Chapter 19
Understanding Digital Literacy, Digital Competence, and Pedagogical Digital Competence: Implementing Online Teaching for Filipino Tertiary Educators During COVID-19

Vivencio O. Ballano, Nicolas T. Mallari, and Raul Roland R. Sebastian

Abstract This chapter aims to trace and clarify the meaning of digital literacy (DL), digital competence (DC), and pedagogical digital competence (PDC) in the global literature, as well as their relevance to the Filipino tertiary education teachers' PDC during the current COVID-19 pandemic that suspended face-to-face classes in favor of flexible, blended, and online teaching as mandated by the Philippines' Commission on Higher Education (CHED). It also examines the major obstacles that hinder the development of the Filipino teachers' PDC to be able to implement the CHED's long-distance learning requirement as part of its recommended flexible learning to minimize COVID-19 infection. Using a systematic literature review as the primary method and peer-reviewed journal articles, reports, and books as sources of textual data, it argues that responding adequately to the CHED's teaching mandate during the pandemic requires addressing the problems of lack of logistical support for teachers and students, such as weak and unstable Internet connection and lack of access to digital devices and educational technologies. It also needs to strengthen institutional support for information communication technology (ICT) infrastructure in colleges and universities and teachers' ICT training to enhance their PDC and attitude toward online and long-distance learning. This chapter recommends that the Philippine government through the CHED must encourage more studies to understand fully the implementation barriers to improve the Filipino tertiary educators' PDC during the current COVID-19.

Keywords Digital literacy · Digital competence · Pedagogical digital competence · Digital technology · Online learning · Flexible learning · Philippines

V. O. Ballano (✉) · N. T. Mallari · R. R. R. Sebastian
Polytechnic University of the Philippines (PUP), Manila, Philippines
e-mail: voballano@pup.edu.ph

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19.1 Introduction

The Novel Corona Virus disease (COVID-19), which originated from Wuhan, China, and became a global public health emergency on January 30, 2020, has caused unprecedented deaths and distress to everybody across the world (Klapproth et al., 2020; Singhal, 2020). Undoubtedly, aside from deaths and disruption of the economy, the COVID-19 pandemic has created the greatest disturbance of education in human history. To control the spread of the disease, governments around the world implemented lockdowns, temporarily closed schools, and implemented social distancing that affected greatly the daily routines and activities of students (Lee, 2020).

Because of its highly contagious nature, governments around the world suspended classes in the early part of 2020, resulting in the displacement of 98.6% of students around the world or 1.725 billion students from pre-school to tertiary education in 200 countries (United Nations, 2020). The mode of instruction largely shifted abruptly from face-to-face to online classes that heavily utilize digital technology. Indeed, the global pandemic has prompted schools to change their teaching strategies and adopt remote teaching that attempts to provide students with quality like physical teaching (Vaataja & Ruokamo, 2021). Thus, tertiary education institutions started to apply emergency education through different online platforms, which are unfamiliar to many teachers. Many schools, colleges, and universities have discontinued face-to-face instruction and were compelled to create and introduce alternative teaching strategies (Pokhrel & Chhetri, 2021).

This led to the adoption of a teaching orientation that mostly depend on digital technologies "to design learning environments that supported pedagogical practices involving students' collaboration, problem-solving, and knowledge-construction" (Butler et al., 2017, p. 236). Thus, the online and blended learning and teaching methods that largely depend on digital platforms such as Microsoft Teams, Google Classroom, Canvas, and Blackboard were used by tertiary educators for their courses, training, and skill development (Petrie, 2020). Pokhrel and Chhetri (2021, p. 135) also claimed "workplace chat, video meeting and file storage that keep classes organized and easy to work, as well as sharing of a variety of content like Word, PDF, Excel file, audio, or videos and many more, were also used by educators… to track student learning and assessment by using quizzes and the rubric-based assessment of submitted assignments."

The Philippines as one of the most hit countries by the COVID-19 pandemic is not exempted from this disruption in the school calendar and shift in pedagogical orientation. The country's educational system was in turmoil when President Rodrigo Duterte suspended physical classes in the remaining days of the school year 2019–2020 to prevent the increase of COVID-19 cases in the country (Al-Lily et al., 2020). Thus, more than 28 million learners in various academic levels were required to remain in their homes and follow the Philippine government's quarantine policies (UNESCO, 2020). And around 3.5 million students who were enrolled in around 2,400 higher education institutions (HEIs) were compelled to follow the government's new directives on long-distance and online learning

methods (Joaquin et al., 2020). These can include some adapted forms of online learning such as "synchronous, real-time lectures and time-based outcomes assessments, or asynchronous, delayed-time activities, like pre-recorded video lectures and time-independent assessments" (Oztok 2013).

To provide a uniform learning method to colleges and universities in the country during the pandemic, the Commission on Higher Education (CHED), the Philippines' regulating body for tertiary education, released the Memorandum Order No. 4, series of 2020, to encourage all higher education institutions (HEIs) of the country to implement the flexible learning (FL) method in holding classes during the pandemic to minimize the risk of infection (CHED, 2020). Although the CHED's FL allows the use of modules and other non-online teaching methods, any HEIs adopt the "delivery methods of long-distance learning and facilities of educational technology, availability of devices, internet connectivity, level of digital literacy, and approaches" (CHED 2021, III. Definition). Thus, it requires the application of a student-centered approach, relying on digital technology and higher digital literacy (DL) for teachers who are expected to deal with young students in HEIs who are considered digital natives of the latest technology (Prensky, 2001).

As the world shifts to long-distance and online learning using digital technology when the COVID-19 pandemic struck in early 2020, the digital literacy (DL) of teachers became crucial for higher education to prevent the spread of the Coronavirus. Digital technology has become a pedagogical tool for many Filipino teachers with the growing digitalization of higher education in the Philippines. In the current technological age, "colleges and universities are now populated with students who have never experienced a moment of their existence without the presence of digital technology in most, if not all, aspects of their lives" (Medrick et al., 2016, p. 327). As Vaataja and Ruokamo (2021, p. 1) argue, "The current generation of youth is being educated in a world filled with digital technologies that shape everyday life." Thus, the CHED's FL method encourages HEI educators to continuously rethink their pedagogical practices (Sailin & Mahmor, 2018) and to apply digital technologies in instruction to enhance student responsibility, cooperation, and activity in learning (Butler et al., 2017). The adoption and utilization of digital educational technologies require teachers to acquire a higher level of digital literacy (DL), digital competence (DC), and pedagogical teaching competence (PDC) to be able to teach in long-distance and online platforms. But what precisely is the meaning of these terms for Filipino college teachers who are still struggling to cope with the emergency of shifting their teaching method from face-to-face teaching to long-distance or online teaching?

As a developing country, the Philippines' online education that requires digital skills for tertiary education teachers is still in progress. Clarifying DL, DC, and PDC in relation to digital teaching in tertiary education has not been well explored in the current educational research in the country. Describing and understanding the Filipino teachers' understanding of DL, DC, and PDC and their capability to implement the long-distance component of CHED's FL method during the current COVID-19 pandemic has not been explored in the literature. There is also a paucity of information on how online courses are assessed by faculty members (Moralista &

Oducado, 2020). Thus, using a systematic analysis of some relevant global literature on the DL, DC, and PDC, this book chapter aims to provide an overview of the meaning of these concepts in relation to online learning and to explore how these concepts resonate with the Filipino tertiary education teachers' experience, the major obstacles in enhancing them, and how they affect their ability to implement the CHED's mandate on online teaching and learning as part of the FL method.

This chapter consists of two major sections aside from the introduction and methodology. The first section provides an overview and clarifies the meaning of using the global literature. The second section is concentrated on how these basic concepts can be measured and applied to the Philippine educational environment and Filipino teachers' experience vis-à-vis the CHED's mandate to adopt long-distance learning during the current COVID-19 pandemic. It also examines the major obstacles in enhancing teachers' digital pedagogical competency that hinder them to respond to the requirements of online learning during the pandemic. It argues that despite the growing improvement of the PDC of Filipino tertiary teachers and their willingness to adapt to the online and long-distance learning system despite logistical and institutional obstacles, the state of digital education in the Philippines still lags behind in enhancing tertiary education with the necessary PDC and proper attitude to respond adequately to the challenges of the COVID-19 pandemic.

19.2 Method

This study applies the systematic literature review method. In its initial literature search, the authors searched for existing reviews, familiarized themselves with the research field, identified relevant databases and search terms, and formulated a search strategy to find the relevant online materials for the study (Booth 2016). The strategy and search terms were generated from the aims and questions. Peer-reviewed journals that deal on digital literacy and competence, pedagogical digital competence, online learning, and the Philippine government's program for flexible learning for higher education teachers from 2015 to 2021, with a special focus on literature that deals with online learning during the COVID-19 pandemic, were scrutinized and analyzed to achieve the chapter's objectives.

19.3 Understanding Digital Literacy, Competence, and Pedagogical Digital Competence

19.3.1 Defining DL and DC

The term DL started in the United States (US) with the publication of the book *Digital Literacy* by Paul Gilster in 1997. This book first defined the skills necessary to critically deal with information in an increasingly digital world (Pangrazio, Godhe, & Ledesma 2020). DL has been defined in various ways, but it is usually "associated with the identification and treatment of information, the creation of content, communication, and the safe use of digital tools" (Esteve-Mon et al., 2016, p. 818). It is related to the "use of information, content creation, communication, and safety in digital tool use" (Esteve-Mon et al., 2016, p. 818). To Gilster, DL is "the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers" and, particularly, through the medium of the Internet (Gilster in Pool, 1997, p. 6). To Pangrazio et al. (2020, pp. 453–54), DL "refers not only to the skills and capacities required to use digital texts, but also a disposition toward the digital that is both critical and creative." It includes the identification and treatment of information, the creation of content, communication, and the safe use of digital tools (Covello, 2010; Gilster, 1997).

Conversely, the word "literacy" in DL primarily refers to the ability to read but with the growing digitalization of society, its meaning has been expanded to refer to DL and DC (Buckingham, 2006). Although it is not directly synonymous to literacy, "the notion of competence is often used in a similar way as literacy" (Johanessen, Øgrim, & Giaever 2014, 301). Thus, Hatlevik and Christophersen (2013) aptly observed that DL and DC are often used interchangeably by scholars since their meanings overlap to some degree. Albeit with distinctions, education scholars tend to use DL as related to the concept of DC (Tyner, 1998). Both terms are used as in education literature as broader terms that incorporate skills, understandings, and critical reflections (Erstad, 2010). The European Digital Competence Framework (DigComp), which was published in 2013 and revised in 2016 and 2017, describes the DC of citizens as the application of digital technology in professional life (Ferrari, 2013; Carretero et al., 2017), while the European Framework for the Digital Competence of Educators (DigCompEdu), which was published in 2017, describes the DC as specifically related to the teaching profession (Redecker, 2017). With the growing digitalization of society, teachers are expected to possess a certain degree of competence in using digital technology for student learning.

DL is often used synonymously with the term DC, which is widely used internationally, especially in European contexts (Ferrari, 2012). DC is also interpreted as "acquiring the skill, ability, and knowledge to use computers and their applications, as well as software in teaching" (Medrick et al., 2016). The positive attitudes of teachers toward their competence in using computers will affect how they deliver knowledge to the students (Huang & Liaw, 2011). One study by Gasaymeh (2009)

that explored the relationship between the faculty members' attitudes toward Internet-based distance education and their perceptions of their level of computer and Internet skills, and perceived value in online education indicated that faculty members tended to have moderately favorable attitudes toward Internet-based distance education. Thus, acquiring computer and Internet skills is crucial for teachers' DC to achieve satisfactory online teaching.

19.3.2 Teachers' DC and PDC

The DC for teachers is different from non-teaching professionals. A digitally competent teacher is one "who possesses the abilities, attitudes, and knowledge that are needed to engender true learning in a context that is enhanced by technology" (Hall et al., 2014). DC is a term that has evolved over the last few decades, though it has always been associated with the various literacies of the new media (Lankshear & Knobel, 2008). Existing literature reveals that DC for teachers is a relative term with respect to time and context. Education researchers define it in various ways (Krumsvik, 2009). Thus, there is no uniform view on what constitutes DC among education researchers who specialize in teachers' competence in the use of digital technologies for student learning (Johannesen et al., 2014), although the national curriculum can play a crucial role in defining the school's method in using digital tools and teachers' DC for learning (Johannesen et al., 2014).

A teacher's DC can consist of "a set of skills, abilities, and attitudes that the teacher must develop to incorporate digital technologies into their practice and professional development" (Lázaro-Cantabrana et al., 2019, p. 1). To Medrick et al., (2016, p. 327), DC can also refer to the teacher's adequate practical knowledge of digital skills as well as theoretical applications for integrating educational technology in the classroom. Teacher's DC involves "more than just the ability to use software or operate digital devices and involves a large variety of complex skills – cognitive, motoric, sociological, and emotional – users need to have in order to use digital environments effectively" (Eshet-Alkali & Amichai-Hamburger, 2004, p. 421). It is "not only having certain abilities, knowledge, and attitudes but also the capacity to put these in action and mobilize them in a certain educational context" (Esteve-Mon et al., 2016, p. 818).

In relation to the use of information communication technologies (ICSTs), the teacher's DC is not only learning the basic skills, tools, and expertise in digital technology but also knowing learning strategies in an educational setting (Johanessen et al., 2014). Thus, the concept of pedagogical digital competence (PDC) was conceived to refer to the teacher's knowledge, skills, and attitudes, as well as technology, learning theory, subject, context and learning, and the relationship between them in education (From, 2017). It implies a higher level of DC that affects the attitude, knowledge, and educational use of ICT for teaching and online learning (From, 2017). Thus, it is related to both technological knowledge and its didactic use (Rivera-Laylle et al., 2017). In today's technological age, it is expected that teachers

should acquire adequate PDC skills to be able to use ICT for online teaching. They are expected to possess some basic digital and pedagogical skills to deal with certain situations in the learning and teaching profession (Lund et al., 2014). Thus, educators are expected to enhance their PDC and that of their students (Insteford & Munthe, 2017). However, despite the popularity of digital devices and educational tools, educational institutions and teachers are still struggling on how to "integrate technologies into the curriculum and prepare students for their (digital) futures" (Pangrazio et al., 2020, p. 443). Thus, university faculty must update their PDC and must be adept with the new methodologies in their academic specialization. It is "incumbent on the educational professionals to preserve, improve and update their level of digital competence, and so improve learning and teaching" (Mirete et al., 2020, p. 1). The faculty is expected to acquire the attitude, knowledge, and educational use of Information Communication Technology (ICT) for teaching and online learning (From, 2017).

19.3.3 Measuring DC and PDC

Measuring Teachers' PDC has no universal and uniform criteria and instruments in the global literature. In recent years, instruments or models have been developed to measure the level of technological competence and PDC of teachers. Martínez and Vidal (2015), for instance, created a self-perception instrument for teachers called INCOTIC which mediates the use of ICT: "INCOTIC-Grado aims to improve these processes by implementing the fundamental initial action of getting university students to diagnose their own digital competence. This initial step, which must be carried out before the teaching is planned, will enable [teachers] to determine what knowledge students consider they have already acquired at the beginning of their university degree" (Martinez & Vidal, 2015, p. 35). This INCOTIC tool can guide educators in planning their ICT-mediated instruction (Martinez & Vidal, 2015).

Another instrument, which is called the TPACK model (Technological Pedagogical and Content Knowledge), was created by Koehler and Mishra (2009) to describe the complex skills that teachers need to integrate digital tools for learning. This instrument is only one of the many methods used by scholars to describe digital skills teachers ought to possess to integrate DL into the learning processes. Its primary focus is for teachers to learn technological knowledge, as well as comprehension of content and pedagogy. In short, the TPACK model traces the educators' use of integrated technology to know other subject areas (Johanssen et al., 2014). To Cox and Graham (2009), the TPACK model is essential for educators to enhance their digital knowledge in a setting that maximizes their digital skills (Guillén-Gámez et al., 2021).

Aside from education scholars proposing instruments and models to measure teachers' PDC, state educational authorities also formulated frameworks to understand and measure DC in education. The European Framework for the Digital Competence of Educators (DigCompEdu), for example, details 22 educator-specific digital

competencies organized in six areas to measure PDC. Its core is represented by areas 2–5, in which technologies are integrated into teaching in a pedagogically meaningful way (Redecker, 2017). Area 6 (Facilitating Learners' Digital Competence) is said to complete this framework "by highlighting that a digitally competent teacher should be able to promote information and media literacy and integrate specific activities to enable digital problem solving, digital content creation and digital technology use for communication and cooperation" (Ghomi & Redecker, 2019, p. 542).

Lastly, most of the research on teachers' PDC in the scientific-educational literature focuses on discovering the educational use of ICT for faculty (Ahmed et al., 2016; Amhag et al., 2019). Mercader and Sallan (2017), for example, have analyzed how teachers used ICT in instruction. Using a sample of 527 professors, they discovered that the tools that most teachers use are virtual presentations (97%) and LMS, such as Moodle or the Virtual Campus of universities (89.2%). Less than 40% of the teachers indicated that they use blogs, wikis, or social networks in their classes. In the same context, Barak (2017) used a sample of 52 science teachers and concluded that almost 40% of them used asynchronous online forums, with other less popular applications in the cloud, such as wikis, blogs, and social networks (45–25%) (Guillén-Gámez et al., 2021). In sum, to track down the teachers' PDC is indeed difficult with the diversity of teaching strategies teachers used in their digital teaching.

19.4 Filipino Tertiary Educators' PDC and Online Learning

The Philippines as a developing country has not escaped the growing digitalization of education in contemporary society. The rising Internet usage in the country rose from 9% in 1998 to 35% in 2014 (Labucay, 2014). Toward the end of the decade, with a population of about 106 million Filipinos in 2018, the Internet utilization of the population further increased to 62–63% or about 67 million Filipinos are considered Internet users (Estella & Löffelholz, 2019). In the field of education, this rising use of the Internet in the country also serves as a milestone that opens wide range of teaching and learning opportunities for the faculty and students (Lorenzo, 2016). Some studies suggested that the use of digital technology in teaching and online learning have slowly advanced in the field of education (Ma'arop & Embi, 2016; Matheos & Cleveland-Innes, 2018; Olelewe & Agomuo, 2016). Specifically, online instruction and learning are increasing among teachers in higher education (Forbes, 2016; Porter et al., 2014; Minty-Walker et al., 2017). Although there is an intensive study on online learning in tertiary education, it remains unclear, however, how educators engage themselves in the sudden shift to online or remote learning during the COVID-19 pandemic. In the Philippines, studies measuring the DL and DC of teachers in tertiary education in response to the COVID-19 pandemic are limited (Tarrayo et al., 2021).

The use of online learning in the Philippines is still new to many tertiary educators in the Philippines who are still socialized in conventional teaching and learning environment (De la Pena-Bandalaria, 2007), although Ocak (2011) is optimistic that transforming teachers' PDC and attitude toward online teaching and learning can still be enhanced. Thus, some education researchers agree that exploring the faculty's teaching and learning satisfaction toward online teaching should be explored (Martins & Nunes, 2016; Previtali & Scarozza, 2019; Selim, 2007) as most of the teachers' concerns on how to utilize online and blended learning methods were not sufficiently documented (Stacey & Gerbic, 2008). In the Philippines, there is a variety of approaches and frameworks in measuring teachers' PDC in tertiary learning approaches. While studies on online learning have been extensive, it remains unclear, however, how educators engage themselves in the sudden shift to online learning and long-distance education using digital technology to address the educational challenges brought about by the COVID-19 pandemic (Tarrayo et al., 2021).

Despite the general lack of research and documentation on the Filipino teachers' PDC and application of digital teaching in HEIs in the Philippines during the pandemic, some studies have indicated that some top private colleges and universities were able to integrate ICT and PDC in their response to COVID-19. One of the top Catholic universities in the Philippines, De La Salle University (DLSU), for instance, has resorted to blended and remote online learning during the pandemic, which combines both synchronous and asynchronous activities with some flexible options for students such as modules to complete their course requirements throughout the school year (De La Salle University, 2020). Another Catholic university Ateneo de Manila University also engages its faculty in online learning and provides some options to their students besides online classes to learn offline at their own pace (Villarin, 2020). Although these universities did not completely resort to online teaching and learning to address the pandemic, it did indicate that their teachers' PDC was heavily utilized in their online teaching system. Thus, the concept of blended learning, not wholly remote teaching, has been utilized by these HEIs during COVID-19, allowing other options for students who cannot cope with online learning. This is also true to other private colleges and universities in the country such as St. Scholastica College, University of Santo Thomas (UST), STI College, Adamson University, Far Eastern University (FEU), University of the East (UE), Ateneo de Davao University, and University of San Carlos (USC) (Joaquin et al., 2020, pp. 1–2).

The use of online and long-distance learning that requires a higher level of DC and PDC is not well utilized in public and state HEIs compared to top private institutions in the Philippines. State universities and colleges (SUCs) in the Philippines which offer free tuition fees and are generally located in the provinces, catering to students who are mostly come from lower classes, do not engage much in online teaching that requires a higher level of teachers' PDC. Although many faculty members in SUCs expressed a strong willingness to engage in online classes, limitations in Internet connectivity and access to digital devices have become common problems that hinder a higher engagement in online teaching and learning as encouraged by the CHED. A study by Callo and Yazon (2020), for instance, in Laguna State Polytechnic University

(LSPU) using quantitative research indicated that faculty and students are prepared for online teaching in case the pandemic continues, but they recommended that the institution should provide a series of training for teachers as a capacity building to enhance their PDC, especially equipping them with knowledge and competencies on the use of digital technology in teaching and learning.

19.5 Obstacles in Enhancing Filipino Teachers' PDC and Implementing Online Learning

In recent years, online learning has experienced significant development due to its flexibility in delivering instruction. The rapid adoption of information and communication technologies (ICTs) is an indication that new forms or approaches of teaching and learning are possible (Jeffrey et al., 2014). HEIs are now envisioning the role of ICTs in the teaching and learning environment. At the university level, Kuo et al. (2014), for instance, argued that blended learning that uses online teaching is now becoming one of the most popular teaching methods for teachers in HEIs. Thus, Filipino tertiary education teachers are expected to have a higher level of PDC to be digitally competent in their online classes than their students during the COVID-19 pandemic to assure quality education. As already mentioned, there are no uniform and universal methods of measuring teachers' PDC. Existing research and literature have revealed that Filipino teachers in HEIs have weak PDC which can also greatly affect the quality of their online teaching to their students. Digital pedagogical competencies are usually the skills teachers need to integrate digital technologies successfully into their teaching.

19.5.1 Logistical Problems

One primary obstacle to developing the Filipino teachers' PDC has something to do with logistical problems that are related to access to digital technology and devices and Internet connection. An ideal online learning under the flexible and online learning requires that both the teachers and students have adequate digital tools and devices, DC, as well as strong and steady Internet connectivity. In the Philippines, ownership of digital devices, poor digital infrastructure, and weak and expensive Internet connections for poorer teachers and students are common logistical problems that greatly impede the implementation of the CHED's long-distance learning. It is widely acknowledged that digital technology should have a significant presence in higher education to enhance teachers' PDC (Selwyn, 2016). "Technology provides structural measures through learning management systems as well as online platforms in order to increase collaboration and communication between students as well as between students and faculty" (Gudmundsdottir & Vasbø, 2017, pp. 1–2).

Although the world has witnessed an exponential growth in the use of digital technology in tertiary education, developing countries such as the Philippines are still lagging in this aspect. Computer and Internet access, as well as the use of digital technology in education, remain perennial issues in the country: serious logistical problems, inadequate financial assistance, structural capability, human resources, management support, as well as behavioral factors are perennial problems in online learning are fundamental challenges to tertiary education (Dotong et al., 2016). Internet connection in the country is both an issue and challenge not only for the students but also for teachers and the institution (Asio et al., 2021). In fact, there are still areas in the Philippines, particularly in rural areas, where a reliable supply of electricity and Internet is miles away to achieve.

Thus, access and connectivity issue in the use of digital technology greatly "inhibits and affects the capability of teachers to become skillful on the use of ICT in blending with teaching and learning" (Alvarez, 2020, p. 116). As Tanucan et al., (2021) argue, implementing long-distance learning during the pandemic can be hampered by the perennial problems of weak Internet connection and poor digital infrastructure and technologies in the country. Indeed, these logistical problems can obstruct the enhancement of teachers' PDC and the full implementation of the CHED's online learning in the Philippines especially during the COVID-19 pandemic, resulting in weak or modest readiness of schools to implement various modalities of remote education (e.g., Alea et al., 2020; Mallillin et al., 2020).

But implementing online learning that integrates digital technology in teaching can still be feasible for Filipinos as they are among the top users of the Internet and social media in the world (Baclig, 2020). Faculty members in HEIs have shown moderate readiness to engage in online learning with their students (Mallillin et al., 2020). This can be enhanced, however, if teachers are given adequate and appropriate training in digital technologies (Koehler et al., 2013). A study done by Alea et al. (2020) during the initial stage of the pandemic in the Philippines, for instance, revealed that Filipino teachers and students expressed their "readiness to switch to distance learning education; however, they felt hampered due to lack of facilities, equipment, and capacity building to distance learning education" (p. 141).

19.5.2 Preference for Face-To-Face Teaching

Another primary obstacle is the preference of tertiary educators for face-to-face teaching despite the shift to online education because of the pandemic. Apelgren and Olsson (2010, pp. 30–31) argued that PDC has six aspects that are crucial for online teaching, namely, attitude, knowledge, ability to adapt to the situation, perseverance, and continuous development (Vaataja & Ruokamo, 2021, pp. 2–3). "PDC is connected to teachers' knowledge, skills, and attitudes in relation to digital technology, learning theory, and context" (From, 2017, p. 47). Several studies have shown that many Filipino teachers still prefer physical classes to online classrooms, indicating their lack of preparation and the necessary PDC skills for online teaching.

The change from face-to-face pedagogy to online learning has challenged instructors' and students' ability to adapt to the new digital technologies (Mok et al., 2021, p. 4). In the Philippines, the ability of tertiary education to enhance the students' online learning is dependent on teachers' PDC in handling digital educational technologies during the pandemic. Thus, in one study by Cabauatan et al. (2021) among 236 faculty members in a comprehensive university in the Philippines, for instance, revealed that although most of them owned a computer with a high 96.61 Internet access, they still lacked confidence in handling online classes and preferred the traditional approach of face-to-face classes, thus showing a low attitude toward online teaching that is demanded by the CHED to respond to the pandemic.

This is also illustrated in another study by Moralista and Ocudado (2020, p. 4736) which showed that teachers have low attitudes toward online teaching and still expressed a preference for physical classes despite having an intermediate computer competency. To them, online education is prone to academic dishonesty, lacking in personal touch compared to face-to-face classes, and difficult to handle in terms of technology. Also, they felt a feeling of "unnaturalness" in online learning as revealed in some studies (e.g., Larreamendy-Joerns & Leinhardt, 2006; Aldan & Anwar, 2020). Other studies also revealed the faculty's skepticism and confusion concerning online education that can hinder blended learning developments (Jobst, 2016; Ooms et al., 2008; Wingo et al., 2017).

This negative view concerning online education and preference for face-to-face classes is related to their lack of knowledge and training on ICT integration and poor digital infrastructure in many schools (Aldosemani et al., 2018; Benson et al., 2011; Tshabalala et al., 2014). The pandemic has really caught many Filipino teachers and students in higher education unprepared in online learning. "The sudden transfer of conventional face-to-face classes to online learning regardless of instructors and students' readiness, [has] resulted in the new phenomenon called "emergency online learning," which has created many confusions to instructors, students, and higher education administrators" (Mok et al., 2021, p. 2). Pokhrel and Chhetri (2021, p. 135) contend, "The use of suitable and relevant pedagogy for online education may depend on the expertise and exposure to information and communications technology (ICT) for both educators and the learners." The emergency of the COVID-19 pandemic has prematurely exposed Filipino tertiary educators to the realities of online teaching that requires a higher level of PDC.

19.5.3 Lack of Institutional Investment and Faculty Training for PDC

Another major obstacle in enhancing the teachers' PDC for higher education faculty is the lack of institutional investment of HEIs to provide advanced e-learning technologies and regular training and seminars to enhance the faculty's PDC and poor

research. In the Philippines, HEIs that invested much in acquiring e-learning technology and improving faculty PDC before COVID-19 are more likely to be prepared for online learning compared to those which have just started in response to the pandemic (Cabauatan et al., 2021). DC varies between people and is related to aspects such as a person's interests, belief in their own ability, actual ability, and access to social support or other resources when needed (Larsson-Lund, 2018, p. 733). Different organizations and institutions have identified different indicators or standards that describe teachers' PDC (Muñoz-Repiso et al., 2020). In the Philippines, many HEIs are still behind in ICT pedagogical training for their faculty. As Dotong et al. (2016) explain, limitations such as shortage of ICT facilities, poor maintenance of available or existing ICT resources, and lack of ICT budget have seriously affected teachers' PDC to engage in online teaching (e.g., Lorenzo, 2016; Tomaro, 2018; Vergel de Dios, 2016).

Lastly, the weak PDC of Filipino tertiary educators can be linked to the poor research productivity of many HEIs in the Philippines. As Yazon et al. (2019) argue, the increase in understanding, finding, using, and creating information using digital technologies is positively related to faculty members' ability to conduct, complete, present, and publish a research article. This is a problem in many colleges and universities in the country whose focus is on teaching rather than research. Thus, most tertiary education teachers are less exposed to digital technology and online sources in scientific research and publication which can greatly enhance their PDC. "Faculty member's digital competence is strong and significantly correlated to their research productivity, which clearly indicates that as their knowledge, skills, and attitudes for working, living and learning in the knowledge society increases, there is also a significant increase in their ability to produce publishable research outputs" (Callo & Yazon, 2020, p. 3511). Finally, Mena, Singh and Clarke (2018, p. 588) also stated that digital competencies include the contents, skills, knowledge, and attitudes that connect technical expertise with pedagogical purposes to enhance students' learning. Thus, the success of online education as demanded by the CHED to address the COVID-19 largely depends on the expertise and exposure of the faculty to ICT, scientific research, (Pokhrel & Chhetri, 2021) and access to digital devices, educational tools, Internet connection, institutional support, and training.

19.6 Conclusion

This chapter has provided an overview and clarification on the meaning of DL, DC, and PDC in online and long-distance learning using the global literature review. DL and DC for teachers, which are usually understood as synonymous by education scholars, are different from those of other professions. Although there is no uniform definition and standard in understanding and measuring these digital skills as applied to education in the global literature, the ability to use and apply digital tools and pedagogies effectively to pursue online or long-distance teaching and learning are the common features in understanding teachers' DL, DC, and PDC. Measuring

these skills were also varied depending on the objectives of the study, from the use of INCOTIC, TPACK, DigiCOM, and other instruments. Although the Philippine tertiary education has a growing access to digital technology and is generally open to new ICT digital educational tools to implement online teaching and learning in response to the CHED's flexible learning and long-distance learning mandate, most of the HEIs and their faculty are still caught unprepared and still adjusting to the sudden shift from face-to-face to online classes in response to the COVID-19 pandemic. The major obstacle in enhancing the Filipino tertiary education teachers' PDC include weak Internet connection, lack of access to digital devices and educational technologies, lack of institutional support for ICT infrastructure, and regular teachers' ICT training to enhance their PDC and attitude toward online teaching.

To make them responsive to the CHED's mandate on flexible and online learning during the current COVID-19 pandemic, this study recommends that these major obstacles must be addressed by the Philippine government through the CHED. The weak PDC and negative attitude of many Filipino tertiary teachers toward online teaching and learning is systemic in nature. Thus, more studies should be commissioned by the CHED to understand fully the problem and encourage education to recommend ways to the Philippine government on how to solve them.

References

Ahmed, M., Badusah, J., Mansor, A. Z., Abdul Karim, A., Khalid, F., Daud, M. Y., Din, R., & Zulkefle, D. F. (2016). The application of 21st century ICT literacy model among teacher trainees. *Turkish Online Journal of Educational Technology, 15*(3), 151–161.

Aldan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology, 2*(1), 45–51. https://doi.org/10.33902/JPSP.2020261309

Aldosemani, T., Shepherd, C. E., & Bolliger, D. U. (2018). Perceptions of instructors teaching in Saudi blended learning environments. *TechTrends, 63*(3), 341–352. https://doi.org/10.1007/s11528-018-0342-1

Alea, L., Fabrea, M., Roldan, R., & Farooqi, A. (2020). Teachers' COVID-19 awareness, distance learning education experiences and perceptions towards institutional readiness and challenges. *International Journal of Learning, Teaching and Educational Research, 19*(6), 127–144. https://doi.org/10.26803/ijlter.19.6.8

Al-Lily, A. E., Ismail, A. F., Abunasser, F. M., & Alqahtani, R. H. A. (2020). Distance education as a response to pandemics: Coronavirus and Arab culture. *Technology in Society, 63*, 101317. https://doi.org/10.1016/j.techsoc.2020.101317

Alvarez, A. J. (2020). The phenomenon of learning at a distance through emergency remote teaching amidst the pandemic crisis. *Asian Journal of Distance Education, 15*(1), 127–143.

Amhag, L., Hellstrom, L., & Stigmar, M. (2019). Teacher educators' use of digital tools and needs for digital competence in higher education. *Journal of Digital Learning in Teacher Education, 35*(4), 1–18.

Apelgren, Å. R., & Olsson, T. (Eds.). (2010). *A Swedish perspective on pedagogical competence.* Uppsala University.

Asio, J. M., Gadia, E. D., Abarintos, E. C., Paguio, D. P., & Balce, M. (2021). Internet connection and learning device availability of college students: Basis for institutionalizing flexible learning

in the new normal. *Studies in Humanities and Education, 2*(1), 56–69. https://doi.org/10.48185/she.v2i1.224

Baclig, C. E. (2020, November 20). *The promises and pitfalls of blended learning in PH*. Inquirer.Net. https://newsinfo.inquirer.net/1362497/the-promises-and-pitfalls-ofblended-learning-in-ph. Accessed 10 Dec 2022

Barak, M. (2017). Cloud pedagogy: Utilizing web-based technologies for the promotion of social constructivist learning in science teacher preparation courses. *Journal of Science Education and Technology, 26*, 459–469. https://doi.org/10.1007/s10956-017-9691-3

Benson, V., Anderson, D., & Ooms, A. (2011). Educators' perceptions, attitudes, and practices: Blended learning in business and management education. *Research in Learning Technology, 19*(2), 143–154. https://doi.org/10.1080/21567069.2011.586676

Booth, A. (2016). Searching for qualitative research for inclusion in systematic reviews: a structured methodological review. *Systematic Reviews, 5*(74), 1–23. https://doi.org/10.1186/s13643-016-0249-x

Buckingham, D. (2006). Defining digital literacy—What do young people need to know about digital media? *Nordic Journal of Digital Literacy, 1*(4).

Butler, D., Leahy, M., Hallissy, M., & Brown, M. (2017). Different strokes for different folks: Scaling a blended model of teacher professional learning. *Interactive Technology and Smart Education, 14*(3), 230–245.

Cabauatan, R. R., Uy, C., Manalo, R. A., & De Castro, B. (2021). Factors affecting intention to use blended learning approach in the tertiary level: A quantitative approach. *Higher Education for the Future, 8*(2), 239–255. https://doi.org/10.1177/23476311211011934

Callo, E. C., & Yazon, A. D. (2020). Exploring the factors influencing the readiness of faculty and students on online teaching and learning as an alternative delivery mode for the new normal. *Universal Journal of Educational Research, 8*(8), 3509–3518. https://doi.org/10.13189/ujer.2020.080826

Carretero, S., Vuorikari, R., & Punie, Y. (2017). *DigComp2.1: The digital competence framework for citizens with eight proficiency levels and examples of use.* EUR28558 EN. Publications Office of the European Union.

CHED [Commission on Higher Education]. (2020). CHED Memorandum Order No. 4, Series of 2020. Retrieved from https://ched.gov.ph/2020-ched-memorandum-orders/

CHED [Commission on Higher Education]. (2021). *CHED memorandum order no. 04 Series of 2020, Subject: Guidelines on the implementation of flexible learning.* https://ched.gov.ph/2020-ched-memorandum-orders/. Accessed 10 Aug 2020.

Covello, S. (2010). *A review of digital literacy assessment instruments.* Syracuse University, School of Education.

Cox, S., & Graham, C. R. (2009). Diagramming TPACK in practice: Using an elaborated model of the TPACK framework to analyze and depict teacher knowledge. *Tech Trends, 53*(5). https://doi.org/10.1007/s11528-009-0327-1

De la Pena-Bandalaria, M. (2007). Impact of ICTs on open and distance learning in a developing country setting: The Philippine experience. *International Review of Research in Open and Distance Learning, 8*(1), 1–15. https://doi.org/10.19173/irrodl.v8i1.334

De La Salle University. (2020). Coping with challenges and learning during the enhanced community quarantine period. Retrieved from https://www.dlsu.edu.ph/2nd-term-faqs/

Dotong, C. I., De Castro, E. L., Dolot, J. A., & Prenda, M. (2016). Barriers for educational technology integration in contemporary classroom environment. *Asia Pacific Journal of Education, Arts and Sciences, 3*(2), 13–20.

Erstad, O. (2010). Educating the digital generation. *Nordic Journal of Digital Literacy, 1*, 56–70.

Eshet-Alkali, Y., & Amichai-Hamburger, Y. (2004). Experiments in digital literacy. *Cyberpsychology and Behavior, 7*, 421–429.

Estella, P., & Löffelholz, M. (2019). Media landscapes-Philippines. Retrieved from https://www.dbthueringen.de/servlets/MCRFileNodeServlet/dbt_derivate_00046035/ilm1-2019200503.pdf

Esteve-Mon, F., Cela-Ranilla, J. M., & Gisbert-Cervera, M. (2016). ETeach3D: Designing a 3D virtual environment for evaluating the digital competence of pre-service teachers. *Journal of Educational Computing Research, 54*(6), 816–839. https://doi.org/10.1177/0735633116637191

Ferrari, A. (2012). *Digital competence in practice: An analysis of frameworks*. Publications Office of The European Union.

Ferrari, A. (2013). *DIGCOMP: A framework for developing and understanding digital competence in Europe*. Joint Research Centre.

Forbes, D. (2016). Keynote: Going to university-blended strategies for learning and teaching in a modern tertiary context. *Journal of Open, Flexible, and Distance Learning, 20*(2), 21–23.

From, J. (2017). Pedagogical digital competence-between values, knowledge, and skills. *Higher Education Studies, 7*(2), 43–50. https://doi.org/10.5539/hes.v7n2p43

Gasaymeh, A. M. M. (2009). *A study of faculty attitudes toward internet-based distance education: A survey of two Jordanian public universities (Unpublished doctoral dissertation)*. Ohio University.

Ghomi, M., & Redecker, C. (2019). Digital competence of educators (DigCompEdu): Development and evaluation of a self-assessment instrument for teachers' digital competence. In *Proceedings of the 11th International Conference on Computer Supported Education (CSEDU 2019)*, 541–548. https://doi.org/10.5220/0007679005410548

Gilster, P. (1997). *Digital literacy*. Wiley Computer Publication.

Gudmundsdottir, G. B., & Vasbø, K. B. (2017). Toward improved professional digital competence: The use of blended learning in teacher education in Norway. In P. Resta & S. Smith (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 499–509). Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/primary/p/177328/

Guillén-Gámez, F. D., Mayorga-Fernández, M. J., & Bravo-Agapito, J. (2021). Analysis of teachers' pedagogical digital competence: Identification of factors predicting their acquisition. *Tech Know Learn, 26*, 481–498. https://doi.org/10.1007/s10758-019-09432-7

Hall, R., Atkins, L., & Fraser, J. (2014). Defining a self-evaluation digital literacy framework for secondary educators: The DigiLit Leicester project. *Research in Learning Technology, 22*. https://doi.org/10.3402/rlt.v22.21440

Hatlevik, O. E., & Christophersen, K. A. (2013). Digital competence at the beginning of upper secondary school: Identifying factors explaining digital inclusion. *Computers & Education, 63*, 240–247.

Insteford, E. J., & Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education, 67*, 37–45. https://doi.org/10.1016/j.tate.2017.05.016

Jeffrey, L. M., Milne, J., Suddaby, G., & Higgins, A. (2014). Blended learning: How teachers balance the blend of online and classroom components. *Journal of Information Technology Education: Research, 13*, 121–140. https://doi.org/10.28945/1968

Joaquin, J., Biana, H. T., & Dacela, M. (2020). The Philippine higher education sector in the time of COVID-19. *Frontiers in Education, 6*, 576371. https://doi.org/10.3389/feduc.2020.576371

Jobst, V. J. (2016). Diving into the blended learning pool: One university's experience. *Journal of Higher Education Theory and Practice, 16*(4). https://doi.org/10.33423/jhetp.v16i4.1993

Johannesen, M., Øgrim, L., & Giæver, T. H. (2014). Notion in motion: Teachers' digital competence. *Nordic Journal of Digital Literacy, 9*(4), 300–312. https://doi.org/10.18261/ISSN1891-943X-2014-04-05

Klapproth, F., Federkeil, L., Heinschke, F., & Jungmann, T. (2020). Teachers' experiences of stress and their coping strategies during COVID-19 induced distance teaching. *Journal of Pedagogical Research, 4*(4), 444–452. https://doi.org/10.33902/JPR.2020062805

Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary issues in technology and teacher education, 9*(1), 60–70. https://www.learntechlib.org/primary/p/29544/

Koehler, M. J., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)? *Journal of Education, 193*(3), 13–19. https://doi.org/10.1177/002205741319300303

Krumsvik, R. J. (2009). Situated learning in the network society and the digitized school. *European Journal of Teacher Education, 32*(2), 167–185. https://doi.org/10.1080/02619760802457224

Kuo, Y. C., Belland, B. R., Schroder, K. E., & Walker, A. E. (2014). K-12 teachers' perceptions of and their satisfaction with interaction type in blended learning environments. *Distance Education, 35*(3), 360–381. https://doi.org/10.1080/01587919.2015.955265

Labucay, I. D. (2014). Patterns of internet usage in the Philippines. In J. D. James (Ed.), *The internet and the Google age: Prospects and perils* (pp. 27–49). https://doi.org/10.14705/rpnet.2014.000176

Lankshear, C., & Knobel, M. (2008). *Digital literacies: Concepts, policies, and practices*. Peter Lang.

Larsson-Lund, M. (2018). The digital society: Occupational therapists need to act proactively to meet the growing demands of digital competence. *British Journal of Occupational Therapy, 81*(12), 733–735. https://doi.org/10.1177/0308022618776879

Larreamendy-Joerns, J., & Leinhardt, G. (2006). Going the distance with online education. *Review of Educational Research, 76*(4), 567–605. https://doi.org/10.3102/00346543076004567

Lázaro-Cantabrana, J. L., Usart-Rodríguez, M., & Gisbert-Cervera, M. (2019). Assessing teacher digital competence: The construction of an instrument for measuring the knowledge of pre-service teachers. *Journal of New Approaches in Educational Research, 8*(1), 73–78. https://doi.org/10.7821/naer.2019.1.370

Lee, J. (2020). Mental health effects of school closures during COVID-19. *The Lancet Child and Adolescent Health, 4*(6), 421.

Liaw, S., & Huang, H. (2011). A study of investigating learners' attitudes toward e-learning. In *2011 5th International Conference on Distance Learning and Education IPCSIT* 12. IACSIT Press.

Lorenzo, A. R. (2016). Effectiveness of the computer and internet literacy project in public high schools of Tarlac province, Philippines. *Turkish Online Journal of Educational Technology-TOJET, 15*(2), 38–46.

Lund, A., Furberg, A., Bakken, J., & Engelien, K. L. (2014). What does professional digital competence mean in teacher education? *Nordic Journal of Digital Literacy, 4*(9), 281–299.

Ma'arop, A. H., & Embi, M. A. (2016). Implementation of blended learning in higher learning institutions: A review of the literature. *International Education Studies, 9*(3), 41–52. https://doi.org/10.5539/ies.v9n3p41

Mallillin, L. L., Mendoza, L.C., Malilin, B. J., Felix, R. C., & Lipayon, I. C. (2020). Implementation and readiness of online pedagogy: A transition to COVID-19 pandemic. *European Journal of Open Education and E-Learning Studies, 5*(2), 71–90. https://doi.org/10.46827/ejoe.v5i2.3321

Matheos, K., & Cleveland-Innes, M. (2018). Blended learning: Enabling higher education reform. *Revista Eletrônica de Educação, 12*(1), 238–244. https://doi.org/10.14244/198271992524

Martins, J., & Nunes, M. (2016). The temporal properties of e-learning: An exploratory study of academics' conceptions. *International Journal of Educational Management, 30*(1), 2–19. https://doi.org/10.1108/IJEM-04-2014-0048

Martinez, J. G., & Vidal, C. E. (2015). Digital competence. In M. Gisbert, M. Bullen (Eds.), *Teaching and Learning in Digital World: Strategies and Issues in Higher Education*, 33. Universitat Rovira i Virgili.

Medrick, J. A., Zhang, S., Hartely, K., & Marchand, G. (2016). Preservice teachers and self-assessing digital competence. *Journal of Educational Computing Research, 54*(3), 326–351. https://doi.org/10.1177/0735633115620432

Mena, J., Singh, B., Clarke, A. (2018). Teacher education for ICT integration in classroom. In *TEEM'18: Proceedings of the sixth international conference on technological ecosystems for enhancing multiculturality*, October 2018, pp. 588–591. https://doi.org/10.1145/3284179.3284279

Mercader, C., & Sallan, J. G. (2017). How do university teachers use digital technologies in class? *REDU, 15*(2), 257–273. https://doi.org/10.4995/redu.2017.7635

Minty-Walker, C., Wilson, N. J., Ramjan, L., & Glew, P. (2017). Unleashing the potential and pitfalls of the iPad on undergraduate nursing students in tertiary education. *The Australian and*

New Zealand Student Services Association, 25(2), 39–50. https://doi.org/10.30688/janzssa.2017.15

Mirete, A. B., Maquilon, J. J., Mirete, L., & Rodriguez, R. (2020). Digital competence and university teachers' conceptions about teaching. Structural causal model. *Sustainability, 12*, 4842. https://doi.org/10.3390/su12124842

Mok, K. H., Xiong, W., & Rahman, N. B. E. (2021). COVID-19 pandemic's disruption on university teaching and learning and competence cultivation: Student evaluation of online learning experiences in Hong Kong. *International Journal of Chinese Education,* January–April 2021, 1–20. https://doi.org/10.1177/22125868211007011

Moralista, R. B., & Oducado, R. M. (2020). Faculty perception toward online education in a state college in the Philippines during the Coronavirus disease 19 (COVID-19) pandemic. *Universal Journal of Educational Research, 8*(10), 4736–4742. https://doi.org/10.13189/ujer.2020.081044

Muñoz-Repiso, A.G.-V., Martín, S. C., & Gómez-Pablos, V. M. B. (2020). Validation of an indicator model (INCODIES) for assessing student digital competence in basic education. *Journal of New Approaches in Educational Research, 9*(1), 110–125. https://doi.org/10.7821/naer.2020.1.459

Ocak, M. A. (2011). Why are faculty members not teaching blended courses? Insights from faculty members. *Computers & Education, 56*(3), 689–699. https://doi.org/10.1016/j.compedu.2010.10.011

Olelewe, C. J., & Agomuo, E. E. (2016). Effects of B-learning and F2F learning environments on students' achievement in QBASIC programming. *Computers & Education, 103*(1), 76–86. https://doi.org/10.1016/j.compedu.2016.09.012

Ooms, A., Burke, L., Linsey, T., & Heaton-Shrestha, C. (2008). Introducing e-developers to support a university's blended learning developments. *ALT-J, 16*(2), 111–122. https://doi.org/10.1080/09687760802316307

Oztok, M. (2013). Tacit knowledge in online learning: Community, identity, and social capital. *Technology, Pedagogy and Education, 22*(1), 21–36. https://doi.org/10.1080/1475939X.2012.720414

Pangrazio, L., Godhe, A-L., & Ledesma, A.G. L. (2020). What is digital literacy? A comparative review of publications across three language contexts. *E-Learning and Digital Media, 17*(6), 442–459. https://doi.org/10.1177/2042753020946291

Petrie, C. (2020). Spotlight on quality education for all during COVID-19 crisis (HundrED Research Report #01). *United Nations.* Retrieved from https://hundred.org/en/collections/quality-education-for-all-during-coronavirus

Pokhrel, S., & Chhetri, R. (2021). A Literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future, 8*(1), 133–141. https://doi.org/10.1177/2347631120983481

Porter, W. W., Graham, C. R., Spring, K. A., & Welch, K. R. (2014). Blended learning in higher education: Institutional adoption and implementation. *Computers & Education, 75*, 185–195. https://doi.org/10.1016/j.compedu.2014.02.011

Prensky, M. (2001). Digital natives, digital immigrants. Retrieved from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Previtali, P., & Scarozza, D. (2019). Blended learning adoption: A case study of one of the oldest universities in Europe. *International Journal of Educational Management, 33*(5), 990–998. https://doi.org/10.1108/ijem-07-2018-0197

Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu.* Publications Office of the European Union.

Rivera-Laylle, L. I., Fernandez-Morales, K., Guzman-Games, F. J., & Eduardo-Pulido, J. (2017). ICT acceptance by University professors: Knowledge, attitude, and practicality. *Revista Electrónica Educare, 21*(3), 1–18. https://doi.org/10.15359/ree.21-3.6

Sailin, S., & Mahmor, N. (2018). Improving student teachers' digital pedagogy through meaningful learning activities. *Malaysian Journal of Learning and Instruction, 15*(2), 143–173.

Selim, H. M. (2007). E-learning critical success factors: An exploratory investigation of student perceptions. *International Journal of Technology Marketing, 2*(2), 1–26. https://doi.org/10.1504/IJTMKT.2007.014791

Selwyn, S. (2016). Digital downsides: Exploring university students' negative engagements with digital technology. *Teaching in Higher Education, 21*(8), 1006–1021. https://doi.org/10.1080/13562517.2016.1213229

Singhal, T. (2020). Review of Coronavirus disease-2019 (COVID-19). *Indian Journal of Pediatrics, 87*(4), 281–286. https://doi.org/10.1007/s12098-020-03263-6

Stacey, E., & Gerbic, P. (2008). Success factors for blended learning. In Hello! Where are you in the landscape of educational technology? Proceedings ascilite Melbourne 2008. Retrieved from http://www.ascilite.org.au/conferences/melbourne08/procs/stacey.pdf

Tanucan, J. C. M., Hernani, M. R. A., & Diano, F. J. (2021). Filipino physical education teachers' technological pedagogical content knowledge on remote digital teaching. *International Journal of Information and Education Technology, 11*(9), 416–423. https://doi.org/10.18178/ijiet.2021.11.9.1544

Tarrayo, V. N., Paz, R. M. O., & Gepila, E. C. (2021). The shift to flexible learning amidst the pandemic: The case of English language teachers in a Philippine state university. *Innovation in Language Learning and Teaching*, 1–14. https://doi.org/10.1080/17501229.2021.1944163

Tomaro, Q. P. V. (2018). ICT integration in the educational system of Philippines. *Journal of Governance and Public Policy, 5*(3), 259–282. https://doi.org/10.18196/jgpp.5399

Tshabalala, M., Ndeya-Ndereya, C., & van der Merwe, T. (2014). Implementing blended learning at a developing university: Obstacles in the way. *Electronic Journal of E-Learning, 12*(1), 101–110.

Tyner, K. (1998). *Literacy in the digital world: Teaching and Learning in the age of information*. Routledge.

UNESCO. (2020). *Education: From disruption to recovery*. UNESCO.

United Nations. (2020). Policy brief: Education during COVID-19 and beyond. Retrieved from United Nations. https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf

Vaataja, J. O., & Ruokamo, H. (2021). Conceptualizing dimensions and a model for digital pedagogy. *Journal of Pacific Rim Psychology, 55*, 1–12. https://doi.org/10.1177/1834490921995395

Vergel de Dios, B. (2016). Building and sustaining national ICT/education agencies: Lessons from the Philippines. *SABER-ICT Technical Paper Series*. World Bank, Washington, DC. © World Bank. Retrieved from https://openknowledge.worldbank.org/handle/10986/26262

Villarin, J. R. T. (2020). *Enhanced community quarantine*. Ateneo de Manila University.

Wingo, N. P., Ivankova, N. V., & Moss, J. A. (2017). Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning, 21*(1), 15–35. https://doi.org/10.24059/olj.v21i1.761

Yazon, A., Manaig, K., Buama, C., & Tesoro, J. (2019). Digital literacy, digital competence and research productivity of educators. *Universal Journal of Educational Research, 7*(8), 1734–1743. https://doi.org/10.13189/ujer.2019.070812