes, they were not full experts. Their knowledge of technological tools remains limited as they share and recommend or discourage their use. The *fragmented and unsubstantiated procedures* indicates that the procedures shared between teachers were limited by their knowledge of the tools and often remained at a basic level.

- 1) *Limited variety of technological tools*: Adel said: "They say it's better over Zoom than over MS Teams. So I'll try Zoom. Because not only do I actually teach, but now I will even have an interview with a supervisor via Zoom." Teachers shared tips on different technological tools and applications that they adopted from each other, often not seeking other options. Just as

positive experiences were shared, so were negative ones, as teachers established for each other what worked and what they used. An interesting moment occurred when one teacher shared an experience that did not work for him. Virginia said:

A colleague said that he was trying to record in the room... yeah normally in the room where the lessons were supposed to take place, but just lecturing for the empty chairs, so it wasn't quite the thing, yeah so he left it and just went straight to a PowerPoint recording, so we more or less did it all the same.

Virginia described the situation in which her colleague tried to record a lecture for the students at the faculty. This was during a time when the students were not allowed to enter the building and some teachers made recordings in empty classrooms. Virginia's colleague's experience was not good; Virginia then stated that the teacher abandoned the process and the other teachers followed. If the tools that teachers tried at the beginning of pandemic worked, they often remained unchanged, at least in part.

- 2) *Fragmented and unsubstantiated procedures*: At a time when teachers were not aware of the wide range of possible technological tools, they certainly did not know the variations of the different procedures. In such circumstances, procedures that are adopted can become fragmented and reproduce unsubstantiated assumptions about what procedures are desirable and effective. Vaclava said:

Speaking for myself, I thought that if I could handle the lowest level, I would be able to sign up for that meeting in some way, organize it in some way and provide students with some materials [...] that would be enough for me.

Vaclava described the situation when she learned some basic procedures with technological tools; she described it as sufficient. Milada described a similar situation: "A colleague and I made short PowerPoint presentations [...] but at the moment when I was recording, I got stuck on every other word. [...] and I didn't figure out how, in that PowerPoint, how to manage the timing. Maybe there's some technical...way but I just didn't discover it." Milada was describing the situation in which she and her colleagues collaboratively prepared study materials for students by recording PowerPoint presentations; however, this had the disadvantage of requiring repeated recordings due to frequent speech errors. Boris described the situation as "We will keep doing the same thing until the end and we will not create anything." This could be interpreted as reflecting not only a limited knowledge of more precise procedures, but also as a limited will to learn new procedures.

5. Discussion

The aim of this study was to describe the role of peer learning in the process of integrating digital technologies into higher education teaching and show what significance it had for teachers and what limitations this way of learning entails. It is important to highlight that the context of this study was during a period of ERT that placed a greater time burden and a greater degree of stress on teachers than traditional full-time teaching (Marek et al., 2021) and during a time when teachers had only limited space to develop their technological competences (Cameron-Standerford et al., 2020).

I identified four main roles that peer learning among university teachers plays in integrating digital technologies into higher education teaching. *Offering emotional support* refers to mutual verbal support in a challenging situation, encouraging teachers to take the next step in the integration process. *Understanding needs* is when teachers share tips and the support is tailored and very time-efficient, as teachers know the context of each other's teaching. *Providing intelligible advice* refers to advice and procedures shared among teachers using "the same language" and avoiding the uncomfortable situation of not understanding the IT specialists. *Mediating experience* allows teachers to directly try shared procedures or see their use in teaching.

I also addressed two limitations that peer learning entails. The *limited variety of technological tools* refers to the fact that although many teachers in the sample were not technological dilettantes, they were also not full experts. As a result, their knowledge of technological tools remained limited as they shared and recommended or discouraged their use. The *fragmented and unsubstantiated procedures* indicates that the procedures shared among teachers were limited by their knowledge of the tools and often remained at the basic level.

The question arises as to how to relate the results to the findings of other researchers. Studies have long suggested that one reason technologies are not integrated into higher education is insufficiently designed courses and workshops (Baran, 2016; Chukwunonso & Oguike, 2013; Wentworth et al., 2009). Eekelen et al. (2005) reported that teachers learn in (mostly) informal, unplanned interactions with colleagues and described their learning as non-linear; Sahin and Thompson (2007) and Nicolle and Lou (2008) observed collegial interactions to be significant predictors of the technology adoption level. The results of this study confirm these findings. In contrast to webinars and other sources of support, in peer learning teachers perceive mutual and targeted support that happens to be effective for them. I consider the fact that teachers cannot find "the same language" with the IT technicians who generated most of the support for teachers to be an important finding. Webb et al. (2002) showed that in order for the help offered to the learner

to be beneficial, the learner must understand the explanation, have the opportunity to apply what they understood, and use this opportunity. In this context, Horsburgh and Ippolito (2018) argued that it is important to think in the language of a particular discipline.

Studies focused on peer learning in relation to the integration of technologies during ERT are still rare. Le et al. (2022) showed that teachers hoped for the support of a learning management system in courses, to provide peer support and mentoring, and for online communities to share their best practices. A study by Johnson et al. (2020) showed that peer learning was a sought-after source of support and that it had clear benefits for teachers. This can certainly be agreed, but it is essential to realize that while peer learning surely has significant benefits, it also has visible limits. At a time when teachers are looking for support among themselves, there is a high risk that they will be left with limited opportunities to use technological tools as well as insufficiently learned procedures that specialized IT technicians would be able to pass on. In addition, teachers may share mistrust for certain technological tools and practices and thus not integrate technologies into teaching effectively, or only at the basic level. Lintner (2020) mentioned the use of social network analysis to examine teacher relationships and also their collaboration. As far as we know, teachers are diverse in their relations to technology, ranging from fascination to rejection; it would be interesting to look at how networks between teachers work (or are created) and whether teachers create networks among other teachers with the same attitudes and how this further shapes their professional development.

Conclusion

This study presented teachers' approaches to integrating digital technologies into higher education teaching during ERT. Teachers used peer learning as a main source of support. I identified four roles of peer learning and its significance for teachers as well as its limitations. This study can be seen as contributing to the debate on conducting webinars and offering support for higher education teachers in integrating technologies into their teaching. However, it is important to recall that the study is based on data that reflect a period of ERT and that teachers quite logically looked for the most effective and easiest way to teach in this challenging period.

References

- Alqabbani, S., Almuwais, A., Benajiba, N., & Almoayad, F. (2020). Readiness towards emergency shifting to remote learning during COVID-19 pandemic among university instructors. *E-Learning and Digital Media*, 18(5), 460–479. <https://doi.org/10.1177/2042753020981651>
- Alvarez, I., Guasch, T., & Espasa, A. (2009). University teacher roles and competencies in online learning environments: A theoretical analysis of teaching and learning practices. *European Journal of Teacher Education*, 32(3), 321–336. <https://doi.org/10.1080/02619760802624104>
- Baran, E. (2016). Investigating faculty technology mentoring as a university-wide professional development model. *Journal of Computing in Higher Education*, 28, 45–71. <https://doi.org/10.1007/s12528-015-9104-7>
- Baran, E., & Correia, A.-P. (2014). A professional development framework for online teaching. *TechTrends*, 58(5), 95–101. <https://doi.org/10.1007/s11528-014-0791-0>
- Boud, D., Cohen, R., & Sampson, J. (Eds.) (2001). *Peer learning in higher education: Learning from and with each other. Making the move to peer learning*. Kogan Page.
- Boud, D., & Lee, A. (2005). ‘Peer learning’ as pedagogic discourse for research education. *Studies in Higher Education*, 30(5), 501–516. <https://doi.org/10.1080/03075070500249138>
- Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education*, 15(1), 1–6. <https://doi.org/10.5281/zenodo.3778083>
- Buchanan, T., Sainter, P., & Saunders, G. (2013). Factors affecting faculty use of learning technologies: implications for models of technology adoption. *Journal of Computing in Higher Education Volume*, 25, 1–11. <https://doi.org/10.1007/s12528-013-9066-6>
- Cameron-Standerford, A., Menard K., Edge C., Bergh B., Shayter A., Smith K., & VandenAvond L. (2020). The phenomenon of moving to online/distance delivery as a result of COVID-19: Exploring initial perceptions of Higher Education Faculty at a Rural Midwestern University. *Frontiers in Education*, 5, 1–11. <https://doi.org/10.3389/educ.2020.583881>
- Downing, J. J., & Dymont, J. E. (2013). Teacher educators’ readiness, preparation, and perceptions of preparing preservice teachers in a fully online environment: An exploratory study. *The Teacher Educator*, 48(2), 96–109. <https://doi.org/10.1080/08878730.2012.760023>
- Eekelen, I. M. V., Boshuizen, H. P. A. & Vermunt, J. D. (2005). Self-regulation in higher education teacher learning. *Higher Education*, 50, 447–471. <https://doi.org/10.1007/s10734-004-6362-0>
- Englund, C., Olofsson, A. D., & Price, L. (2017). Teaching with technology in higher education: Understanding conceptual change and development in practice. *Higher Education Research & Development*, 36(1), 73–87. <https://doi.org/10.1080/07294360.2016.1171300>
- Ertmer, P. A., Ottenbreit-Leftwich, A. T., & Tondeur, J. (2015). Teachers’ beliefs and uses of technology to support 21st-century teaching and learning. In H. Fives & M. G. Gill (Eds.), *International handbook of research on teacher beliefs* (pp. 403–418). Routledge.
- Georgina, D. A., & Olson, M. R. (2008). Integration of technology into higher education: A review of faculty self-perceptions. *The Internet and Higher Education*, 11(1), 1–8. <https://doi.org/10.1016/j.iheduc.2007.11.002>
- Gronseth, S., Brush, T., Ottenbreit-Leftwich, A., Strycker, J., Abaci, S., Easterling, W., Roman, T., Shin, S., & van Leusen, P. (2010). Equipping the next generation of teachers: Technology preparation and practice. *Journal of Digital Learning in Teacher Education*, 27(1), 30–36. <https://doi.org/10.1080/21532974.2010.10784654>

- Hammersley-Fletcher, L., & Orsmond, P. (2006). Reflecting on reflective practices within peer observation. *Studies in Higher Education*, 30(2), 213–224. <https://doi.org/10.1080/03075070500043358>
- Hendry, G. D., & Oliver, G. R. (2012). Seeing is believing: The benefits of peer observation. *Journal of University Teaching & Learning Practice*, 9(1), 1–9. <https://doi.org/10.53761/1.9.1.7>
- Hendry, G. D., Bell, A., & Thomson, K. (2013). Learning by observing a peer's teaching situation. *International Journal for Academic Development* 19(4). <https://doi.org/10.1080/1360144X.2013.848806>
- Horsburgh, J., & Ippolito, K. (2018). A skill to be worked at: Using social learning theory to explore the process of learning from role models in clinical settings. *BMC Medical Education*, 18(1), 1–8. <https://doi.org/10.1186/s12909-018-1251-x>
- Chukwunonso, F., & Oguike, M. C. (2013). An evaluation framework for new ICTs adoption in architectural education. *International Journal of Informatics and Communication Technology (IJ-ICT)*, 2(3), 183–189. <https://doi.org/10.11591/ij-ict.v2i3.5285>
- Johnson, N., Veletsianos, G., & Seaman, J. (2020). US faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning*, 24(2), 6–21. <https://doi.org/10.24059/olj.v24i2.2285>
- Le, V., T., Nguyen, N., H., Tran, T., L., N., Nguyen, L., T., Nguyen, T., A., & Nguyen, M., T. (2022). The interaction patterns of pandemic-initiated online teaching: How teachers adapted. *System*, 105, 102755. <https://doi.org/10.1016/j.system.2022.102755>
- Lintner, T. (2020). Siete vo vzdelávaní: Možnosti využitia analýzy sociálnych sietí v pedagogickom výzku. *Studia paedagogica*, 25(3), 153–185. <https://doi.org/10.5817/SP2020-3-6>
- Liu, Q., Geertshuis, S., & Grainger, R. (2020). Understanding academics' adoption of learning technologies: A systematic review. *Computers and Education*, 151, 103857. <https://doi.org/10.1016/j.compedu.2020.103857>
- Marek, K. (2009). Learning to teach online: Creating a culture of support for faculty. *Journal of Education for Library and Information Science*, 50(4), 275–292.
- Marek, M. W., Chew, C. S., & Wu, W.-C. V. (2021). Teacher experiences in converting classes to distance learning in the COVID-19 pandemic. *International Journal of Distance Education Technologies (IJDET)*, 19(1), 89–109. <https://doi.org/10.4018/IJDET.20210101.0a3>
- Mercader, C. & Gairín, J. (2020). University teachers' perception of barriers to the use of digital technologies: the importance of the academic discipline. *International Journal of Educational Technology in Higher Education*, 17(4), 1–14. <https://doi.org/10.1186/s41239-020-0182-x>
- Naylor, D., & Nyanjom, J. (2021). Educators' emotions involved in the transition to online teaching in higher education. *Higher Education Research and Development*, 40(6), 1236–1250. <https://doi.org/10.1080/07294360.2020.1811645>
- Nicolle, P. S., & Lou, Y. (2008). Technology adoption into teaching and learning by mainstream university faculty: A mixed methodology study revealing the “How, When, Why, and Why Not”. *Journal of Educational Computing Research*, 39(3), 235–265. <https://doi.org/10.2190/EC.39.3.c>
- Rakes, G. C., & Dunn, K. E. (2015). Teaching online: Discovering teacher concerns. *Journal of Research on Technology in Education*, 47(4), 229–241. <https://doi.org/10.1080/15391523.2015.1063346>
- Ramlo, S. (2021). The Coronavirus and higher education: Faculty viewpoints about universities moving online during a worldwide pandemic. *Innovative Higher Education*, 46(1), 241–259. <https://doi.org/10.1007/s10755-020-09532-8>

- Sahin, I., & Thompson, A. (2007). Analysis of predictive factors that influence faculty members technology adoption level. *Journal of Technology and Teacher Education*, 15(2), 167–190. <https://www.learntechlib.org/primary/p/18935/>
- Shattuck, J., & Anderson, T. (2013). Using a design-based research study to identify principles for training instructors to teach online. *The International Review of Research in Open and Distributed Learning*, 14(5). <https://doi.org/10.19173/irrodl.v14i5.1626>
- Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior*, 118, 106675. <https://doi.org/10.1016/j.chb.2020.106675>
- Schneckenberg, D. (2009). Understanding the real barriers to technology-enhanced innovation in higher education. *Educational Research*, 51(4), 411–424. <https://doi.org/10.1080/00131880903354741>
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Sage.
- Šeďová, K., Nekardová, B., & Rozvadská, K. (2021). Výzva, nebo nemožná mise? Tranzice k online výuce v době pandemie covid-19 očima vysokoškolských učitelů. *Studia Paedagogica*, 26(3), 51–81. <https://doi.org/10.5817/SP2021-3-3>
- Tenenberg, J. (2014). Learning through observing peers in practice. *Studies in Higher Education*, 41(4), 756–773. <https://doi.org/10.1080/03075079.2014.950954>
- Tondeur, J., van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2012). Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence. *Computer & Education*, 59(1), 134–144. <https://doi.org/10.1016/j.compedu.2011.10.009>
- Webb, N. M., Farivar, S. H., & Mastergeorge, A. M. (2002). Productive helping in cooperative groups. *Theory into Practice*, 41(1), 13–20. https://doi.org/10.1207/s15430421tip4101_3
- Weidlich, J., & Kalz, M. (2021). Exploring predictors of instructional resilience during emergency remote teaching in higher education. *International Journal of Educational Technology in Higher Education*, 18(1), 1–26. <https://doi.org/10.1186/s41239-021-00278-7>
- Wentworth, N., Graham, C. R., & Monroe, E. E. (2009). TPACK development in a teacher education program. In L. T. W. Hin & R. Subramaniam (Eds.), *Handbook of research on new media literacy at the K-12 level: Issues and challenges, Volume 1* (pp. 823–838). IGI Global.