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CULTURAL AND REGIONAL PERSPECTIVES

Teachers' experiences of teaching online during COVID-19: implications for postpandemic professional development

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Abstract
As a result of the Great Online Transition (GOT) that occurred during COVID-19, it is increasingly necessary to understand the digital competencies that are required for online and blended learning in the postpandemic era. Postquarantine, higher education institutions must return to on-campus face-to-face learning, a situation which raises questions concerning how to retain the lessons learned from this period of the *forced* acquisition and innovation of online teaching competencies. In this article, we present the results of an interview-based study of teachers' experiences of online teaching during the pandemic. One hundred fifty-one teachers were interviewed over a period of 2 years during the pandemic. We conducted a hybrid thematic analysis to systematize teachers' experiences. Our results show that despite the problems faced due to the disruption caused by the pandemic, several lessons were learned: teachers employed an array of digital tools to maintain content delivery and promote interaction, deepened their understanding of course design and assessment, and developed an empathic disposition to understand students' situations. We build upon these experiences to generate recommendations for developing digital competencies following the GOT.

Keywords Online teaching · Blended teaching · Professional development · COVID-19

Introduction

Although teachers' digital competencies had received a great deal of attention prior to the COVID-19 pandemic due to the constantly increasing digitalization of contemporary society, this interest grew significantly during the Great Online Transition (GOT) (Howard et al., 2022), thus raising questions about teachers' readiness to continue delivering

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instruction during the disruption (Scherer et al., 2021). More recently, this concern has been reinforced in the postquarantine era given the increasing need to understand the digital competencies that are necessary for online and blended learning in a postpandemic context. An example of this interest is An (2021), who states that it is unclear what digital competencies will be needed on the part of teachers and who consequently calls for more research in this area. Given that An's work focused on K12 settings, research exploring teachers' digital competencies in higher education is necessary. Therefore, in response to An's call for research, we present a study on teachers' experiences during the pandemic. We build upon these experiences to generate recommendations for developing post-GOT digital competencies.

Higher education teachers' digital competencies

Before the pandemic, scholars expressed interest in teachers' digital competencies. This interest was aligned with the digitalization processes that affect all human action domains in the context of the so-called Fourth Industrial Revolution (Schwab, 2017). Consequently, higher education institutions were expected to educate graduates in such a way as to ensure that they were competent in using digital technologies, an essential competence to participate productively in the knowledge society. Teachers were considered to be fundamental in the task of integrating digital technologies into their students' educational experiences to promote this objective.

Prepandemic research on teachers' digital competencies aspired to generate frameworks to advance the pedagogical use of digital technologies. These studies have been systematized in recent literature reviews (Basilotta-Gómez-Pablos et al., 2022; Bilbao-Aiastui et al., 2021; Esteve-Mon et al., 2020; Fernández-Batanero et al., 2021; Viñoles-Cosentino et al., 2022; Zhao et al., 2021). The key findings were as follows: (1) A disparity in the competency frameworks employed. The Digital Competence Framework for Citizens (DigComp) and The European Framework for the Digital Competence of Educators (DigCompuEdu) have been most prevalent, but the International Society for Technology in Education Standards (ISTE) and the Spanish National Institute for Educational Technology and Teaching Formation Standards (INTEF) have also been mentioned. Notably, these frameworks were not initially developed for use in higher education. Furthermore, some authors have developed ad hoc models to assess teachers' digital competencies. (2) Teachers tended to report medium to low levels of pedagogical competence and felt unsure of how to incorporate digital tools into their pedagogical practices. The use of digital technology for student assessments was particularly problematic. Therefore, it has been claimed that teachers needed extensive pedagogical training to achieve the expected competencies. (3) Teachers valued development activities, both traditional (courses, seminars) and emerging (reflection on teaching practices, communities of practice). Satisfaction with these instances has been reported and increased self-efficacy regarding teachers' digital competencies emerged as a product of participation in such activities. A helpful summary of the competencies dimensions included in several frameworks is that provided by Esteve-Mon et al. (2020), who affirm that the core elements include (1) basic digital skills—the use of digital tools for interacting with content and with others, which entails the capacity to create content such as documents, multimedia, or other formats; (2) the pedagogical application of digital technologies—application to the learning processes, incorporating them into the design, enactment, and evaluation of learning experiences; (3) the use of technology to support continuous professional development—which implies the capacity to participate in formal

professional development activities and networks in pursuit of this purpose; and (4) the ability to further the digital competencies of higher education students—facilitating technical, communicative and multimedia skills in students, both for learning purposes and for students' professional development.

It is also worth highlighting certain reviews that have situated digital competencies as part of a broader repertoire of teachers' competencies. For example, Dervenis et al. (2022) include digital competencies in their framework alongside personal, professional, educational, scientific, and communication skills. Similarly, Villarroel and Bruna (2017) develop a framework featuring various types of competencies: general—disciplinary knowledge, ability to communicate ideas, theories, and concepts, and demonstrated responsibility and commitment to their teaching roles—specific—the capacity to deploy student-centered approaches to teaching, being capable of designing, enacting and evaluating learning experiences—and transversal—empathy, developing an adequate classroom climate and establishing good interpersonal relationships with students. Both groups of researchers situate the digital across these domains. The competencies highlighted by these authors align with reviews that identify good teaching practices for promoting student achievement (Schneider & Preckel, 2017; Smith & Baik, 2021).

The impact of the pandemic on higher education teachers' digital competencies

Despite the efforts made in the prepandemic era—in part embedded in the research syntheses described above—to systematically advance the pedagogical use of digital technologies, it is acknowledged that teaching was mainly conducted face-to-face and that these technologies were used only occasionally (Daumiller et al., 2021). However, COVID-19 led to massive disruption, causing teaching to transition online rapidly in the form of videoconferencing, the provision of learning resources via learning management systems, and the use of digital libraries to provide bibliographic resources (de Boer, 2021; Yang & Huang, 2021). Indeed, digital technologies' unfulfilled promise of radical educational change (Laurillard, 2008) advanced toward fulfillment during GOT, in which context digitalization trends have done nothing but accelerate. Nevertheless, several problems arose. Students and university professors resented the excessive workload caused by the need to adapt to this online milieu; criticisms emerged regarding the quality of learning and the validity of assessments, and connectivity problems highlighted persistent inequities in education systems. Furthermore, the lack of on-campus interaction put students' sense of belonging and the out-of-classroom learning opportunities that campuses usually offer into question (see for example, Bolumole, 2020; Ordorika, 2020; Raaper & Brown, 2020).

Now, in the postquarantine era, higher education institutions worldwide are returning to on-campus face-to-face learning. This shift generates questions regarding the ability to retain the lessons learned during this period of *forced* online teaching competencies acquisition and innovation. It has been claimed that the face-to-face format will continue to be the primary form of educational experience, but at the same time, higher education institutions will carry forward at least some of the practices developed during the pandemic (IESALC-UNESCO, 2022).

In this context, it is essential to systematize the lessons learned and to project them onto postpandemic professional development initiatives. This article contributes to this goal by presenting a study of teachers' experiences of teaching online during the pandemic. We build upon these experiences to generate recommendations for developing post-GOT digital competencies. The remainder of the article is structured as follows: in the following

section, we describe the methodology used by the study, focusing on setting, design, sample, data collection, and analysis. Subsequently, we present the study results, which are organized around the four competency dimensions proposed by Esteve-Mon et al. (2020) with the addition of Villaroel y Bruna's (2017) transversal competencies. Finally, in the "Discussion" section, we focus on providing recommendations for post-GOT teachers' digital competency development.

Methodology

Setting

There are 140 institutions of higher education in Chile—30 *traditional universities*, 29 *private post-81 reform universities*, and 82 *technical institutions*—including approximately 1,200,000 students attending undergraduate studies during the pandemic. Before these disruptive events, universal access to higher education had been achieved. However, several structural inequities—related to access, retention, and graduation—remained evident in a highly segregated system (Salazar & Rifo, 2020). On the side of teaching, criticisms from international agencies—pertaining to traditional teaching methods or the lack of innovation—(OECD, 2009) led to the development of initiatives for teaching development, the most salient being the implementation of Centers for Teaching Development (González, 2015). Although success was achieved in terms of the development of a vision for student-centered teaching (Marchant et al., 2018), difficulties with respect to implementing student-centered pedagogies remained (Pey et al., 2013). Not only did COVID-19 affect this system, but since October 2019, massive political unrest occurred. Due to numerous protests, the final third of the 2019s semester was completed online, in anticipation of what would become the norm, beginning in March 2020, during COVID-19. These circumstances led to a *double disruption*, amplifying structural problems and significantly affecting teaching and the student experience.

Research design

A qualitative hybrid thematic analysis featuring a pragmatic research approach was employed in this study. Pragmatic research focuses on experience, considers reality to be socially constructed, and aims to develop practical applications for improving action (Goldkuhl, 2012; Morgan, 2014). A deep exploration of teachers' experiences is essential to understand the disruptive, unprecedented scenario in which the study took place. Simultaneously, pragmatic research suits our aim of projecting disruptive experiences for post-GOT teachers' professional development, thus allowing us to develop recommendations for action. Thematic analysis is selected because it is a highly flexible approach that, given the theoretical freedom it offers, has been employed in the context of a variety of qualitative approaches. Even so, this approach can generate rich and complex analyses (Nowell et al., 2017). It permits researchers to identify, analyze, describe, and report on themes emerging from a qualitative dataset (Braun & Clarke, 2006). Its hybrid variant combines a deductive approach with the development of themes inductively from that data (Fereday & Muir-Cochrane, 2006). This approach is useful in such a study given that at least part of the teachers' experiences, due to the exceptional circumstances, were unlikely to be captured by an a priori codebook.

Sample

We developed explicit criteria for a purposive sample. Teachers should come from institutions representing a fair picture of the diversity of the Chilean higher education system. We expected balance in terms of gender, disciplinary area, years of experience, and type of contract. Indeed, we sought higher education teachers who were teaching undergraduate courses online due to COVID restrictions. We approached authorities from higher education institutions to invite them to participate. Eight institutions accepted the invitation. Two of these institutions were *traditional universities* (TU), three were *private post-81 reform universities* (PU), and two were *technical institutions* (TI). Senior staff supported us in developing a balanced qualitative sample in terms of our sampling criteria. Over a period of 2 years (2020–2022), we conducted 151 interviews. Table 1 presents a summary of the sample features.

Data collection

An interview protocol was developed based on the extant literature on teaching competencies (for example, Biggs & Tang, 2011; Esteve-Mon et al., 2020; Laurillard, 2013; Selwyn, 2014; Villarroel et al., 2018). Expert judgment was sought from two experienced researchers and two senior teaching staff members. Pilot interviews were conducted to test the clarity of the questions. Both processes led to schedule adjustments.

Potential interviewees were emailed with an invitation to participate in the study. Those who agreed to participate received informed consent forms approved by the PUC Ethics

Table 1 Sample

	Traditional universities	Private post 81 universities	Technical institutions
Reported gender			
Women	32 (54.2%)	32 (57.1%)	17 (47.2%)
Men	27 (45.8%)	24 (42.9%)	19 (52.8%)
Disciplinary area			
Social sciences and humanities	35 (59.3%)	28 (50%)	19 (52.8%)
Science, technology and health	24 (40.7%)	28 (40%)	17 (47.2%)
Years of experience			
Up to 10	22 (37.3%)	34 (60.7%)	21 (58.4%)
11–20	20 (33.8%)	12 (21.5%)	9 (25%)
More than 20	17 (28.9%)	7 (12.4%)	6 (16.6%)
Without information	–	3 (5.4%)	–
Type of contract*			
Full-time	40 (67.8%)	13 (23.2%)	20 (55.6%)
Part-time	10 (16.9%)	27 (48.2%)	12 (33.3%)
Casual	8 (13.6%)	15 (26.8%)	4 (11.1%)
Without information	1 (1.7%)	1 (1.8%)	–
Total	59 (39.1%)	56 (37%)	36 (23.9%)

*We followed the definition provided by the National Council of Education. Full-time: between 33 and 44 weekly hours. Part-time: between 20 and 32 weekly hours. Casual: 19 weekly hours or less

Committee (Protocol 200603003). Semistructured interviews were conducted by experienced research assistants via videoconferencing to collect data. Interviews were conducted in Spanish, lasted between 45 and 90 min and were recorded using the videoconferencing platform recording tool. It is important to note that interviewing during lockdown was challenging. Remote interviews may negatively influence rapport, affect interviewees' fatigue, and discourage in-depth interaction. However, on the other hand, this approach has a broader reach and offers visual cues that are similar to face-to-face cues. (Keen et al., 2022). Our own experience supported both sides of this argument. This approach allowed us to conduct interviews that would otherwise not have been possible considering the circumstances. Simultaneously, it saved traveling time to reach teachers, particularly those who were far away from our location. However, the process was affected by intermittent internet connectivity, difficulties with managing different videoconferencing platforms, and some teachers who preferred to keep their cameras off.

Each interview was transcribed verbatim and assigned a unique code for easy identification. Transcripts were stored in well-organized digital folders, and an Excel file was employed to keep a record of transcripts, including information regarding the participant's institution, gender, disciplinary area, type of contract, and years of experience.

Data analysis

Interviews were analyzed using a hybrid thematic analysis (Fereday & Muir-Cochrane, 2006). Initially, we developed a codebook based on the relevant literature. Team members coded approximately one-third of the interviews using this codebook. Subsequently, subthemes were developed inductively based on more specific or unexpected themes emerging from the interviews. Two team members performed this procedure, analyzing the initial set of transcripts. The proposed codebook, including deductive and inductive codes, was presented and analyzed over the course of several research meetings. As data collection period intertwined with the data analysis, when new transcripts arrived, they were used to continue developing and validating the codebook. After consensus was reached, a sample of 15% of the interviews (n = 23) was double-coded to calculate intercoder reliability, which is appropriate according to the guidelines proposed by MacPhail et al. (2016). A coding comparison was conducted using NVivo software. This iterative process started by coding a small group of transcripts, calculating Cohen's Kappa values, conducting dialogic reliability checks, and adding new transcripts in each iteration. This process led to significant improvement, and substantial agreement was reached (Kappa = 0.73). The remainder of the interviews were then coded independently by individual team members. One team member who did not directly participate in the coding process reviewed the analysis to determine whether the themes fit the data.

Throughout the process, the team held weekly meetings. These meetings allowed the team to develop a shared understanding of the codes, calibrate the research assistants' coding processes, analyze complex transcripts, and discuss coding decisions to ensure consistency. These meetings also provided a space for reflexivity and peer debriefing. Detailed minutes of these meetings were kept, and the issues discussed, and decisions made were recorded to ensure an audit trail.

Direct member checking was impossible due to the exceptional circumstances in which this study was conducted. However, the findings were presented to senior teaching staff members from the participating institutions. The feedback received indicated a broad consensus that the themes appropriately represented teachers' experiences.

Results

In this section, we organized a narrative of themes drawn from our analysis oriented on the four dimensions of teachers' digital competencies proposed by Esteve-Mon et al. (2020) (basic digital skills, the pedagogical application of digital technologies, the use of technology to support continuous professional development, and the ability to further the digital competencies of higher education students). We also incorporated the analysis of transversal competencies offered by Villarroel and Bruna (2017), given the importance that such competencies acquired during the pandemic. We organized our results around these five dimensions to converge the analysis of teachers' experiences with teachers' digital competency development needs for post-GOT online and blended teaching. Weprovide, within this section, selected interview excerpts and, as an Appendix, Tables 3, 4, 5, 6 and 7 with the full set. In bothcases, a number is assigned to highlight the fact that they are drawn from different transcripts.

Basic digital skills

At the beginning of the COVID-19 pandemic, teachers had different self-perceptions of their digital pedagogical skills. Teachers with good self-perceived skills, e.g., teachers who were advanced in the use of the institutional learning management systems and/or had the ability to create multimedia content before the disruption, were well positioned to respond to the pandemic.

> [ ] When you know these technological resources, how to develop a game, how to create a quiz (using the learning management system), it facilitates (teaching) enormously. (I11).

On the other hand, teachers who reported self-perceived poor digital skills struggled. In this case, particularly at the beginning of the sanitary crisis, teachers noted that they were disoriented, particularly those who were older. As time advanced, these teachers had to learn and try to apply the digital tools that were necessary in the new context.

> I really struggled with the system. Zoom was really difficult for me [ ] for those of us who are older; it is more complex (I128).

The pedagogical application of digital technologies

The pedagogical application of digital technologies relates to the tasks of learning planning and designing, enacting educational experiences, and assessing students' learning.

Regarding planning and design, the need to adapt course design by prioritizing content and decreasing the length of classes emerged. Teachers engaged in more detailed course planning due to the necessity of accommodating content and interaction in the face of shortened schedules and with the aim of reducing students' uncertainty. This approach represented a change from prepandemic teaching, in which context some degree of looser planning was allowed, as was some degree of improvisation. Although more detailed and tight planning was reported, teachers also had the flexibility to cope with disruptions resulting from connectivity issues, lack of attendance, or other unexpected events.

> Sometimes you need to vary class content because you have planned an activity [ ] and half of the class had a connectivity problem, or half is not there, you cannot advance as much as you want, because groups are not working…(I29).

Second, the enactment of learning experiences presented several issues. Teachers noted that they perceived that most students attended online classes with their cameras off. This situation deprived teachers of the visual cues that they usually employed to familiarize themselves with the classroom climate and make adjustments when necessary. This made it difficult for them to determine whether students were paying attention or understanding the content. Teachers expressed frustration. Some intended to explain this situation by blaming students' lack of motivation and feelings of shame when participating. However, other teachers elaborated on students' material conditions: the lack of proper space, the lack of (or the possession of only poor) devices, and/or bad internet connections. Interviewees noted that this situation was the case for students from lower socioeconomic backgrounds who lived in small dwellings alongside several people and shared computing devices with other family members or those who lived in areas with poor internet access or with scarce resources for maintaining a continuous connection.

> Internet problems… where they (students) live, they have many connection problems, so they consume their connection trying to watch the video…[ ] My students live with several people in their houses, and these are small houses… this generated problems when attending (I5)

To overcome these problems, teachers implemented several strategies. Some teachers employed digital tools to promote interaction during synchronous online classes, given that interaction was difficult to achieve. Tools used for this purpose included Kahoot!, Miro, Padlet, Mentimeter, Online Surveys, and Online Group Rooms, among others. Similarly, video-conferencing embedded chat tools emerged as a critical medium for promoting interaction. Teachers reported that chatting over the microphone became the students' preferred means of communication. From the teachers' perspective, a regular online class was a challenging situation due to the need to orchestrate several channels (video, microphone, and chat), digital tools for interaction, and the delivery of class content using both traditional resources, such as PowerPoint, and emerging resources, such as online whiteboards.

> …but, as I am presenting, several times I am not watching the chat, I tried to be multitasking and reading the chat like…ok "that is your classmate saying…" let's answer. But it was difficult…kind of lost the class focus (I143).

Regarding asynchronous content and interaction. The use of video recording in the form of video capsules explaining content allowed students to engage with specific content on their own time. Furthermore, online class recordings were uploaded to the learning management system for the students to watch later. Moreover, several materials, such as PowerPoint or bibliographic resources, were also uploaded to the learning management system. Interaction between class sessions occurred mainly by employing other *informal* means, for example, WhatsApp groups. This approach significantly increased teachers' workload, thereby affecting their well-being.

> I have a WhatsApp group with students, only for academic purposes…it is not for sending memes [ ] I usually, for example, send them, links to the papers I have been talking in class, or a link to something related to the class or a file (I98).

Students' assessments required adaptation. In a situation in which it was impossible to control the materials students had at hand while completing exams, traditional exams focused on rote memorization, which had previously been widely used, were no longer feasible. This situation generated controversy. On the one hand, teachers complained about students openly cheating on their exams. However, on the other hand, several teachers became aware of the need for a change and sought to deploy practices that resembled authentic assessment practices.

> The exams we did before, that defined a big chunk of the course grade…[ ] memorization based [ ] it is not possible to do them anymore [ ] what I do now is application, several small exams [ ] I am not interested in that they resolve an integral, I want them to apply that to a real life situation, that they know when and what for you can apply that…(I95).

The use of technology to support continuous professional development

Before the pandemic, teachers had several opportunities to engage in teaching development, including diplomas, seminars, and workshops. Such development pertained both to pedagogical issues and to the use of digital technologies for teaching—mainly with regard to the technical aspects of using the institutional learning management system. These opportunities were conducted in blended learning formats, featuring both face-to-face sessions and asynchronous interaction. Teachers valued these instances but also expressed certain reservations. Competing demands among teaching, administration, and research—in research-oriented institutions—led to work overload. Prepandemic teaching development, however, was essential for facing the challenges resulting from the pandemic. Teachers who had participated in these activities felt better prepared to face pedagogical and technological challenges.

The social outbreak entailed the need for teachers to be better prepared for uncertain emerging conditions. Thus, higher education institutions started by providing more intensive online training for online teaching. During this stage, as the 2019s semester had finished mostly asynchronously, training was focused on developing video capsules, delivering content via the learning management system, and conducting online evaluations.

> When the social outbreak came [ ] they (training staff) [ ] started to prepare us, we learned online platforms… sent a couple of handbooks… [ ] and now came the pandemic…(I29)

The COVID-19 pandemic led to a rise in videoconferencing. Therefore, alongside supporting teachers' use of institutional learning management systems, training was focused on this essential tool for online synchronous teaching. Simultaneously, teachers reported that, given the difficulties they faced with regard to motivating and evaluating students, these topics were included. Both technical and pedagogical aspects were highly valued. However, an increasing number of compulsory courses led to a feeling of work overload, particularly during the second semester of 2020.

> The problem is that (on top of courses for online teaching) everything starts accumulating now in December: exams, teaching reports, and so on… (I29)

Moreover, as different levels of competency were not considered, teachers with higher skills complained when the courses seemed to be basic.

The ability to further the digital competencies of higher education students

With regard to the teachers' perspective, teachers generally perceived that students use digital technologies intensively, particularly with respect to social networks. Teachers employ these technologies to align with what they perceive as the form in which their students want to learn. In this regard, several such technologies were used to deliver content or maintain communication and interaction during the pandemic (for example, Instagram, YouTube, and TikTok, among others). However, some teachers felt less prepared than their students to use these tools.

> I think students know digital technologies better [ ] they are inserted in new technologies, they are inserted in social networks, all the time, during classes, before, after [ ] If you use these tools for learning I think for them it will be closer (to their everyday lives) (I27)

Regardless of students' high level of social network use, teachers also generally perceived that they were less confident and struggled with the use of digital technologies for learning and professional purposes. First, teachers noted that it is not apparent that students know how to employ the digital technologies officially provided by their institutions (such as learning management systems, digital libraries, or videoconferencing) or other technologies that are not provided by the institutions but are used to promote interaction (for example, Padlet or Kahoot).

> Sure…they use social networks, but they do not manage…they are not able to use other types of digital technologies that allow them to participate more actively in classes (I24).

Simultaneously, teachers reported problems with the digital tools that students must incorporate as part of their professional development. Students seem unprepared to learn how to use such tools at the expected level.

Transversal competencies

The deployment of transversal competencies—particularly the capacity to establish a safe learning environment, ensure accessibility to students, and have the disposition to understand students' situations (with regard to both personal and academic matters) were emphasized by teachers as crucial in the exceptional circumstances that were in effect during COVID-19.

Concerning the capacity to establishment a safe online learning environment, teachers claimed that it is essential to provide students with the confidence to interact academically. For teachers, such interaction is important because students tend to feel insecure and ashamed in the context of participating. Establishing a safe environment can help break such an asymmetric relation. In this manner, more horizontal relationships may allow students to ask questions when they do not understand the content and cause them to feel as if they can make mistakes as part of their learning.

> …being close (to students) for them to feel confident to participate… for them not to feel the teacher is a "superior being." (I14)

In line with the establishment of a safe environment, teachers highlighted the importance of being accessible. This factor focused on their availability to answer questions and provide feedback when necessary. Simultaneously, it entailed being close to students, attributing importance to a more holistic relationship and balancing this relationship with the establishment of clear rules and an emphasis on the need to meet course requirements.

> It is important to create a link with students… a space to know them in their particularities [ ] …accompany them in the process …(I24).

During the pandemic, teachers became aware of several complex conditions faced by students. Teachers perceived differences in students' living conditions. Examples include disparities in terms of digital devices or the features of physical spaces that facilitate participation in synchronous sessions and independent study.

> We have found that students have several difficulties, several different realities. Students who connect from a notebook or PC, other only from a cell phone, [ ] not all of them have an established workspace [ ], so you have to consider that… (I7).

Moreover, issues related to the need to care for family members (children, elders) and financial matters—particularly during quarantine—also affected students' learning. Teachers developed a disposition that allowed them to understand students' conditions. Empathy became crucial for ensuring flexibility and accessibility and for providing different means to facilitate student engagement.

Discussion

In this study, we investigated higher education teachers' experiences of teaching online during COVID-19 with the aim of contributing to current debates on teachers' digital competency development needs during this disruptive era.

We found that, with regard to *basic digital skills*, teachers entered the pandemic with different levels of competencies. This finding aligns with previous research claiming teachers tend to report that they are unclear with regard to the task of incorporating digital technologies into their practice (Esteve-Mon et al., 2020; Zhao et al., 2021). In relation to *the pedagogical application of digital technologies*, these disruptive times represented a period of *forced* innovation due to the rapid transition to online teaching (Howard et al., 2022). Teachers expanded the range of digital technologies in use, adopting both *institutional* (i.e., tools that were provided by their institutions, for example, learning management systems, video conferencing tools & digital libraries) and *noninstitutional* (i.e., tools that were not provided by their institutions, for instance, WhatsApp, Instagram, YouTube, TikTok, Kahoot!, Miro, Padlet, and Mentimeter, among others) tools (González et al., 2022). This contrasts with prepandemic research that highlighted low to medium levels of use and low capacity to implement digital technologies in designing and enacting learning experiences (Esteve-Mon et al., 2020). A key problematic issue was that of student assessment. Prepandemic research has demonstrated that in Chile, teachers exhibited a lower level of competencies, employing mainly traditional forms of assessment (Peña Vicuña, 2019). At the international level, Esteve-Mon et al. (2020) highlighted the fact that teachers' least advanced competency regarding the use of digital technologies pertained to assessment. In this disruptive scenario, the need for more sophisticated and authentic forms of assessment

emerged. Regarding *the use of technology to support continuous professional development*, prepandemic professional development, particularly during and after the social outbreak, helped teachers cope with the COVID-19 scenario. Teachers also valued professional development during the lockdown, which was aimed at the development of digital technology competencies and an improved understanding of student learning processes in this scenario. However, professional development represented another source of work overload. It is also important to notice that these activities were in traditional formats (e.g., workshops or seminars), similar to what Esteve-Mon et al. (2020) described in their systematic review. These authors proposed, therefore, advancing towards other forms of professional development afforded by digital technologies (e.g., online communities of practice, professional networks, peer support, or dissemination of experiences with technology). Regarding *the ability to further the digital competencies of higher education students*, teachers found that, unlike the common sense of "digital natives", students exhibited heterogeneous levels of digital technology use. Some students resembled digital natives in certain respects, while others exhibited relatively modest use. (Selwyn, 2014). Before the pandemic, research showed that teachers were skeptical about the need to teach digital elements in their courses as they perceived their students already had strong digital skills (Esteve-Mon et al., 2020). Our results demonstrate that there is indeed a need to teach how digital technologies can support both learning and future professional practice. Finally, *transversal competencies* emerged as essential during the pandemic. The capacities to establish a safe learning environment, ensure accessibility for students, and have the disposition necessary to understand students' situations were highlighted as important in the context of disruption. Prepandemic reflections on these issues highlighted the importance of establishing good interpersonal relationships with students (Villarroel & Bruna, 2017). Our results show that, as a product of these disruptive times, an increasing awareness of the value of transversal competencies emerged.

These elements portray a complex situation, in which several adaptations needed to be made. However, this situation was also a period of tremendous learning, particularly with regard to advancing the incorporation of digital technologies into teaching and learning, prioritizing content, introducing new forms of assessment, and developing empathic relationships with students. All these elements, if preserved and deepened, may help us overcome long-lasting issues in teaching and learning in the context of higher education, which in the case of Chile is paramount. With the aim of projecting the lessons learned, we subsequently offer some practical recommendations.

Basic digital skills Teachers' digital competencies are not homogeneous. It is not the case that because teachers engaged in *forced* innovation, their knowledge and skills with regard to online and blended teaching were leveled (teachers reported problems throughout the pandemic). Therefore, the consequence is that trainers must account for these differences when designing development initiatives. This task may entail the creation of different learning paths depending on the initial stage.

The pedagogical application of digital technologies First, in relation to the planning and designing of learning, teachers learned to prioritize content and engage in more detailed planning. This approach represented an advance in the case of Chile, where curriculum overload is common. To deepen what has been learned, teachers need systematic guidance on curriculum development and learning design. The literature on teachers as designers may be helpful as a framework, particularly the work on the use of digital tools for collaborative design (Laurillard et al., 2018). Moreover, training in the use of emerging tools from the field of curriculum analytics may help with the collection of real-time data on how students cope with workload (Hilliger & Pérez-Sanagustín, 2022). Second, teachers need

pedagogical models to understand their role in the learning processes to improve the pedagogical integration of the array of digital technologies employed. Laurillard's (2013) conversational framework is helpful for distinguishing among types of learning (acquisition, inquiry, practice, production, discussion, and collaboration) and determining how digital technologies may serve those goals. Such a framework may guide teachers to select appropriate tools for achieving their pedagogical aims. It is also important not to omit technical training regarding the task of integrating and embedding digital technologies into the institutional learning management system. Several learning management system-specific handbooks may help in this task [for example, John, 2021 (CANVAS)]. Third, teachers were forced to innovate in terms of assessments during the pandemic, with the results resembling authentic assessment practices. This situation is, therefore, an opportunity to deepen these practices by systematizing the work that has already been done in this respect. Valuable resources include the Villarroel et al. (2018) conceptual model and St-Onge et al.'s (2022) description of teachers' experiences using e-assessment.

The use of technology to support continuous professional development During the post-GOT era, professional development must consider what has been learned during COVID-19, as noted in other parts of this discussion. In so doing, it is also essential to complement traditional instances of development with emerging approaches (for example, the development of communities of practice or peer support). Simultaneously, issues related to time management and work overload are essential. In this context, the model for professional development for online and blended learning proposed by Philipsen et al. (2019) may be effective as a reference framework.

The ability to further the digital competencies of higher education students Given that teachers realized that students need support to use digital technologies, teachers are closely involved in the task of furthering students' digital competencies, particularly in learning and professional settings. The Laurillard (2013) framework may be useful in explaining to students how different technologies may serve different forms of learning. With regard to discipline-specific digital tools, disciplinary communities may need to develop resources to support students in learning to use the digital tools associated with specific fields.

Transversal competencies It is important to deepen transversal competencies, particularly empathy. Before the pandemic, reports and student protests (particularly in fields such as medicine and architecture) highlighted situations that made it apparent that these competencies were scarce. A significant change in this context could be encouraged based on the awareness of students' conditions obtained by teachers during the disruption caused by the pandemic. The general competency frameworks proposed by Villarroel and Bruna (2017) and Dervenis et al. (2022) may help promote such a transformation.

Table 2 summarizes teachers' experiences during the GOT and their implications for professional development during the post-GOT era.

This study faces certain limitations. The teachers interviewed were those who expressed their willingness to participate, which may have led to a bias toward individuals with more interest in teaching. As it is not possible to generalize our findings, the recommendations we provide are based solely on the experiences of the participating teachers. Therefore, to be helpful, these suggestions must be interpreted in light of the particular contexts in which they may be considered. In addition, as our understanding of post-GOT teachers' digital competency development needs remains preliminary, the proposed resources for professional development are mostly focused on a prepandemic situation.

These limitations raise questions that can be addressed by future research. First, it is important to continue systematizing teachers' experiences both during and after the GOT to generate resources that explicitly take those experiences into account. Trying to reach

Table 2 A summary of experiences of teaching during GOT and their implications for post-GOT age training

Competency dimension	Experience during GOT	Implications for post-GOT age training	Resources
Basic digital skills	Teachers had different levels of digital competencies	It is not possible to assume teachers' digital competencies are homogeneous. Different learning paths are needed	Assessment tools for teachers' digital competencies (Bilbao-Aiastui et al., 2021; Zhao et al., 2021)*
The pedagogical application of digital technologies	Teachers learned to prioritize content and engage in more detailed planning	Teachers need systematic guidance on curriculum development and learning design to build upon their experiences	Digital pedagogical planners (Laurillard et al., 2018) Curriculum analytics (Hilliger & Pérez-Sanagustín, 2022)
	Teachers employed several *institutional* (provided by their institutions) and *non-institutional* (not provided by their institutions) digital technologies for delivering content and promoting interaction	Teachers need technical training for integrating and embedding digital technologies in their institutional learning management system. More important, they need pedagogical frameworks to understand the role of digital technologies s and how students use them	LMS handbooks (for example, John, 2021) A pedagogical framework for the use of digital technologies (Laurillard, 2013) Description of students' use of digital technologies (González et al., 2022)
	Traditional rote memorization exams were not feasible. Teachers engage in practices that resemble authentic assessment	Teachers need training that helps them to systematize pandemic assessment practices. They need to conceptualize authentic assessments for post-GOT deployment	A clear conceptual model for authentic assessment (Villarroel et al., 2018) An understanding of e-assessment practices (St-Onge et al., 2022)
The use of technology for continuous professional development	Teachers valued both technological and pedagogical professional development, but excessive training overloaded them	It is important to incorporate "pandemic lessons" in post-GOT professional development, broaden the range of activities (e.g., advancing towards participation in communities of practices or peer support), and consider issues related to work overload	A professional development framework for online and blended learning (Philipsen et al., 2019)
The ability to further digital competencies for university students	Students made intensive use of social networks but were less prepared for using digital technologies in their learning processes and for learning digital tools for their professional disciplines	Teachers have much to do with furthering students' digital competencies, particularly for learning and professional settings	A pedagogical framework for the use of digital technologies (Laurillard, 2013) Description of students' use of digital technologies (González et al., 2022) Discipline-specific digital tools and resources handbooks or other materials

Table 2 (continued)

Competency dimension	Experience during GOT	Implications for post-GOT age training	Resources
Transversal competencies	Teachers' capacity to generate a safe learning environment, be accessible for students, and have the disposition to understand students' situations, were essential during the pandemic	Teachers need professional development that helps deepen transversal competencies to maintain what they learned during the pandemic	Teaching competencies models by Villarroel and Bruna (2017) and Dervenis et al. (2022)

*However, consider that existing ones have not been developed initially for higher education (there is a need for developing assessment tools specifically for higher education). Also, consider that post-GOT digital competencies may vary

specific groups, for example, casual teachers—who were less willing to participate in this study—may provide a more complete picture. Second, it is necessary to develop competency assessment tools both from and for higher education settings, given that existing tools focus on other educational levels. This sort of tool would be important, for example, to assess teachers' digital competencies levels and to offer personalized training paths. Third, it is necessary to conduct research to evaluate how this disruptive GOT period impacted teaching practices: What will be maintained? What will be left aside? How will these elements impact problematic issues that were diagnosed before the pandemic (either positively or negatively)? These are all relevant questions for the post-GOT era.

The recommendations mentioned above are important at this stage of research and reflection on postpandemic teachers' digital competency development needs. As institutions return to entirely face-to-face on-campus learning, the risk of returning to practices similar to prepandemic practices emerges. In this article, we found that teachers' *forced* digital technology deployment led to significant learning regarding how to employ those technologies for pedagogical purposes. In parallel, essential changes in assessment and teacher-student relationships occurred. These changes are crucial for higher education in Chile, particularly given the problems with and critiques of the system that were in evidence before the disruption caused by COVID-19. These findings may also resonate in other contexts. An auspicious future takes these learned lessons as a guide to system improvement. However, the danger of continuing along the same path due to inertia persists. In this less optimistic scenario, instead of amplifying innovation, these changes would remain within the usual group of enthusiast teachers without affecting the entire system.

Conclusion

In this study, we focused on teachers' experiences of teaching online during COVID-19. Our objective was to contribute to current debates on the digital competencies that teachers will need in the post-GOT era. Our results showed that teachers faced a very difficult situation. However, they simultaneously obtained a tremendous amount of learning: they expanded the range of digital technologies in use to maintain content delivery and promote interaction, developed innovations in terms of course design and assessment, and developed an empathic disposition to understand students' situations. Now that institutions are returning to on-campus face-to-face learning, questions emerge regarding the extent to which these lessons learned can be preserved. We provided several recommendations for advancing toward an auspicious future scenario in which innovation is maintained and strengthened.

Appendix: full set of interview excerpts

See Tables 3, 4, 5, 6, and 7.

Table 3 Basic digital skills

Basic digital skills	Illustrative quotations
Teachers with self-perceived good digital skills were better prepared for facing disruption	*…(Previously) I developed several video capsules… [] When the pandemic came, I had this important bank of resources… [] We had 17 anatomy videos, 15 to 20 min each, that encompassed the whole anatomy academic program… this allowed me to do flipped classroom (during GOT)… [] When you know these technological resources, how to develop a game, how to create a quiz (using the learning management system), it facilitates (teaching) enormously. (I11)*
Teachers with self-perceived poor digital skills struggled	*If you, in March 2019, had told me I had to do my classes entirely online, I had told you, 'No way, I quit!'. I really struggled with the system. Zoom was really difficult for me [] for those of us who are older; it is more complex (I128)*
	To be really honest, this (online teaching) found us in a very, very initial stage. So, when we realized we had to start with online classes… as time advanced, we had to go repairing, fixing things, and also experiencing a lot of problems [] Those who are older are not really into new technologies (I7)

Table 4 The pedagogical application of digital technologies

	Illustrative quotations
Planning and designing of learning	
Prioritizing contents and shortening classes	*… what we did was eliminating some texts that before were mandatory [] I also followed the recommendation of doing one class module only (not two) [] because it seemed an aberration to me… because I knew it was impossible to keep students' attention for so long… (I81)*
Need for more detailed planning	*Preparation is important [] in this (online) modality you need to have everything planned…what are you going to do, how you are doing it, even thinking in advance possible students' questions [] you need to provide much more learning resources…in the other modality (face to face) you had a broad idea of what you wanted to do and there (in the class) you managed your time, you didn't need many resources because you were the resource… (I50)*
Flexibility with design	*Sometimes you need to vary class content because you have planned an activity [] and half of the class had a connectivity problem, or half is not there, you cannot advance as much as you want, because groups are not working…(I29)*
Enactment of educational experiences	
The lack of visual cues does not allow realize students are paying attention or understanding the contents	*…when I'm in class…and as students do not have their cameras on… it isn't easy to understand what part (of the class content) is challenging or not… Whether I'm capturing their attention or not… if I use a video, is it attractive to students? … have you understood that text? (I29)*
	(In face-to-face classes) you perceive what students are doing, but online, you cannot require that students turn the cameras on… (so you miss) reading how these persons are looking at you, the questions… (I120)
Low interaction	
Low interaction is because students were not motivated or felt ashamed of participating	*… so I had students that were not even…that suddenly turn the camera on, and they were still in bed… that sort of stuff…so there was not so much interest (from students) [] I think it was lack of motivation, lack of commitment (I88)*
	I think there is an issue of shame; they feel ashamed if they have to turn their cameras on and speak using the microphone (I60)

Table 4 (continued)

	Illustrative quotations
Low interaction is due to students' material conditions	*Internet problems… where they (students) live, they have many connection problems, so they consume their connection trying to watch the video…[] I had to turn my camera off…the first classes were with the camera on but it was a disaster…all got disconnected, and I couldn't carry out the class [] My students live with several people in their houses, and these are small houses… this generated problems when attending (I5)*
	It may be that their houses are not that silent, not really pleasant for showing themselves…when they turn on their microphones, there is a lot of noise (I121)
Strategies for increasing synchronous interaction	
Breakout rooms for dialogue and collaboration	*I had the objective of active participation [] Dialoguing in (zoom breakout rooms) small groups… assigned randomly…that is the strategy. [] These small groups talked, engaged in dialogue, and created a presentation …[] (after the work in breakout rooms), all groups presented to the whole class generating questions…interaction (I38)*
Padlet for sharing and discussing students' work	*…there were six classes (in the context of a design for e-commerce course) in which we did six exercises… at the end, we had a portfolio with all those pictures, and they uploaded to a Padlet…all students could see them…could see their classmates work and evaluating… giving stars or giving hearts… to see who photographed the product better. (I44)*
Voting and gamification tools for promoting participation	*When you make a question, and one asks "who wants to answer?" nobody does [] but in the context of the pandemic, there is the zoom voting tool [] or equivalents such as Mentimenter or Kahoot! (I72)*
Online conceptual maps for collaboration	*I used Miro [] teaching them to do conceptual maps in groups [] each group had a space for them to complete … (I146)*
Strategies for delivering content asynchronously	
Video capsules with specific content uploaded to LMS	*I did (video) capsules on the history of the book in Chile…so students watched the capsule to know that content [] I am going to ask that two classes later…and in class, I remember students "watch the video because we are going to get back on this in the next course module"…(I108)*
Online classes recordings uploaded to LMS	*(There are) students that cannot be in (online synchronous) class [] they were with more people in their houses, they were taking care of brothers or whatever… so they watched the (recorded) class during the night… (I61)*

Table 4 (continued)

	Illustrative quotations
Bibliographic materials, PPTs, etc., uploaded to LMS	*(The learning management system) allows that you upload content in an organized manner. For the course introduction, I prepared a video where I explained the course…so we have the course program, so we have week by week…I have modules, I upload the zoom video, the content, and any other extra material… the basic bibliography… (I75)*
Chat was the preferred means for interacting in online classes	*Most interaction is by using the chat, when I ask a question students answer through the chat (I31)*
	Students participate…but they always participate more using the chat than …let's say live, by the microphone (I80)
Challenges integrating several interaction channels	*…but, as I am presenting, several times I am not watching the chat, I tried to be multitasking and reading the chat like…ok "that is your classmate saying…" let's answer. But it was difficult…kind of lost the class focus (I143)*
In-between classes interaction through *informal* means	*I have a WhatsApp group with students, only for academic purposes…it is not for sending memes [] I usually, for example, send them, links to the papers I have been talking in class, or a link to something related to the class or a file (I98)*
Evaluation of student learning	
Concerns with students cheating	*…assessing students has been extremely difficult, find a way to really assess learning… How you do it? How do you know the person who is doing the exam is really the student? That they are not cheating on WhatsApp, because they have access to copying, to ask someone, to see the books, everything… (I139)*
New forms of assessment	*The exams we did before, that defined a big chunk of the course grade…[] memorization based [] it is not possible to do them anymore [] what I do now is application, several small exams [] I am not interested in that they resolve an integral, I want them to apply that to a real life situation, that they know when and what for you can apply that…(I95)*
	I ask them reports, for example they have to do a small interview-based study comparing the ideas of three (social workers) professionals on professional principles and ethics. (I37)

Table 5 The use of technology to support continuous professional development

	Illustrative quotations
Pre-pandemic training	*I have had a very good experience…in blended learning professional development diplomas. There you share experiences…with people from other campuses (from different cities) So further than the contents you have the experience of other people…you learn from that. (I10)*
Social outbreak training	*When the social outbreak came [] they (training staff) [] started to prepare us, we learned online platforms… sent a couple of handbooks… [] and now came the pandemic…(I29)*
Competing demands	*…the time you can devote to this (pedagogical training) … Because the demand and the pressure are so much…[] you have to do research, academic management, teaching your courses, service…. (I49)*
Pandemic training	*I have done several courses that helped me a lot…technological tools, virtual…motivation for online teaching, students' assessment… they have all been very good. … (I25)*
	Digital technologies… Kahoot use, for example…online discussions; they analyze your videos, that kind of training …also the video-conferencing platform we are now using (I31)
Training as source of work overload	*It is now full of courses, too much [] it is not bad but maybe not 100% productive [] for example…. from one week to another we had to take three courses!!! (I7)*
	The problem is that (on top of courses for online teaching) everything starts accumulating now in December: exams, teaching reports, and so on… (I29)

Table 6 The ability to further the digital competencies of higher education students

	Illustrative quotations
Teachers try to align with students' use of digital technology	*I think students know digital technologies better [] they are inserted in new technologies, they are inserted in social networks, all the time, during classes, before, after [] If you use these tools for learning I think for them it will be closer (to their everyday lives) (I27)*
	Students really know very well the digital technologies…if you give a bad lecture, do not use the online platform well, they notice and get bored… so they may turn to YouTube for a "better" teacher… (I7)
Students have less capacity for using digital technology for learning and for professional use	*Sure…they use social networks, but they do not manage…they are not able to use other types of digital technologies that allow them to participate more actively in classes (I24)*
	So this is a thermodynamics course… they require much interpolating, making regressions… so I say: ok, let's do it in excel, and they complain: I want to do it by hand in my notebook. I say, "no, you have to use excel; an engineer without excel is like a carpenter who does not know how to use a hammer." (I126)

Table 7 Transversal competencies

	Illustrative quotations
Capacity to generate a safe learning environment	*In the online [] the first thing is to generate a safe space)… a safe space where we are going to be together as peers (I108)*
	…being close (to students) for them to feel confident to participate… for them not to feel the teacher is a "superior being." (I14)
Being accessible for students	*It is important to create a link with students… a space to know them in their particularities [] …accompany them in the process …(I24)*
	Being patient, in the sense of being open to receive, for example, comments, answering questions… (I50)
Disposition to understand students' situations	*We have found that students have several difficulties, several different realities. Students who connect from a notebook or PC, others only from a cell phone, [] not all of them have an established workspace [], so you have to consider that… (I7)*
	Students have gotten tired…have exhausted…so despite they have interest in the courses you see less and less are connecting (to online classes) [] I think this may also be because of the situation we are living in… (I34)

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