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Preparing teachers for emergency remote teaching: A professional development framework for teachers in higher education

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Preparing teachers for emergency remote teaching: A professional development framework for teachers in higher education

Abstract

COVID-19 has significantly impacted teaching and learning in higher education, leading institutions to embrace Emergency Remote Teaching (ERT) in response to school and university closure. A systematic review research methodology was used to identify, analyse and synthesise literature on professional development in higher education published between 2010 and 2020. Following an inductive thematic analysis, the authors identified four themes that represent the literature: learning approaches, delivery modes, design features and institutional support. Based on the emerging themes and the analysis of the selection of studies, a framework for professional development is proposed to prepare teachers in higher education for ERT. The use of the framework is recommended to guide higher education institutions in best assisting their academic staff during an ERT context.

Practitioner Notes

1. The study presents a framework for professional development of university teachers during emergency remote teaching, based on a systematic review of literature of professional development between 2010 and 2020.
2. The framework includes design considerations and support considerations to help higher education institutions design sound professional development provisions.
3. The framework can help higher education.
4. The framework can aid higher education institutions in evaluating their professional development provisions during emergency remote teaching.
5. Following the considerations outlined in the framework, higher education providers can better select professional development opportunities for teachers to improve teaching and learning practices during emergency remote teaching.

Keywords

COVID-19, Emergency Remote Teaching, higher education, professional development, systematic review

Introduction

The COVID-19 pandemic has caused a widespread and significant global disruption to higher education, through mandated social distancing (regarded as the most effective preventive measure for COVID-19) and consequent suspension of face-to-face classes to prevent community transmission of the virus. Higher education institutions have been forced to rapidly shift their curricula online to enable students to continue their education. This paper adopts Hodges et al.'s (2020) conceptualisation, 'Emergency Remote Teaching' (ERT) to characterise the type of instruction being delivered online by most academic institutions in response to the COVID-19 pandemic. Hodges et al. defined ERT as "a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances" (2020, p. 6).

Although higher education institutions differed in their response to COVID-19, the majority embraced ERT (Crawford et al., 2020; Hodges et al., 2020). ERT assisted the sector to provide instruction with the available resources. However, subsequently, many challenges associated with ERT have been brought to light. Teachers were unprepared to shift to ERT and they faced many challenges, such as creating online content, learning new instructional tools, and utilising online pedagogy (Hartshorne et al., 2020). Moreover, shifting courses to online delivery for ERT had challenges associated with faculty support and training (Hodges et al., 2020), professional skills in developing and offering online education (Crawford et al., 2020) and adapting teaching methodologies and managing teaching time (Dhawan, 2020). Likewise, Chang and Fang (2020) identified that faculty members' unfamiliarity with the teaching tools can hinder the successful application of ERT. While faculty struggled to deliver classes from home due to technical inexperience, they also lacked pedagogical content knowledge required for online teaching (Rapanta et al., 2020). Without proper and sound digital literacy training for university teachers, learning outcomes cannot be fully achieved during ERT (Adnan & Anwar, 2020).

Several attempts were made to make the shift to ERT successful and feasible. Karalis (2020) stressed the importance of teaching staff training to help them implement the emergency approach. Since ERT supported a quick response to the crisis utilising the available resources (Hodges et al., 2020), Karalis (2020) argued that teacher training should focus on necessary issues that are contextualised to emergency management in the institution. Although the crisis had a negative impact on teaching and learning, McMaster et al. (2020) argued that the unplanned interruption of education during COVID-19 provided great opportunities for professional development through reflection and engagement in academic research. Sharing a similar view, Dhawan (2020) claimed that COVID-19 provided teachers with many opportunities to develop innovative pedagogical strategies. One way to address teachers' inability to shift to ERT is to provide teachers with a step-by-step guide to assist them accessing and using the available e-learning tools (Dhawan, 2020).

Shifting to online instruction in a short span of time has posed many challenges to higher academic institutions, one of which is the lack of professional skills in offering online education (Crawford et al., 2020). Likewise, Devaney et al. (2020) reported that many institutions faced a formidable dilemma during COVID-19 as faculty members were not experienced enough to handle online teaching. Gacs et al. (2020) suggested that higher education institutions should increase their support in providing in-time training for teachers to teach online during emergencies. Although there are numerous studies on the impact of COVID-19 on education, professional development provisions for teachers rapidly transitioning to ERT has not received critical attention. Thus, it is useful and essential to investigate professional development for teachers to identify how to support them in the transition to ERT.

This study reviewed the literature on professional development of teachers in higher education to identify and synthesise effective approaches and characteristics that may be suitable for the ERT context. The study presents a framework to guide professional development of teachers for the ERT context during COVID-19 and any similar, future, pandemic or global emergency that may require higher education institutions to shift to ERT. In this paper, the authors defined professional development as the planned programmes and activities offered by higher education institutions to develop their teachers' skills, knowledge, attitudes, expertise and characteristics of effective teaching. The study is guided by the following research questions:

1. What professional development is needed to support Emergency Remote Teaching during global emergencies?
2. What framework based on the literature will guide professional development of teachers to equip them for Emergency Remote Teaching?

Method

The authors selected a systematic review because it provides a transparent, comprehensive, and structured approach to synthesising the existing literature (Bearman et al., 2012; Petticrew & Roberts, 2006).

Search strategy

The search strategy was designed to ensure a comprehensive data collection, high quality and recent information. The search was limited to peer-reviewed journal articles published between 2010 and 2020. The following databases were searched: ProQuest, Education Resources Information Center (ERIC), ScienceDirect, SAGE journals, Springer Link, Scopus and Taylor and Francis with keywords search string: [professional development OR training] AND [higher education OR college OR university]. The title and abstract for each article identified by the search results were imported and organised into folders in Mendeley® (a desktop reference management software). In addition, Google Scholar was searched using the same search string, with relevant titles in the Google Scholar library saved before exporting the entries to Mendeley®.

Selection Procedures

The following inclusion criteria were used to guide the selection of articles for review:

1. Available as a full-text;
2. Empirical peer reviewed articles or a systematic review published between 2010 and 2020;
3. Related to professional development of teachers in higher education;
4. Related to organizational perspectives and features of professional development programme;
5. Related to professional development provisions and/or their development.

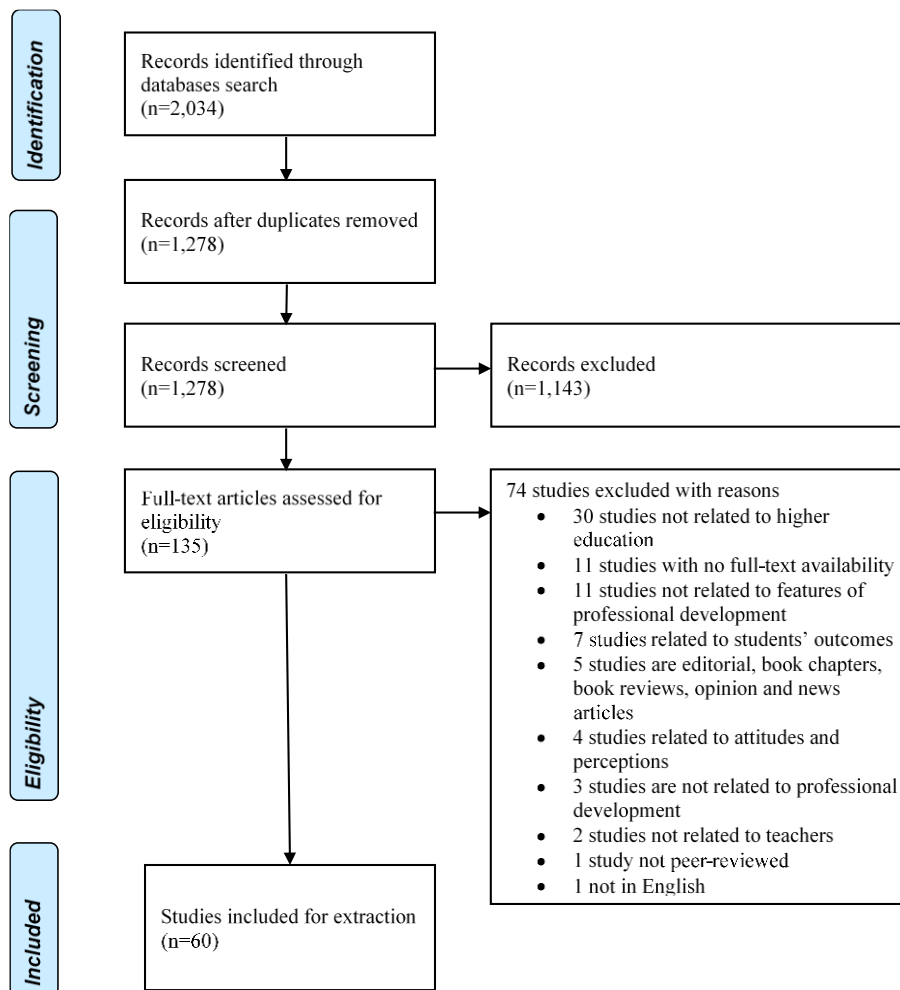
Articles that did not meet all the inclusion criteria were excluded from the review. To support systematic implementation of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach (see Moher et al., 2009), the first author imported all titles and abstracts into Covidence® online software.

Two thousand and thirty-four studies were imported to Covidence® from the eight databases, 756 of which were identified as duplicates. A single author screened and assessed the validity of the titles and abstracts based on the inclusion criteria. Out of 1278 studies screened, 1142 studies were deemed irrelevant. 135 articles progressed to full-text review phase. These full-text articles were uploaded to Covidence®. Using a double-screening process, two authors reviewed the full-text

articles for extraction. The third author resolved the conflicts in the review outcomes. 60 articles were assessed to be eligible for data extraction (see Figure 1).

Figure 1

PRISMA Diagram



Quality Assessment

Included articles were assessed for quality with two quality assessment tools. The Mixed Method Appraisal Tool (MMAT) (Hong et al., 2018) was used to assess empirical research and the Quality Assessment Tool for Theory and Literature (QATTL) (Crawford et al., 2020) to assess theoretical articles. The articles were scored and placed into quality categories: high (80% to 100%), medium (50% to 80%) and low (below 50%). Articles with low quality scores were excluded from the final research sample for extraction. Table 1 presents the quality assessment results.

Table 1

Quality Assessment Results

Quartile	MMAT (<i>n</i> =43)	QATTL (<i>n</i> = 17)
Low	14	4
Medium	6	9
High	23	4

Data Extraction and Analysis

Bibliographic data (title, authors, journal, publication date, abstract, keywords) was extracted from the selected articles organised in Mendeley®. The first author read the full-text of the articles and extracted additional information: type of the study, research methods and participants, adding to each record. This bibliographic data was exported into an MS Excel® spreadsheet which was used to record preliminary themes.

The inductive thematic analysis used followed Braun and Clarke's (2006) six steps: data familiarisation, coding data, searching for themes, reviewing themes, defining and naming themes and writing up. Familiarisation with the data was achieved through the title and abstract screening, full-text review, and the quality assessment procedures. The articles were allocated for independent coding of preliminary themes, two authors per article. Next, the preliminary themes were consolidated by the first author. To ensure rigour and inter-coder reliability, the authors discussed the emerging preliminary themes for revision and defining the final themes (Creswell & Miller, 2000; Tracy, 2010). The authors initially defined and named four themes: *learning approaches*, *delivery modes*, *design features* and *institutional support*. The theme, *learning approaches*, was subdivided into two themes: *social learning* and *practice-based approaches to learning*. These five themes are discussed in-depth in the results section. With authors' agreement on the themes, the first author completed the write-up and developed the framework. The co-authors provided a subsequent round of review and revision to ensure rigour, reflexivity and collaboration (Creswell & Miller, 2000).

Results**Characteristics of selected articles**

The selected articles represented a wide range of discipline areas, countries and research types and methods. A summary of bibliographic data of the selected articles can be provided upon request. The United States of America, United Kingdom and Australia represented the majority of articles in the sample (49.20%). The selection of articles represented 18 articles from The United States of America (29.5%), 8 articles from the United Kingdom (13.1%) and 4 articles from Australia (6.6%). The selection of articles included 28 articles from other countries (47.5%), with a range from 1 to 3 articles each country.

The sample included (43, 73.3%) empirical research articles and (17, 28.3%) theoretical papers. Of the empirical research papers, slightly more than half of the sample reported a qualitative study design (25, 58.1%), compared to mixed methods study design (9, 20.9%) and quantitative descriptive design with (9, 20.9%) studies. For the empirical research papers, the number of participants ranged between one and 1652 university staff participants. The empirical research studies used different research methods, including case study, action research, interviews,

documents analysis, surveys, reflections, and observations. Theoretical papers included systematic reviews and narrative reviews.

Professional development in higher education: Five themes

Five themes explain professional development of teachers in higher education: *social learning, practice-based approaches to learning, delivery modes, design features* and *institutional support*. Table 2 provides a summary of the themes and defines theme components and related concepts.

Table 2

Summary of thematic analysis and related concepts

Themes	Definition components	Example articles	Related concepts
Social learning	<ul style="list-style-type: none"> • takes place in social interactions • leads to a change in attitudes, behaviours, norms and practices • fosters mutual relationships among the social group 	(Reed et. al., 2010) (Dysart & Weckerle, 2015)	<ul style="list-style-type: none"> • Community of practice • Mentorship / peer-pairs • Technology enhanced communications • Reflective and collaborative professional development • Transformative learning
Practice-based approaches to learning	<ul style="list-style-type: none"> • practical and contextualised context • safe environment for critique and endorsement of practice • collaboration with others • enhance teaching practices 	(Holland et al., 2018) (Fanghanel, 2013)	<ul style="list-style-type: none"> • Paired teaching (experienced/ novice) • SoTL activities • certified online professional development course
Delivery modes	<ul style="list-style-type: none"> • desired qualities of professional development programmes affected by delivery mode • Qualities include: interaction, collaboration, active learning, interest-driven, resources 	(Baran & Correia, 2014) (Evans et al., 2020) (Holland et al., 2018)	<ul style="list-style-type: none"> • face-to-face • blended learning • online professional development • social effects of learning environment
Design features	<ul style="list-style-type: none"> • professional development programme should include a mixture of three purposes (theoretical, applied and institutional) • relevant to teachers' context and everyday practices 	(Elliott et al., 2015) (Sergeeva et al., 2014)	<ul style="list-style-type: none"> • authentic learning • organisational structures, policies and guidelines and purposes • systematic course design
Institutional support	<ul style="list-style-type: none"> • management support (recognition and encouragement) <ul style="list-style-type: none"> ◦ supportive campus climate ◦ institution specific expectations ◦ staffing support • monitoring and evaluation mechanism 	(Gast et al., 2017) (Mohr and Shelton, 2017) (Sergeeva et al., 2014)	<ul style="list-style-type: none"> • Certified course • sustainable professional development programmes

Social learning

Social learning is “a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks” (Reed et al., 2010, p. 7). Reed et al. argued that learning takes place in social interactions that leads to a change in attitudes, behaviours, norms and practices, and also fosters mutual relationships among the social group that can build respect, trust and shared goals. Dresner and Worley (2006) claimed that learning from other teachers is an effective professional development approach.

Considering professional development of university teachers, social learning underpins many professional development activities, such as learning communities (Carney et al., 2016; Chikh & Berkani, 2010; Cochrane & Narayan, 2013; Gast et al., 2017; Holmes & Kozlowski, 2015; Jaipal-Jamani et al., 2015; Lewis & Rush, 2013; Soto et al., 2019; Spilker et al., 2020; Webb et al., 2013), mentorship (Baran, 2016; Dysart & Weckerle, 2015), peer review (Byrne et al., 2010; Drew & Klopfer, 2014; Dysart & Weckerle, 2015; Holland et al., 2018), collaborative learning (Chikh & Berkani, 2010; Hobbs & Coiro, 2019; Soto et al., 2019; Teräs, 2016), international experience (Hamza, 2010) and social networking (Cochrane & Narayan, 2013; Donelan, 2016; Lewis & Rush, 2013).

Wenger et al. (2002) defined communities of practice as “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (p. 4). Carney et al. (2016) valued the implementation of structured interdisciplinary communities of practice focused on scholarship of teaching and learning (SoTL), in which university teachers from different specialisations collaborate to adopt new skills and practices in higher education. This prompted their collaborative research and helped them investigate issues at a sophisticated and a systematic level. Cochrane and Narayan (2013) expanded the idea of communities of practice by using an intentional community of practice to redesign professional development on the impact of web 2.0 technologies in higher education. Their model differed in their inclusion of a systematic plan at the core to help achieve a pre-planned purpose.

Lewis and Rush (2013) used microblogging technologies in developing Twitter-based communities of practice in higher education to enhance university teachers' knowledge of using social media for educational purposes. Twitter® aided the development of useful networks and communities among teachers due to its features, flexibility, promptness and accessibility (Lewis & Rush, 2013). Similarly, Soto et al. (2019) used Google Hangouts® and Google Drive® to build a virtual community of practice including five university teachers across USA for facilitating a lesson study through which university teachers were able to re-think their teaching strategies, and the community meetings continued afterwards with various topics for discussion. Similarly, Cochrane and Narayan's (2013) community of practice was systematically pre-planned, which explained the success of both communities. Although Spilker et al.'s (2020) systematic review focused on academic conferences in professional development, the study paid attention to the impact of the emerging social technologies in building learning communities among university teachers in academic conferences. They argued that the common use of Twitter® and Facebook® in academic conferences created immediate value and contributed to professional development. However, there was no follow-up communication that enriched the learning communities after the event. In addition to exchanging knowledge, communities of practice provided an embedded ongoing support from their peers (Dysart & Weckerle, 2015).

Mentorship constitutes an essential part of learning communities and it fosters the development and success of learning communities. Baran (2016) claimed that mentoring programmes outperformed traditional technology workshops and they provided in-time support, which engaged learners in the

learning community. He cautioned imposing a strict programme; arguing a mentor-mentee pair should be guided on specified pre-planned action plans under a common shared goal in the learning community. A customised and adaptable approach increased the ability of individual mentors and mentees in negotiating and setting attainable learning goals (Baran). In the same vein, peer coaching was an essential component of Dysart and Weckerle's (2015) conceptual model for comprehensive and ongoing support for university teachers in developing technological, pedagogical and content knowledge (TPACK). They found that when novice university teachers were paired with experienced teachers during teaching as a professional development initiative, it provided an authentic context for practice and the required reinforcement for understanding.

Byrne et al. (2010) argued for a peer development process in which the university teacher developed his/her practice by engaging in a meaningful dialogue with others about pedagogy, justifying this mutual collaboration in enhancing long-term professional development and developing communities of practice. In order to enhance university teachers' teaching skill and inform professional development practices, Drew and Klopfer (2014) proposed a Peer Review and Observation of Teaching, (PRO-Teaching) process. In context-specific and collegial settings, the process involved observing significant proportion of university teachers then analysing the aggregated data within a structured analysis framework and predefined criteria. The process provided positive quality enhancement at the organizational level due to the rigorous documentations and analysis of teaching.

In a similar attempt, Holland et al. (2018) implemented a paired-teaching model in a transformed course for science university teachers by teaming experienced teachers with new teachers who were either new to the science department, to the course or to student-centred teaching. The results indicated the effectiveness of the initiative in assisting new teachers to learn, adopt, reflect, and continue to use evidence-based teaching practices. Investigating the learning experiences of university teachers in a collaborative, authentic e-learning based professional development programme, Teräs (2016) claimed that reflective and collaborative online professional development led to significant professional growth despite the challenges associated with implementing online professional development programmes.

Employing an exploratory interpretive paradigm, Hamza (2010) reported that American faculty international experiences in the Arab countries in the Gulf region fostered transformative learning. This transformative learning was reflected in three main areas: changes in personal and professional attitudes, students' learning styles and behaviour, and broadening global perspectives (2010).

Practice-based approaches to learning

Several studies in the sample stressed the usefulness of practice-based learning approaches and their positive impact on the effectiveness of professional development programmes. When pairing new university teachers with experienced teachers to implement active learning and student-centered teaching approaches, Holland et al. (2018) revealed that paired-teaching contributed to teachers' long-term growth in using active learning, experiential learning and student-centered teaching methodologies after the treatment.

In addition to active learning and pairing inexperienced university teachers with experienced ones, Fanghanel (2013) argued that SoTL can advance university teachers' knowledge through understanding the practice of higher education in a rich, practical and contextualised context. Fanghanel rationalised the use of SoTL by arguing it provided a safe environment for critique and endorsement of practice in addition to collaboration with others that is powerful in enhancing teaching practices. Its collaborative transdisciplinary methodology not only enhanced the practice, it employed a discovery-based model of research by questioning assumptions, uncovering richness of context, and challenging expectations about theory and practice in higher education (Fanghanel).

Although the SoTL approach sounded promising in professional development, Fanghanel reported that it may have challenges. For example, the difficulty in conveying the value of SoTL as a form of professional development to teaching staff in higher education (Fanghanel, 2013). Similarly, the essence of practical questioning and critiquing teaching practices was evident in Soto et al.'s study of technology facilitated lessons (2019). The videotaped lessons and real-time classroom observations assisted teachers in developing their pedagogical skills and knowledge.

In an attempt to engage university teachers in critical thinking skills and to equip them with the required teaching methods to develop critical thinking skills in their students, Cruz et al. (2019) associated active learning and practical examples in their professional development programme as justifying the success of the programme. The PRO-Teaching programme by Drew and Klopper (2014) required teachers to consciously and justifiably rethink their teaching strategies after the first and the second debriefing and observation stages of the programme. This sense of active involvement and the practical aspects of the PRO-Teaching programme could eventually develop a teaching excellence profile among teachers (Drew & Klopper). In describing the process and design of the professional development training for university teachers to teach online, Eliason and Holmes (2010) indicated that their certified online professional development course promoted and allowed teachers to make meaning of their own practical experiences in teaching.

Delivery modes

The analysis revealed different delivery modes for professional development programmes: online, blended-learning, and face-to-face. While some articles supported the use of face-to-face and blended learning modes, most studies supported the use of online professional development approaches. Apart from availability without geographical and time boundaries (Elliott, 2017), online professional development had the potential for effective support of inquiry and reflection because online learning provided the participants a safe environment for reflection and discussion (Eliason & Holmes, 2010; Elliott et al., 2015); offered flexibility in participation (Macdonald & Poniatowska, 2011) and helped in exchanging feedback and collegial scaffolding (Baran & Correia, 2014). Additionally, online professional development programmes provided pedagogical support for university teachers, equipping them with required knowledge and skills for online teaching and learning (Baran & Correia). Although online professional development programmes seemed promising, Elliott argued that they can be ineffective when they lack commonly accepted qualities, such as interaction, collaboration, interest-driven nature, ongoing nature, availability of proper resources, and proper implementation.

Utilising online options along with face-to-face workshops and practical teaching seminars helped university teachers become online learners and assisted them to plan and implement useful and practical online activities for their students (Evans et al., 2020). The use of blended learning modes for training university teachers enhanced the teachers' ability in using online resources and course management systems in their own courses (Evans et al.). Also, face-to-face meetings helped university teachers share their concerns and implications about implementing what they have learned online in their own teaching contexts which eventually led to the successful implementation of new teaching strategies (Mori & Ractliffe, 2016).

Although the sample articles associated with this theme were largely in favour of online learning options, some authors discussed the usefulness of face-to-face professional development programmes. Ellis et al. (2015) argued that face-to-face delivery mode had more credibility and accessibility and encouraged more involvement. Following the same line of thought, Byrne et al. (2010) reported that university teachers could develop friendship and a sense of being part of big learning communities when involved in face-to-face programmes. Pairing experienced university teachers with novice teachers helped develop active learning and collaboration, and helped to

develop student-centred methodologies in classes (Holland et al., 2018). Furthermore, face-to face programmes allowed university teachers to adjust their practices after being observed, meeting with their colleagues and after receiving feedback from their students (Drew & Kloppe, 2014).

Design features

Several studies in the sample discussed the design features of professional development programmes. Elliott et al. (2015) classified professional development provisions into three broad purposes: theoretical, applied, and institutional. Theoretical initiatives explore contemporary trends and generalised understandings in higher education; applied programmes focus on practical teaching strategies and pedagogical approaches and institutional programmes focus on institutional policies, procedures, and guidelines (Elliott et al.). A good professional development programme should include a mixture of the three purposes (Elliott et al.).

Gregory and Salmon (2013) identified four features that characterise effective professional development for university teachers. Professional development provisions need to be contextualised to ensure authentic learning and to provide teachers with relevant knowledge and practical frameworks for application. Effective professional development programmes should be about the teachers' contexts and everyday practices (Schildkamp et al., 2020). Additionally, programmes should help in creating apprenticeships in online leadership by allowing teachers to administering online professional development courses (Gregory & Salmon).

Professional development interventions for university teachers should be designed based on systematic course design. Eliason and Holmes (2010) identified different steps to be considered when designing a sound professional development programme: learning objectives, assessment and measurement, resources and materials, learner engagement, course technology and support systems. Using the Delphi method, Mohr and Shelton (2017) designed a framework for best practices for online university teachers' professional development in which they classified best practices into two categories: professional development considerations and institutional/ organisational strategies. They divided professional development considerations into four categories of learning topics and opportunities: faculty roles, online classroom design, learning processes and legal issues related to online teaching and learning. The best practices for online university teachers' professional development provisions included three categories: supportive campus climate, institution specific and staffing support (Mohr & Shelton).

Time considerations were found to have an influential impact on the success of professional development (Mori & Ractliffe, 2016; Psiropoulos et al., 2016). According to Mori and Ractliffe (2016), inappropriate time allocation to complete a Massive Open Online Course (MOOC) professional development course negatively contributed to teachers' retention and progression rates. Likewise, Psiropoulos et al. (2016) argued for providing sufficient and flexible time for the teachers to attend the professional development sessions which could help them acquire knowledge, practically apply skills, and reflect on their learning and experiences. Similarly, Sergeeva et al. (2014) allowed university teachers to choose time and form of professional development trainings.

The selected studies showed that providing participants with sufficient, constructive, and ongoing feedback characterised the effectiveness of professional development programmes (Baran & Correia, 2014; Eliason & Holmes, 2010; Elliott et al., 2015; Mohr & Shelton, 2017). Additionally, professional development programmes should provide participants' opportunities for self-development. Suwaed and Rahouma (2015) stated that university teachers can achieve self-development through active learning and learning by doing, reflection on their teaching practices and watching videos and reading books on teaching. Using communication technologies can assist the consolidation of competencies and information received in conferences for continuing professional development (Spilker et al., 2020). Finally, professional development initiatives should

be informed by theory and existing evidence (Elliott, 2017; Hobbs & Coiro, 2019; Schildkamp et al., 2020; Teräs, 2016). They should be informed by previous successful and unsuccessful professional development initiatives (Teräs, 2016).

Institutional support

The identified literature discussed institutional support in professional development. In their review of literature on team-based professional development, Gast et al. (2017) argued that teacher learning was maximised when institutions allocated resources and time for their staff to participate in professional development programmes. Apart from maximising learning, management support (recognition and encouragement) led to sustainable programmes (Gast et al.). Additionally, they found that rewards influenced teachers' participation in professional development interventions. A certified course provided an incentive for teachers to participate and progress (Eliason & Holmes, 2010).

For online professional development initiatives, technical support is required. Eliason and Holmes (2010) claimed that course instructions need to provide clear descriptions of technical support provided; explain the process of assisting teachers in using the available resources; and provide links to resources that can answer anticipated inquiries. Elliott (2017) claimed that higher education institutions need to provide technical staff to assist in the design and administration of online professional development courses.

Mohr and Shelton (2017) categorised institutional support strategies into three main categories: supportive campus climate for online learning; institution specific expectations for online learning; and staffing support. With regard to supportive climate, they argued for clear organisational structures for professional development programmes (Mohr & Shelton). Sergeeva et al. (2014) advised universities to set organisational structures, policies and guidelines and clear purposes for professional development provisions. Similarly, Suwaed and Rahouma (2015) stated that higher education institutions need to establish institutional policies for professional development provisions for university teachers. Mohr and Shelton included policies, online teaching and learning guidelines and online class evaluation as part of the institution specific expectations for effective online learning. They argued that institutions need to support the professional development of online university teachers by providing required staffing resources for online course development and technical support.

Fanghanel (2013) proposed SoTL as a monitoring and evaluation mechanism for educational innovation in higher education teaching and learning. For methodology to scaffold innovation through reflection and innovation, institutions need to provide academic and logistic support for university teachers to enable them work collaboratively (Fanghanel). For example, the establishment of the University of Georgia's SoTL academy that provides a blended course for supporting the university's teachers in participating in a common dialogue of evidence-based and research-based teaching and learning across campus and academic disciplines (Carney et al., 2016).

Professional development framework for ERT in higher education

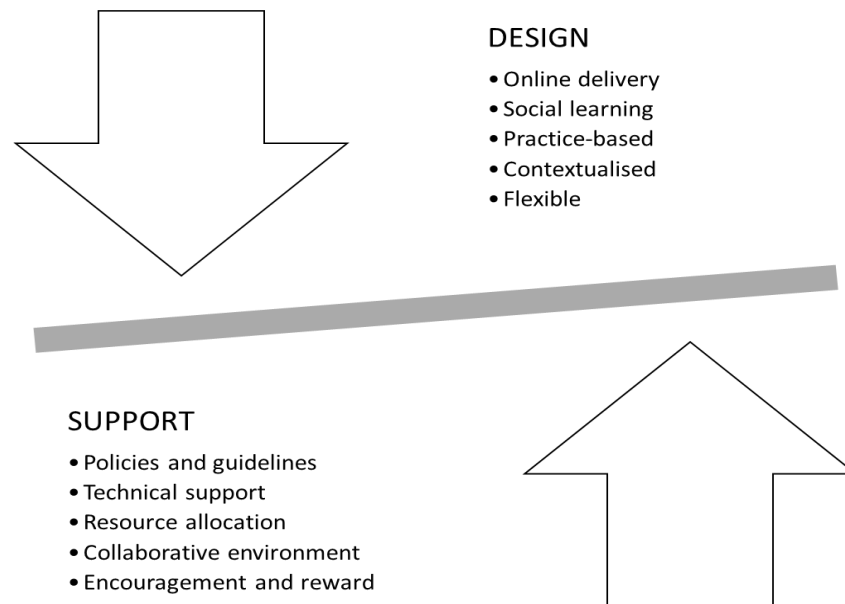
Based on the analysis of the sample literature and mapping the results to the characteristics of ERT, the authors developed a framework to guide professional development for ERT in higher education (see Figure 2). The five themes, *learning approaches* (social learning and practice-based learning approaches), *delivery modes*, *design features* and *institutional support* were further grouped into two areas for consideration: design features (encompassing learning approaches and delivery modes) and support. The framework consists of two main interrelated phases: design and support.

Five design-related considerations are recommended for designing an effective professional development programme: delivered online, based on social learning and practice-based approaches to learning, contextualised and flexible. These design principles should be followed to make the programme suitable for the ERT context.

In addition to these design considerations, five support considerations should be addressed simultaneously to ensure the quality, effectiveness, and success of professional development provisions in ERT. These are enhancing/establishing policies and guidelines for professional development provisions in ERT, providing technical support, allocating resources, encouraging and rewarding participants, and setting a collaborative environment.

Figure 2

Professional development framework for teachers in higher education during ERT



Discussion

This paper systematically reviewed research on professional development of university teachers between 2010 and 2020 to synthesise the characteristics of effective professional development provisions. It aims to design a framework for professional development interventions during ERT. This section further explains the framework and provides guidelines for higher education institutions in using the framework to for professional development of teachers in ERT contexts.

Guidelines for implementing the professional development framework

Based on the framework for professional development of teachers during ERT (see Figure 2), higher education institutions should consider both areas: design and support for effective design and delivery of professional development during ERT. Table 3 provides explanations and examples of design considerations to aid understanding and application of the framework. First, institutions should consider online professional development programmes because other delivery modes are not

suitable for ERT contexts. Online professional development programmes can provide safe and time-flexible environment for learning, reflection, and discussion (Eliason & Holmes, 2010; Elliott et al., 2015), offer flexibility in participation (Macdonald & Poniatowska, 2011), and help participants exchange feedback and scaffold each other (Baran & Correia, 2014).

Higher education institutions can assist teachers during ERT contexts through incorporating a mixture of social learning and practice-based approaches in the professional development programmes. A good intervention should adopt virtual learning communities (Cochrane & Narayan, 2013; Lewis & Rush, 2013; Soto et al., 2019) to help teachers share knowledge and best practices, reflect on their practices, and receive feedback and support from their colleagues. Pre-planned and intentionally structured learning communities have yielded useful outcomes (Cochrane & Narayan, 2013; Soto et al., 2019). Pre-planning and structuring learning communities might not be feasible during ERT contexts due to time-constraints. However, institutions can consider structuring learning communities by reviewing their faculty preferences and prior work and contributions to ensure homogeneity of learning communities. Peer development (Byrne et al., 2010), peer review (Drew & Klopfer, 2014) and paired-teaching (Holland et al., 2018) can help teachers in collaboratively enhancing and reflecting on their teaching knowledge and practices. With respect to practice-based approaches to learning, professional development programmes during ERT should involve active learning, experiential learning, and student-centred methodologies (Holland et al., 2018) as these approaches can provide rich learning experiences to teachers through critiquing and reflecting on practical aspects of their everyday practices (Cruz et al., 2019; Holland et al.). Furthermore, SoTL can be a potential tool for professional development of university teachers during ERT as it can develop knowledge and practice of higher education in a safe environment for critiquing and reflecting using a discovery-based model of research (Fanghanel, 2013).

Following the framework, higher education institutions should ensure that their professional development programmes are contextualised (Gregory & Salmon, 2013): related to teachers' context and everyday practices (Schildkamp et al., 2020), and flexible. They should also serve practical and institutional purposes (Elliott et al., 2015). Flexibility of the professional development programmes is also important because shifting to the ERT context requires university teachers to create online content and learn new instructional tools and strategies (Hartshorne et al., 2020). Consideration of time and workload of staff is also important. Designing flexible programmes, providing sufficient time, and allowing teachers to choose suitable timings (Psiropoulos et al., 2016; Sergeeva et al., 2014) can enhance the effectiveness of programmes.

Table 3

Elements of design considerations for professional development provision

Elements	Explanation
Online	Professional development provision should be online as blended-learning and face-to-face modes are not suitable for ERT.
Social learning	Professional development provision should be based on social learning practices, including virtual learning communities, peer development, peer review
Practice-based learning	Professional development provision should include elements of practice-based approaches to learning: active learning, experiential learning, student-centred methodologies, SoTL
Contextualised	Professional development provision should be related to teachers' everyday practices and should serve applied and institutional purposes.
Flexible	Professional development provision should be flexible regarding time and participation.

The framework includes five support considerations for the success and effectiveness of professional development provisions during ERT (see Table 4). Firstly, institutions should enhance and/or establish institutional policies or guidelines for professional development offerings during emergencies. These can include criteria for selecting designers, trainers and subject-matter professionals who can manage the design and administration of programmes. Policies can also include the types of professional development provisions and support the use of social and practice-based learning approaches. Moreover, policies should cover review and evaluation of professional development programmes.

Higher education institutions should provide technical support by providing clear instructions on the online facilities available and on use of available online resources (Eliason & Holmes, 2010), and by providing technical staff to support the design and implementation of online professional development programmes (Elliott, 2017). Since the shift to ERT contexts is unplanned and rapid responses are required (Crawford, et al., 2020; Hodges et al., 2020; Parisi et al., 2020), higher education institutions should support staff to undertake relevant professional development.

Higher education institutions should allocate resources and funding for professional development provisions during emergencies. This may include subscriptions to online software, online teaching and learning tools, online collaboration and video conferencing tools that can scaffold teachers' learning and can help them collaborate and network with teachers in other institutions and other countries. In addition, higher education institutions may assign budget to help teachers disseminate findings of their SoTL activities and research practices during ERT. Next, institutions should provide environments and tools for collaboration that supports social learning and practice-based learning approaches (based on communication, collaboration and learning communities). This can be achieved by creating specific accounts on social networking sites to enable the participants to reflect and provide feedback on the programmes. This can enhance the dissemination of knowledge and skills obtained through the programmes to a wider teaching staff. Finally, the framework outlines the need for higher education institutions to support, encourage and reward their staff to take part in professional development during ERT, as this can effectively engage participants in professional development programmes (Eliason & Holmes, 2010; Elliott, 2017; Gast et al., 2017). Encouraging teachers to participate can be achieved through certified professional development programmes and through recognising their SoTL and research endeavours. Creating a platform for sharing teachers' best practices obtained thorough participation in professional development programmes among other teachers can encourage others to involve similar professional development programmes.

Table 4*Explanations and examples of support considerations*

Element	Explanation and examples
Policies and guidelines	Enhancing/creating policies and guidelines to support professional development during ERT contexts
Technical support	<p>Training and technical support to all parties involved in the professional development programmes:</p> <ul style="list-style-type: none"> • Supporting and training trainers/teachers on the use of online facilities/resources • Training staff to design online professional development software • Training the trainers on administering online professional development programmes
Resource allocation	<p>Allocating resources to facilitate professional development programmes</p> <ul style="list-style-type: none"> • Subscription in online software • Money for publication of findings of SoTL activities and research
Collaborative environment	Providing a collaborative environment to facilitate social learning and practice-based approaches to learning in professional development programmes during ERT
Reward and encouragement	<p>Rewarding and encouraging staff to participate in professional development programmes during ERT</p> <ul style="list-style-type: none"> • Offering certified professional development programmes • Recognising SoTL and research activities • Sharing best practices with other teachers

Design and support are interrelated, and higher education institutions should take both into consideration. Failing to address one of them or prioritising one over the other, might contribute to failure of a planned professional development programme.

Future research directions

As higher education institutions continue to provide professional development programmes for teachers in ERT, there is a need to evaluate the effectiveness of these offerings following the framework discussed in this study. Future research studies can follow the developed framework to guide the design, implementation, and evaluation of professional development offerings to university teachers during ERT. Comparing professional development programmes offered during the ERT and those offered in normal situations considering the results of this review might be another potential area for future investigation. Future research might consider developing an evaluation survey to evaluate professional development provisions offered in the ERT during COVID-19.

Limitations

This study adopted PRISMA method for identification of articles, MMAT and QATTL for assessing quality of articles and inductive thematic analysis for the analysis of the included papers. These methods are subject to limitations of subjectivity and ensuring a good coverage of literature through

the search criteria and selected databases however, there is a possibility of missing some articles because they may have used different keywords in their titles and abstract than the ones used in this search.

Conclusion

Using a systematic review methodology, the study considered the recent literature on professional development for university teachers. Five themes emerged from the identified literature that represent the characteristics of effective professional development provisions: *social learning, practice-based approaches to learning, delivery modes, design features and institutional support*. Based on the results, the study provided a framework for professional development of teachers in higher education during ERT that groups the identified themes into two main interrelated stages: design and support. The two stages should be followed simultaneously during the design and implementation of professional development provisions to ensure the success and effectiveness of professional development programmes. Professional development programmes should be delivered online, be based on social learning and practice-based learning, be contextualised and be flexible. To facilitate successful implementation of professional development programmes during any ERT context, five support elements should be considered: policies and guidelines, technical support, resource allocation, collaborative environment, encouragement, and reward.

References

- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1), 45–51.
- Baran, E. (2016). Investigating faculty technology mentoring as a university-wide professional development model. *Journal of Computing in Higher Education*, 28(1), 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>
- Bearman, M., Smith, C. D., Carbone, A., Slade, S., Baik, C., Hughes-Warrington, M., & Neumann, D. L. (2012). Systematic review methodology in higher education. *Higher Education Research and Development*, 31(5), 625–640. <https://doi.org/10.1080/07294360.2012.702735>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Byrne, J., Brown, H., & Challen, D. (2010). Peer development as an alternative to peer observation : a tool to enhance professional development. *International Journal for Academic Development*, X. <https://doi.org/10.1080/1360144X.2010.497685>
- Carney, M. A., Ng, L. E., & Cooper, T. (2016). Professional Development Amid Change: Fostering Academic Excellence and Faculty Productivity at Teaching-Intensive Universities. *The Journal of Faculty Development*, 30(2), 27–35. <https://search.proquest.com/docview/1931650436?accountid=27575>
- Chang, C. L., & Fang, M. (2020). E-Learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic. *Journal of Physics: Conference Series*, 1574(1). <https://doi.org/10.1088/1742-6596/1574/1/012166>
- Chikh, A., & Berkani, L. (2010). Communities of practice of e-learning, an innovative learning space for e-learning actors. *Procedia - Social and Behavioral Sciences*, 2(2), 5022–5027. <https://doi.org/https://doi.org/10.1016/j.sbspro.2010.03.814>
- Cochrane, T., & Narayan, V. (2013). Redesigning professional development: reconceptualising teaching using social learning technologies. *Research in Learning Technology*, 21.
- Crawford, J., Butler-Henderson, K., & Kelder, J.-A. (2020). Quality assessment tool for theory and literature (QATTL): Development and validation. *In Press*.
- Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P. A., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 3(1), 9–28.
- Crawford, J., Butler-henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Magni, P., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 3(1), 1–20. <https://doi.org/10.37074/jalt.2020.3.1.7>
- Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice*, 39(3), 124–130. <https://doi.org/10.1207/s15430421tip3903>
- Cruz, G., Nascimento, M. M., & Dominguez, C. (2019). With a little help from my peers: Professional development of higher education teachers to teach critical thinking . *Revista Lusofona de Educacao*, 44(44), 141–157. <https://doi.org/10.24140/issn.1645-7250.rle44.09>
- Devaney, J., Shimshon, G., Rascoff, M., & Maggioncalda, J. (2020). Higher Ed Needs a Long-Term Plan for Virtual Learning Higher Ed Needs a Long-Term Plan for Virtual Learning. *Harvard Buiness Review*, 2–6.
- Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of*

- Educational Technology Systems*, 49(1), 5–22. <https://doi.org/10.1177/0047239520934018>
- Donelan, H. (2016). Social media for professional development and networking opportunities in academia. *Journal of Further and Higher Education*, 40(5), 706–729.
- Dresner, M., & Worley, E. (2006). Teacher Research Experiences, Partnerships With Scientists, and Teacher Networks Sustaining Factors From Professional Development. *Journal of Science Teacher Education*, 17(1), 1. <https://doi.org/10.1007/s10972-005-9000-5>
- Drew, S., & Kloppe, C. (2014). Evaluating faculty pedagogic practices to inform strategic academic professional development: a case of cases. *Higher Education*, 67(3), 349–367. <https://doi.org/http://dx.doi.org/10.1007/s10734-013-9657-1>
- Dysart, S., & Weckerle, C. (2015a). Professional development in higher education: A model for meaningful technology integration. *Journal of Information Technology Education: Innovations in Practice*, 14(1), 255–265. <https://doi.org/10.28945/2326>
- Dysart, S., & Weckerle, C. (2015b). Professional development in higher education: A model for meaningful technology integration. *Journal of Information Technology Education: Innovations in Practice*, 14(1), 255–265. <https://doi.org/10.28945/2326>
- Eliason, S., & Holmes, C. L. (2010). Reflective Practice and Inquiry in Professional Development for Online Teaching. *Journal of Online Learning and Teaching*, 6(2), 454. <https://search.proquest.com/docview/1497198110?accountid=27575>
- Eliason, S. K., & Holmes, C. L. (2010). Reflective Practice and Inquiry in Professional Development for Online Teaching. *Merlot Journal of Online Learning and Teaching*, 6(2), 454–465.
- Elliott, J. C. (2017a). The Evolution From Traditional to Online Professional Development: A Review. *Journal of Digital Learning in Teacher Education*, 33(3), 114–125. <https://doi.org/10.1080/21532974.2017.1305304>
- Elliott, J. C. (2017b). The Evolution From Traditional to Online Professional Development: A Review. *Journal of Digital Learning in Teacher Education*, 33(3), 114–125. <https://doi.org/10.1080/21532974.2017.1305304>
- Elliott, M., Rhoades, N., Jackson, C. M., & Mandernach, B. J. (2015). Professional development: Designing initiatives to meet the needs of online faculty. *Journal of Educators Online*, 12(1), n1.
- Ellis, L., Marston, C., Lightfoot, J., Sexton, J., Brynes, J., Heng-Yu, K., & Black, K. (2015). Faculty Professional Development in Student Learning Assessment: The Assessment Leadership Institute. *Research & Practice in Assessment*, 10. <https://search.proquest.com/docview/1829513087?accountid=27575>
- Evans, J. C., Yip, H., Chan, K., Armatas, C., & Tse, A. (2020). Blended learning in higher education: professional development in a Hong Kong university. *Higher Education Research and Development*, 39(4), 643–656. <https://doi.org/10.1080/07294360.2019.1685943>
- Fanghanel, J. (2013). Going Public with Pedagogical Inquiries: SoTL as a Methodology for Faculty Professional Development. *Teaching & Learning Inquiry*, 1(1), 59–70. <https://search.proquest.com/docview/2093181997?accountid=27575>
- Gacs, A., Goertler, S., & Spasova, S. (2020). Planned online language education versus crisis-prompted online language teaching: Lessons for the future. *Foreign Language Annals*, May, 1–13. <https://doi.org/10.1111/flan.12460>
- Gast, I., Schildkamp, K., & van der Veen, J. T. (2017). Team-Based Professional Development Interventions in Higher Education: A Systematic Review. *Review of Educational Research*, 87(4), 736–767. <https://doi.org/10.3102/0034654317704306>
- Gregory, J., & Salmon, G. (2013). Professional development for online university teaching. *Distance Education*, 34(3), 256–270. <https://doi.org/10.1080/01587919.2013.835771>
- Hamza, A. (2010). International experience: An opportunity for professional development in

- higher education. *Journal of Studies in International Education*, 14(1), 50–69.
- Hartshorne, R., Baumgartner, E., & Kaplan-rakowski, R. (2020). Preservice and inservice professional development during the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 137–147.
- Hobbs, R., & Coiro, J. (2019a). Design features of a professional development program in digital literacy. *Journal of Adolescent & Adult Literacy*, 62(4), 401–409.
- Hobbs, R., & Coiro, J. (2019b). Design Features of a Professional Development Program in Digital Literacy. *Journal of Adolescent and Adult Literacy*, 62(4), 401–409. <https://doi.org/10.1002/jaal.907>
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*, 7. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Holland, T., Sherman, S. B., & Harris, S. (2018a). Paired Teaching: A Professional Development Model for Adopting Evidence-Based Practices. *College Teaching*, 66(3), 148–157. <https://doi.org/10.1080/87567555.2018.1463505>
- Holland, T., Sherman, S. B., & Harris, S. (2018b). Paired Teaching: A Professional Development Model for Adopting Evidence-Based Practices. *College Teaching*, 66(3), 148–157. <https://doi.org/10.1080/87567555.2018.1463505>
- Holmes, C. M., & Kozlowski, K. A. (2015). Tech support”: Implementing professional development to assist higher education faculty to teach with technology. *Journal of Continuing Education and Professional Development*, 2(1), 9–20.
- Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M. P., Griffiths, F., Nicolau, B., O’Cathain, A., Rousseau, M. C., Vedel, I., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(4), 285–291. <https://doi.org/10.3233/EFI-180221>
- Jaipal-Jamani, K., Figg, C., Gallagher, T., Scott, R. M., & Ciampa, K. (2015). Collaborative Professional Development in Higher Education: Developing Knowledge of Technology Enhanced Teaching. *Journal of Effective Teaching*, 15(2), 30–44. <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1077239&site=ehost-live&scope=site>
- Karalis, T. (2020). Planning and evaluation during educational disruption: Lessons learned from Covid-19 pandemic for treatment of emergencies in education. *European Journal of Education Studies*, 7(4), 2020. <https://doi.org/10.5281/zenodo.3789022>
- Lewis, B., & Rush, D. (2013). Experience of developing Twitter-based communities of practice in higher education. *Research in Learning Technology*, 21.
- Macdonald, J., & Poniatowska, B. (2011). Designing the professional development of staff for teaching online: an OU (UK) case study. *Distance Education*, 32(1), 119–134. <https://search.proquest.com/docview/873030680?accountid=27575>
- McMaster, D., Veremu, M., & Santucci, C. (2020). COVID-19: opportunities for professional development and disruptive innovation. *Clinical Teacher*, 17(3), 238–240. <https://doi.org/10.1111/tct.13175>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Altman, D., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J. A., Clark, J., Clarke, M., Cook, D., D’Amico, R., Deeks, J. J., Devereaux, P. J., Dickersin, K., Egger, M., Ernst, E., ... Tugwell, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7). <https://doi.org/10.1371/journal.pmed.1000097>
- Mohr, S. C., & Shelton, K. (2017). Best Practices Framework for Online Faculty Professional Development: A Delphi Study. *Online Learning*, 21(4), 123–140. <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1163625&site=ehost->

- live&scope=site
- Mori, K., & Ractliffe, L. (2016). Evaluating the use of a MOOC within higher education professional development training. *Proceedings of the 25th International Conference Companion on World Wide Web*, 831–833.
- OECD. (2009). *Creating effective teaching and learning environments: First results from TALIS*. OECD.
- Parisi, M. C. R., Frutuoso, L., Benevides, S. S. N., Barreira, N. H. M., Silva, J. L. G., Pereira, M. C., & Cecilio-Fernandes, D. (2020). The challenges and benefits of online teaching about diabetes during the COVID-19 pandemic. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, 14(4), 575–576. <https://doi.org/10.1016/j.dsx.2020.04.043>
- Petticrew, M., & Roberts, H. (2006). Systematic Reviews in the Social Sciences: A Practical Guide. In *Systematic Reviews in the Social Sciences: A Practical Guide*. Blackwell Publishing. <https://doi.org/10.1002/9780470754887>
- Psiropoulos, D., Barr, S., Eriksson, C., Fletcher, S., Hargis, J., & Cavanaugh, C. (2016). Professional development for iPad integration in general education: Staying ahead of the curve. *Education and Information Technologies*, 21(1), 209–228. <https://doi.org/10.1007/s10639-014-9316-x>
- Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, 2, 923–945. <http://link.springer.com/10.1007/s42438-020-00155-y>
- Reed, M. S., Evely, A. C., Cundill, G., Fazey, I., Glass, J., Laing, A., Newig, J., Parrish, B., Prell, C., Raymond, C., & Stringer, L. C. (2010). What is social learning? *Ecology and Society*, 15(4). <https://doi.org/10.5751/ES-03564-1504r01>
- Schildkamp, K., Wopereis, I., Kat-De Jong, M., Peet, A., & Hoetjes, I. (2020). Building blocks of instructor professional development for innovative ICT use during a pandemic. *Journal of Professional Capital and Community*. <https://doi.org/10.1108/JPC-06-2020-0034>
- Sergeeva, Svetlana, Vagaeva, O., & Kozlova, E. (2014). The principles of academic staff professional development in the UK Svetlana. *Life Science Journal*, 11, 155–159. <https://doi.org/10.1038/132817a0>
- Sergeeva, S V, Vagaeva, O. A., & Kozlova, E. V. (2014). The principles of academic staff professional development in the UK. *Life Science Journal*, 11(SPEC. ISSUE 8), 155–159. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84901323222&partnerID=40&md5=c69aff902a2f7b96be8bac3f30369eeb>
- Soto, M., Gupta, D., Dick, L., & Appelgate, M. (2019a). Bridging distances: Professional development for higher education faculty through technology-facilitated lesson study. *Journal of University Teaching and Learning Practice*, 16(3).
- Soto, M., Gupta, D., Dick, L., & Appelgate, M. (2019b). Bridging Distances: Professional Development for Higher Education Faculty through Technology-Facilitated Lesson Study. *Journal of University Teaching and Learning Practice*, 16(3). <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1224005&site=ehost-live&scope=site>
- Spilker, M., Prinsen, F., & Kalz, M. (2020). Valuing technology-enhanced academic conferences for continuing professional development. A systematic literature review. *Professional Development in Education*, 46(3), 482–499. <https://doi.org/10.1080/19415257.2019.1629614>
- Suwaed, H., & Rahouma, W. (2015). A New Vision of Professional Development for University Teachers in Libya “It’s Not an Event, It Is a Process.” *Universal Journal of Educational Research*, 3(10), 691–696. <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1077627&site=ehost->

live&scope=site

- Teräs, H. (2016). Collaborative online professional development for teachers in higher education. *Professional Development in Education*, 42(2), 258–275.
<https://doi.org/10.1080/19415257.2014.961094>
- Tracy, S. J. (2010). Qualitative quality: Eight a"big-tent" criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837–851. <https://doi.org/10.1177/1077800410383121>
- Webb, A. S., Wong, T. J., & Hubball, H. T. (2013). Professional development for adjunct teaching faculty in a research-intensive university: Engagement in scholarly approaches to teaching and learning. *International Journal of Teaching and Learning in Higher Education*, 25(2), 231–238.
- Wenger, E., McDermott, R., & M. Snyder, W. (2002). Cultivating Communities of Practice: A Guide to Managing Knowledge. In *Harvard Business School Press*.
<https://doi.org/10.1177/875697280203300312>