

NAVIGATING EMERGENCY REMOTE TEACHING: UNDERSTANDING PRESENT NEEDS AND ANTICIPATING FUTURE DIGITAL COMPETENCE IN HIGHER EDUCATION

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Abstract: Online and hybrid learning environments are becoming more and more common in higher education. The integration of digital tools and competencies is seen as crucial, guided by institutional policies and frameworks for digital competence. In reaction to the COVID-19 pandemic, emergency remote teaching (ERT) became more popular, necessitating the deployment and maintenance of digital competencies. Throughout this time, researchers documented a variety of remote teaching strategies used in higher education, demonstrating how flexible educators can be even in the face of little preparation. In order to create a conceptual framework for ERT digital competence, this study examined empirical ERT research over the previous two years. The conceptual framework was then used as a lens through which to examine teaching or digital competency frameworks from Australian institutions. The results of this study show that digital capabilities pertinent to ERT were captured in a variety of ways via pre-pandemic instruction and digital competence frameworks. From a practical standpoint, the results provide a foundation for comprehending the digital competencies required by ERT to guarantee readiness in the event of a crisis that interrupts educational services. Additionally, we propose that practical operationalizations that link technical and

pedagogical knowledge, explicitly state the digital possibilities across modes of delivery, and recognize the need to safeguard educators' well-being can help universities better support the development of teachers' digital competence. Keywords: COVID-19, higher education, digital competence, teachers

I. Introduction:

Higher education has increasingly adopted online and blended models of teaching. This practice has been guided by institutional policy and strategy that position the integration of digital tools and competencies as essential to meet the needs of labour markets and remain relevant in a digital society (Webb et al., 2021). The digitisation of teaching and learning requires digitally competent teachers (Sharpe et al., 2022). The conceptualisation of digital competency, however, is contested, between being a tangible skill to develop or an ongoing practice to be supported (Zhao et al., 2021). Within this context, the COVID-19 pandemic resulted in a widescale pivot to emergency remote teaching (ERT), increasing the use of digital technologies and the need to deploy and support teacher digital competencies. Researchers have captured a range of emergency remote teaching practices in higher education across this period (Lin & Johnson, 2021). As higher education institutions move

beyond the pandemic, it is not clear what digital practices will continue nor how institutions should support continue to support the ERT practices that have emerged. The aim of this paper is to review empirical literature that reveals university teachers' ERT digital competence and map that to existing operationalisations of digital competence expressed in university policy documents. Building on contributions of the special issue, *Shifting to digital* (Lin & Johnson, 2021), this paper also contributes to understanding the challenge of rapid shifts in digital practices and supports for teachers in higher education. The paper presents a document analysis of publicly available digital and teaching capability frameworks from 10 Australian universities. The analysis was guided by a conceptual frame developed from a synthesis of the empirical literature concerned with teachers' digital competencies over the first 2 years of the COVID-19 pandemic. The analysis brings together pre-pandemic understandings of digital competencies in higher education with teachers' bottom-up responses to the COVID-19 pandemic. This understanding is important for ensuring ERT is reflected digital competence frameworks so that teachers are prepared for future crises that disrupt education, whether they be global or local, and to consider how competence frameworks might best reflect the aspects of digital competence all higher education teachers need.

II. Background

Digital competence is broadly defined as a set of skills required for participation in a specific context or society (Zhao et al., 2021). Digital competency in higher

education has been a topic of debate, positioned between a list of defined skills that individuals possess through to more comprehensive definitions of socio-cultural digital practices (Spante et al., 2018). There are also variations in the numerous institutional, governmental, and societal frameworks which exist to describe digital competency across teacher profiles (eg. Crompton, 2017; JISC, 2019; Redecker, 2017). Within higher education, digital competence that teachers need for teaching and learning is operationalised within two types of institutional documents—teaching competency frameworks and digital competency frameworks. Within Australian higher education, the conceptualisation of teacher digital competencies has been informed by international models, such as JISC (Press et al., 2019). Most digital competency frameworks focus on technical or operational aspects of digital competence, with few addressing the effects on pedagogy and curriculum (Falloon, 2020). Thus, there is a need to better understand the ways that digital competence is enacted in various modes of digital education and how educators are supported to develop digital competence for teaching and learning.

COVID-19 and digital competence—an opportunity to learn and reflect? Prior to COVID-19, digital competency had long been considered a desirable skillset to participate within an exceedingly digital society and was often framed as a deficit in teachers whose proficiency ranged from novice to mastery (Selwyn, 2007). Research on teachers' digital competence tended to focus on a duality between digital and pedagogical approaches, with teaching being a prioritised skillset for

faculty and digital as emergent (Falloon, 2020). With the rapid shift to ERT during the COVID-19 period, teacher digital competency became a necessity for all. Universities quickly increased the provision of digital services, and moved teaching, learning and support services to online modes (Webb et al., 2021). The speed and scale of this response placed significant demands on the teaching and digital competencies of all educators across education sectors. While some universities were better prepared than others, the sudden activation of digital education resulted in “just-in-time” approaches to teaching that leveraged and developed skillsets through local contextual supports and the broader higher education community (Crawford et al., 2020). Although continuity of education was achieved during this time, inequalities were exposed in both teachers’ and students’ access to digital technologies and their varying levels of digital competence (Webb et al., 2021). While researchers have sought to capture teaching and learning practice across the ERT period, there is a need to better understand how teachers enacted and developed their digital competency across this period, and how this may inform future practice.

III. Methodology

The broad aim of this qualitative study was to review the empirical literature about university teachers’ digital competence from the ERT period and analyse existing operationalisations of digital competence in university contexts. This paper explores the following research questions: RQ1. How can university teachers’ ERT digital competence be characterised from the available empirical literature? RQ2. How

do existing institutional competence frameworks align with university teachers’ ERT digital competence as characterised from the available empirical literature? To do this, the study was conducted in two phases. In Phase 1, we undertook a review of empirical literature to derive a series of normative statements to create a conceptual frame characterising university teachers’ digital competence from the ERT period. In Phase 2 we analysed digital or teacher capability frameworks selected from 10 Australian universities using the Phase 1 normative statements as an analytic framework.

Phase 1 characterising university teachers’ ERT digital competence

The purpose of this phase was to review the empirical literature about university teachers’ digital competence across the ERT response to the COVID-19 pandemic and develop a conceptual frame that captured these digital competencies. To develop the conceptual frame a literature search was conducted. The search was conducted across Web of Science, SCOPUS and Google Scholar using the following keywords and “digital”, “education”, “higher education”, “COVID-19” and “competence*”. The following inclusion criteria were applied to the results: • Peer-reviewed journal articles published during the ERT period (from 2020 through to November 2022), and • Empirical research findings on aspects of teacher digital competency. Fifteen articles met the criteria above for inclusion in the literature review. Thematic data analysis was conducted using the following four steps: 1. The research papers were first analysed inductively to identify and characterise the findings about teachers’

digital competence. This initial round of analysis developed a preliminary set of codes that represented aspects of teachers' digital practices during ERT. 2. The second phase organised the codes into broad thematic categories. 3. The third phase developed the conceptual frame. During this phase the research team reviewed each thematic categories and associated codes to create normative statements of digital competence. The normative statements express the capabilities a teacher should develop to demonstrate an aspect of digital competency. 4. The normative statements, thematic categories and associated codes were then interrogated through the application of key questions to ensure quality, coherence and internal consistency (Braun & Clarke, 2013). Eight normative statements were derived from the reviewed research literature which applied in Phase 2.

Phase 2 analysis of university frameworks Ten Australian university frameworks were selected for Phase 2 of the study. The selected frameworks included digital competence frameworks and teaching capability frameworks. The digital competence frameworks focused on the operationalisation of teachers' digital competencies for teaching and learning, while the teaching capability frameworks focused more broadly on teaching and learning capabilities within which digital competencies were embedded. The frameworks were sampled from 36 public universities in Australia with publicly available frameworks. At the time of analysis, the teaching or digital capability frameworks of four universities were under review. A sample of 10 frameworks was selected for maximum variation in

university type including geographic location (regional/ city and across states), ranking and available delivery modes. The selected frameworks were from universities across 5 of the 8 Australian states and territories, and include 2 regional and 8 city universities, 2 highly ranked universities (top 100 QS World University ranking), and 5 universities with extensive online delivery offerings. Of the 10 selected frameworks, 3 are characterised as digital competence frameworks (DC1, DC2, DC3) and 7 as teacher capability frameworks (TC1–TC7). All 10 frameworks were in place prior to or at the beginning of the pandemic, thus capturing the conceptualisation and operationalisation of teachers' digital competencies in Australian universities prior to the ERT period. Phase 2 data analysis was deductive in nature. The research team applied the conceptual frame developed in Phase 1 to the ten selected university frameworks. The aim of this analysis was to compare the existing frameworks with the normative statements for alignment or additional understanding of digital competence in practice. An initial reading of each framework was conducted by the research team. Following this, the research team applied the conceptual frame by coding each framework for explicit reference to the normative statement and/or descriptor. The codes were reviewed for consensus across the research team.

IV. Findings

RQ1 How can university teachers' ERT digital competence be characterised from the available empirical literature? Fifteen empirical articles that examined teachers' digital competence across the

ERT period were included for review in this study. The 15 studies included 9 high-response surveys of teachers (ranging from 50 to 1000 respondents) drawing on interdisciplinary pools of teachers (Bartolic et al., 2021; Damşa et al., 2021; Kaqinari et al., 2022; Mishra et al., 2020; Myyry et al., 2022; Scherer et al., 2021; Shrestha et al., 2022; Våljataga et al., 2020; Watermeyer et al., 2021) and 6 descriptive case studies (Dalipi et al., 2022; Gao & Zhang, 2020; Moustakas & Robrade, 2022; Müller et al., 2021; Oliveira et al., 2021; Scull et al., 2020). Three major themes were constructed through an analysis of the findings presented in the literature reviewed: technologies, preparedness, and experience. The code descriptors and derived normative statements are presented in Table 1 and "Appendix" presents an overview of themes across the reviewed articles. The conceptual frame, comprising the eight normative statements of digital competence, provides a bottom-up characterisation of digital competence from across the ERT period. A brief outline of the review findings for each theme is presented below in connection with derived normative statements of teachers' digital competence.

Themes	Code descriptors (derived from literature review)	Normative statements of ERT digital competence (conceptual frame)
Technologies	Teachers' use of technologies was focused on familiar tools	N1. Selects digital technologies that are appropriate for teaching and learning contexts
	Teachers' selection of technologies was guided by university technology infrastructures	
	Teachers prioritised digital technologies which supported their connection with students	
Preparedness	Teachers identified the technical limitations within their digital learning environments	N2. Accommodates technical challenges in teaching practice and learning designs
	Teachers leveraged informal digital practices into digital learning environments	N3. Transfers competencies to adapt to a range of learning contexts and modes
	Teachers embraced emergency remote teaching rather than completely adopt an online delivery model	N4. Understands pedagogical demands of discipline, content, and digital learning environments
Experience	Teachers assembled and adapted digital learning environments to support their pedagogical intentions	N5. Connects with networks of support and resources to refine practice
	Teachers relied on institutional and collegial networks to refine their digital learning environments	N6. Supports students to navigate the demands of digital environments through design
	Teachers supported students through a personal approach within digital learning environments	N7. Reflects on and evaluates the integration of digital technologies over time
	Teachers considered the student experience when engaging with digital learning environments	N8. Assesses the time demand and value of digital technology integration
	Teachers sought to iteratively develop their digital learning environment through reflection and student evaluation of the learning experience	
	Teachers recognised the impact of emotion, increased workload and stretched goodwill on the design and delivery of digital learning environments	

Technologies

The selection and use of technologies was a key component of teachers' ERT digital competence. Teachers selected technologies based on four factors: familiarity, availability, functionality, and technical competence. Teachers' selection of technologies for use during ERT was typically driven by familiarity with available technologies as several studies reported educators refrained from adopting new technologies to support learning and teaching (Bartolic et al., 2021; Damşa et al., 2021; Müller et al., 2021; Våljataga et al., 2020). Most

teachers relied on their existing digital practices, such as uploading recordings and synchronous messaging, as these had been utilised as part of their day-to-day teaching prior to emergency delivery (Bartolic et al., 2021; Dalipi et al., 2022; Damşa et al., 2021; Kaqinari et al., 2022; Oliveira et al., 2021). While many also expressed limited experiences with completely online delivery, the connection between existing practices and these technologies helped inform pedagogy during this time (Gao & Zhang, 2020; Müller et al., 2021). Teachers' selection of technologies was primarily guided by the availability of university technology infrastructure. Several studies found that teachers felt the types of technologies and digital infrastructures provided through their respective universities were appropriate and this guided their use. This was most likely an outcome of the emergency context as teachers lacked the time to explore other technologies and the movement online was mandated by their institutions (Damşa et al., 2021; Moustakas & Robrade, 2022; Scherer et al., 2021). Teachers prioritised technologies based on functionality by selecting tools that supported communication and connection with their students. Communication technologies served an important role in emergency delivery as platforms through which teachers could conduct learning activities (Gao & Zhang, 2020; Mishra et al., 2020; Moustakas & Robrade, 2022; Shrestha et al., 2022) as well as facilitate classroom connections and management (Scull et al., 2020; Våljataga et al., 2020). Teachers selected technologies based on their own perceived technical competence. This included being able to identify and provide

technical support for students because the usual support services were disrupted or overwhelmed with increased demand. Examples included diagnosing problems with network connections (Bartolic et al., 2021; Mishra et al., 2020; Moustakas & Robrade, 2022; Shrestha et al., 2022), developing new technology solutions during delivery (Gao & Zhang, 2020; Oliveira et al., 2021) and finding new ways to develop content online (Våljataga et al., 2020). Two normative statements of digital competency were derived from the research findings associated with teachers' digital competence in the context of technologies used and associated challenges:

Preparedness

Teachers' preparedness for ERT was a key factor associated with digital competency across the reviewed studies. Preparedness was varied, drew on informal digital practice, acknowledged the temporality and distinctness of ERT, and shaped the ways that teachers assembled digital learning environments. Teachers leveraged their informal digital practices in their teaching. Teachers sourced information from their everyday social networks to creatively inform their teaching methodologies (Damşa et al., 2021). The use of everyday technology practices provided teachers an existing digital competency to leverage when adopting and adapting existing resources to online delivery (Våljataga et al., 2020). Teachers acknowledged the temporality and distinctness of ERT. Multiple studies found that the level of preparedness was not found to be a direct indicator of a simple transition to ERT (Bartolic et al., 2021; Kaqinari et al., 2022; Müller et al.,

2021). Several studies found that teachers were explicitly approaching this delivery period as different from typical online delivery with little expectation that this type of delivery would be continued into the future (Bartolic et al., 2021; Dalipi et al., 2022; Müller et al., 2021; Watermeyer et al., 2021). Väljataga et al. (2020) found that although a high percentage of teachers saw the value in some of the changes they had made to their delivery during this period there was little expectation that the change would be adopted in their overall teaching approach. The ERT experience, whether teachers felt these practices would continue or not, still resulted in an increase in teacher competency and confidence with digital technologies (Myyry et al., 2022). Teachers assembled digital learning environments to support their intended pedagogical approaches. The impact of the ERT on higher education was profound with stakeholders and systems unprepared for such a sudden shift, leaving teachers to rearrange pedagogical practices in less-than-ideal forms (Dalipi et al., 2022; Kaqinari et al., 2022; Moustakas & Robrade, 2022; Müller et al., 2021; Oliveira et al., 2021; Watermeyer et al., 2021). Primarily these findings support the view that teacher preparedness was developed through the contextual transformations of learning experiences and feedback from their students (Scherer et al., 2021; Scull et al., 2020; Shrestha et al., 2022). Three normative statements of digital competency were derived from the research findings associated with the varied ways teachers leveraged their digital competence to respond to the demands of ERT.

V. Conclusion

The framework we have devised from the available literature helps to understand how university teachers adaptively responded to the new demands wrought by the pandemic. Working under significant pressure, in uncertain times, teachers made decisions about what was feasible and appropriate for themselves and their students so that education provision could continue, albeit in a different form. The framework is a starting point to ensure that teachers are better prepared for ERT in the future. Our analysis of pre-pandemic teaching and digital competency frameworks also identifies some ways in which practical operationalisations might be revised to better connect technical with pedagogical knowledge, make explicit digital possibilities across modes of delivery, and acknowledge the need to protect the wellbeing of university teachers.

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