



Developing a Context- and Subject-Specific Professional Digital Competence Framework for Beginning English Language Teachers in Hong Kong

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Accepted: 19 September 2023 / Published online: 24 October 2023
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Abstract This paper proposes and describes a context- and subject-specific professional digital competence (PDC) framework for beginning English language teachers in Hong Kong. Taking a localised approach, the framework was developed through a four-stage data collection process, (1) Literature review of empirical studies conducted in Hong Kong of English language teachers' technology use, (2) Review of local government curriculum documents; (3) An online survey of English language teachers' technology use ($n = 83$); (4) follow-up individual interviews ($n = 22$). The study revealed that the local subject-specific PDC of teachers includes five aspects; Technological proficiency; Pedagogical compatibility; Preparing students for the digital world; Risk, well-being and ethical awareness and Professional work. Each aspect includes ability statements. The framework can be used to evaluate existing teacher education programmes, support the development of pre-service

English-language teachers and facilitate self-, peer- and teacher assessment. The elements of PDC can be converted into programme- and course-level learning outcomes or incorporated into assessment rubrics. In addition, the methods used to develop the framework can be used by scholars in other contexts and subject areas to develop localised subject-specific PDC frameworks.

Keywords Professional digital competence · Hong Kong · English Language Education · Technology for teaching

Highlights

- This paper proposes and describes a context- and subject-specific professional digital competence (PDC) framework for beginning English language teachers in Hong Kong.
- To achieve this goal, a four-stage process was adopted: (1) a systematic analysis of the literature pertaining to the use of technology by Hong Kong English language teachers; (2) a review of the local curriculum documents pertaining to English language education and technology; (3) a survey of current English language teachers' use of technology; (4) follow-up interviews with survey participants.
- The final proposed PDC framework consists of five aspects; Technological proficiency; Pedagogical compatibility; Preparing students for the digital world; Risk, well-being and ethical awareness; Professional work
- The study can act as a model for other scholars to design a context- and subject-specific professional digital competence (PDC) framework for their contexts

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40299-023-00778-2>.

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Introduction

This paper proposes and describes a context- and subject-specific professional digital competence (PDC) framework for beginning English language teachers in Hong Kong. Beginning teachers, teachers who have just completed their initial teacher education (ITE) programmes and are new to the profession, have been found to have specific challenges as they undergo a period of professional adjustment from their ITE to a full-time teaching post (Clark & Newberry, 2019). Understanding the context and subject-specific skills, knowledge and attributes beginning teachers need is important. If teachers feel competent to begin teaching, this can positively affect their teaching self-efficacy, confidence and satisfaction (Clark & Newberry, 2019). One area where beginning teachers have been found to lack the required knowledge and skills is technology integration (Moorhouse, 2021; Gudmundsdottir & Hatlevik, 2018). This is understandable, as ITE programmes have struggled to keep their programmes up to date with advances in technology (Park & Son, 2022). Numerous studies have highlighted a gap between the PDC a teacher needs and what they acquire from ITE (Gudmundsdottir & Hatlevik, 2018; Park & Son, 2022).

Advancements in technology, portable hardware and Wi-Fi have made it easier for schools to create digitally infused learning environments (Starkey, 2020). Governments, teacher education providers and teachers have recognised the potential affordances of technology in education, integrating technology use into policies and curricula (Camilleri & Camilleri, 2017). Starkey (2020) clarifies that—because integrating technology into education changes pedagogical practices—it is now a requirement rather than an option for teachers to acquire and develop PDC. In addition, the benefits of using technology in English language teaching have been documented in the research literature, with teachers' technology use linked to student motivation (Lin, 2015), the development of bilingualism (Macaruso & Rodman, 2011), academic performance (Hsu, 2016) and skills development (Cheung, 2021).

Over the years, various frameworks have been developed to conceptualise the PDC beginning teachers need (e.g. Falloon, 2020; Starkey, 2020). They aim to guide governments and ITE providers to align their programmes with the digital realities of schools. However, current frameworks are largely general and conceptual (e.g. Falloon, 2020). Indeed, there have been calls for a more localised approach that understands technology in relation to specific learning contexts. As Godwin-Jones (2023) argues, technology should be seen as one of many human and non-human resources that teachers can draw upon to help learners achieve language learning goals.

The PDC framework proposed here was developed using a different approach. It started with the goal of developing a 'context-specific' (i.e. Hong Kong education system) and 'subject-specific' (i.e. English language) PDC framework. To achieve this goal, a four-stage process was adopted: (1) a systematic analysis of the literature pertaining to the use of technology by Hong Kong English language teachers; (2) a review of the local curriculum documents; (3) a survey of current English language teachers' use of technology; (4) follow-up interviews. These four steps led to a draft framework. We then engaged in several rounds of review and revision based on expert feedback to produce the final framework.

The PDC framework developed can help Hong Kong-based ITE providers consider how best to prepare graduates with the PDC they need to begin teaching the English-language in schools. The current Teacher Competencies Framework in Hong Kong was drafted in 2003 (ACTEQ, 2003). It does not include any explicit mention of competencies related to technology. The design of this study can also guide scholars interested in developing context- and subject-specific frameworks for different localities and fields. Instead of adapting existing frameworks to fit local teacher education systems (Starkey & Yates, 2022), this approach allows practitioners to develop new frameworks for specific educational contexts.

Professional Digital Competence

As previously stated, there has been a clear desire to understand the knowledge and skills beginning teachers need to use technology and how they can be best prepared to do so (Starkey, 2020). The argument is that teachers, like other professions, have specific uses for technology in their professional work and therefore need specific competence (Instefjord & Munthe, 2017). Without the required PDC, teachers would not be able to effectively teach in an increasingly digitised world. This has led to the development of PDC and related frameworks. PDC frameworks generally focus on technological competence; they list abilities, skills, knowledge and standards along with related proficiency levels. In this section, general teacher frameworks are introduced, followed by one subject-specific framework designed for English language teachers – 'the TESOL Technology Standards' (Healey et al., 2011).

Given the importance of digital competence, there has been a strong emphasis by governments, organisations and researchers to develop conceptual frameworks that can help guide the development of teacher competence. Falloon (2020) identifies nine such frameworks including the UNESCO ICT competencies framework for teaching (ICT-CFT), (Scientific and Cultural Organisation UNESCO, 2011); The ISTE standards for educators (International Society

for Technology in Education, 2017); The TPACK framework (Mishra & Koehler, 2006) while proposing his own framework titled the Teacher Digital Competency (TDC) framework (Falloon, 2020). In addition to these, there are several others, such as, The European Digital Competence Framework for Educators (DigCompEdu) (Redecker, 2017) and Professional Digital Competence framework (Instefjord & Munthe, 2017). Scholars have also modified existing frameworks. For instance, Starkey (2020) adapted Instefjord and Munthe's framework for beginning teachers entering teaching in a digital-infused school system (see Table 1 for a list of frameworks and their authors).

Most of these frameworks detail specific aspects or competency areas associated with teachers' professional practice. As an illustrative example, DigCompEdu details 22 educator-specific digital competences organised in six areas: (1) professional engagement, (2) digital resources, (3) teaching and learning, (4) assessment, (5) empowering learners and (6) facilitating learners' digital competence (Redecker, 2017). These areas are meant to ensure coverage of the main professional practices of teachers. Yet, other scholars have argued that the integration of technology into teachers' roles goes beyond pedagogical decisions and tasks. Indeed, Falloon's (2020) TDC framework expands on the dominance of technological competences and pedagogical competences found in most frameworks (Skantz-Aberg et al., 2022) by adding personal-ethical competencies and personal-professional competencies. He argues there is a need to expand beginning teachers "understanding of the sort of competencies required to function productively, safely, and ethically in diverse and increasingly digitally-mediated environments" (p.2463).

Yet Falloon's framework and many of the others only pay a passing reference to context and subject-discipline considerations. Skantz-Aberg et al. (2022), in their recent review of studies exploring teachers' PDC express surprise that content or subject-specific competencies were not mentioned in most of the eighteen studied they reviewed. They state that this is "remarkable as a core task for schools is to

develop students' subject knowledge" (p. 10). Similarly, the context teachers end up working in can dramatically affect the way they use technology (Moorhouse, 2023; Taghizadeh & Hasani Yourdshahi, 2020), however, many frameworks suggest a 'one-size-fits' all approach to PDC. It is not hard to imagine that a Mathematics teacher needs different competencies from an English-language teacher given the different subject knowledge and pedagogical traditions (Moorhouse, 2021; Clark-Wilson et al., 2020). Similarly, the PDC that teachers need to begin teaching in a specific education system is affected by local government policies and curricula, technological infrastructure and learners' needs (Starkey & Yates, 2022).

The 'TESOL Technology Standards' (Healey et al., 2011) does aim to address the explicit digital competence of English language teachers, as well as English language learners. The framework includes four goals with three to four standards for each goal. These standards serve as a valuable reference point and cover essential aspects of language teaching, including the use of technology to enhance teaching and learning, for record-keeping, feedback and assessment and to improve communication, collaboration and efficiency. However, the goals are general in nature and do not explicitly consider the subject-specific content and pedagogical traditions of language teachers. Furthermore, given that they were developed more than a decade ago, they may not reflect the needs of language teachers today with recent rapid developments in digital tools, technology-enabled methodologies (e.g. mobile-assisted learning) and the expansion of online and hybrid modes of teaching (Sun, 2022).

Despite the existence of several conceptual frameworks, there is little evidence of their adoption into ITE in Hong Kong. Similar, to other international contexts, Hong Kong beginning teachers have been found to feel unprepared for using technology for teaching (Moorhouse, 2021; Wang, 2023) with ITE providers not requiring pre-service teachers to take any compulsory language teaching-orientated courses on technology (Park & Son, 2022). Therefore, there is a pressing need to develop frameworks that reflect the

Table 1 Frameworks and their authors

Frameworks	Author(s)
European Digital Competence Framework for Educators (DigCompEdu)	Redecker, 2017
The teacher digital competency (TDC) framework	Falloon, 2020
The ISTE standards for educators	ISTE, 2017
The TPACK framework	Mishra & Koehler, 2006
Professional Digital Competence (PDC)	Instefjord and Munthe, 2015, 2017
UNESCO ICT competencies framework for teaching (ICT-CFT)	Scientific and Cultural Organisation (UNESCO), 2011
The critical digital literacy framework	Hinrichsen & Coombs, 2013
The DECK framework	Fisher et al., 2012

local context and subject-specific needs of teachers. It is likely that such frameworks will be seen to have greater relevance and specificity by teacher educators and beginning teachers as they were developed using local data, and, therefore, have a greater chance of adoption and implementation (Darling-Hammond et al., 2017).

Methods

The study aimed to facilitate the creation of a context- and subject-specific PDC framework. We intend that the elements of PDC will be converted into programme- and course-level learning outcomes. Ethical approval was granted by the Hong Kong Baptist University Human Research Ethics Committee (REC/20–21/0218). The four stages of data collection are described in the following sections:

- Stage 1: Literature review
- Stage 2: Review of local government curriculum
- Stage 3: Online survey
- Stage 4: Follow-up interviews

Stage 1: Literature Review

In the first stage, we conducted a systematic review of literature pertaining to the use of technology by English teachers in Hong Kong. On 1 April 2022, a search of titles, abstracts and keywords was conducted using the SCOPUS and Web of Science (WOS) databases. The following keywords were used in a query string to generate relevant results:

- i. Hong Kong
- ii. AND primary teacher* OR secondary* OR school*
- iii. language OR English
- iv. AND technology* OR digital OR e-learn*

We followed the PRISMA guidelines for systematic reviews (Page et al., 2021), as shown in Fig. 1. A search period of ten years (4/2012–4/2022) was adopted to ensure that the studies reported were up to date.

Figure 1 shows how this study selected the fourteen articles for review and inclusion in developing the framework. The number of articles was relatively limited showing that relying solely on a literature review cannot provide an accurate view of how teachers use technology. Other data sources are necessary to develop a complete, localised PDC framework (see Stages 2–4.).

In order to extract the relevant data that could inform the PDC framework, the researchers first read each article to understand how the teachers in the study used technology

to teach English. They then highlighted and extracted the following information from each article:

- Information on the research context, participants and research tools
- The technology used by teachers in the study
- How the teachers used the technology
- Reasons they used the technology
- Key findings of the study related to the teachers use of technology
- Other salient information pertaining to the use of technology

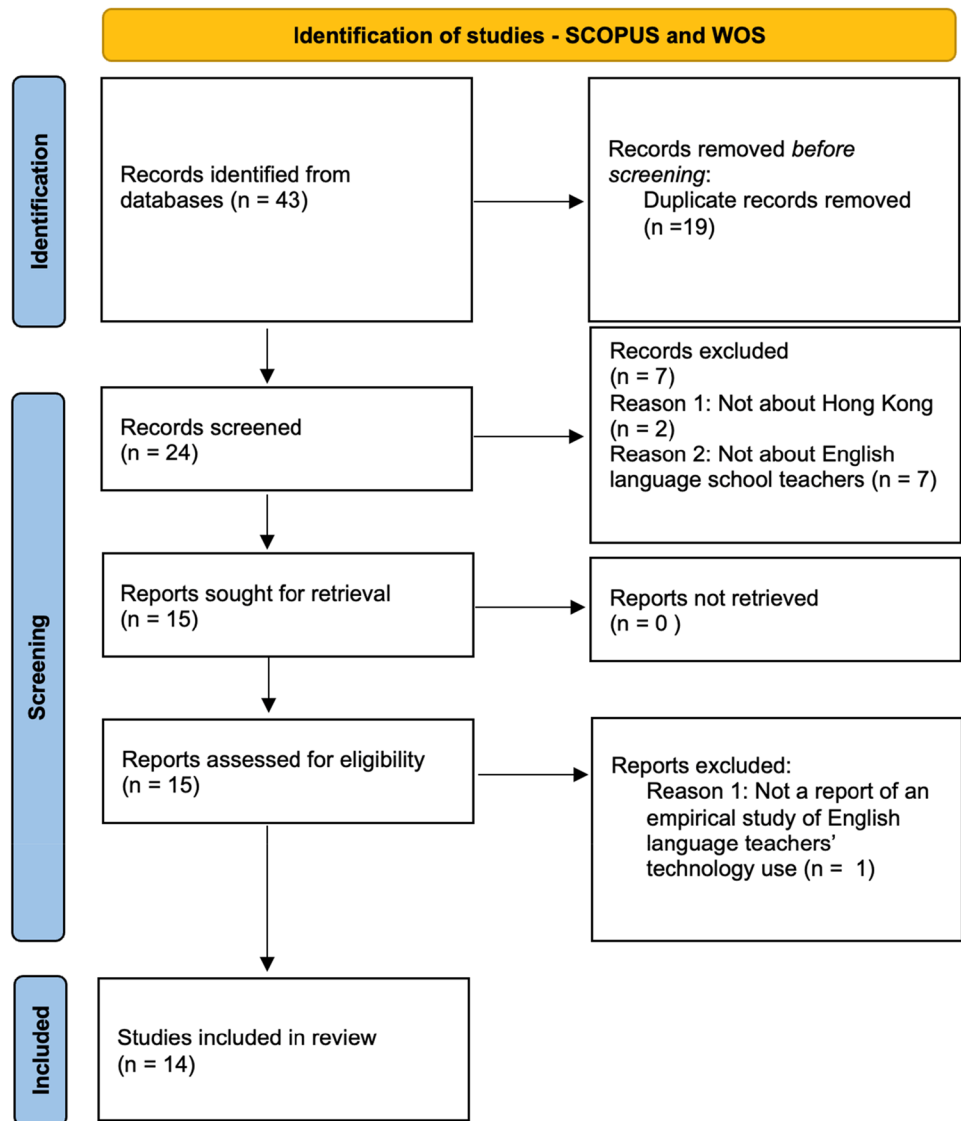
The extracted information was categorised by type (primary function – e.g. collaboration, quiz), utility for teaching (e.g. motivation, skills development, formative assessment) and reasons for using technology (e.g. functionality, ease of use, learner proficiency). Four of the studies examined technology use (e.g. video-conferencing software) during the COVID-19 pandemic (e.g. Cheung, 2021), five reported on using technology to teach writing skills (e.g. collaboration tools) (Bai et al., 2019), one described the use of the flipped classroom approach (Zou & Zhang, 2021), two explored e-portfolio assessment (e.g. Mak & Wong, 2018) and one explored the general use of technology in the language classroom (Gu & Lai, 2019).

Stage 2: Review of Local Government Curriculum Guidelines and Documents

In the second stage, we reviewed the current curriculum document on English language education. The *English Language Education: Key Learning Area Curriculum Guide: Primary 1 to Secondary 6* (ELE: KLA) was released by the Curriculum Development Council (2017). It has been recommended for use in schools by the local Education Bureau. The document superseded the previous curriculum guide, released in 2004. A keyword search was conducted to identify parts of the curriculum that related to technology, including ‘ICT’, ‘technology*’, ‘digital’ and ‘e-learn*’. In addition, we read the full document to check if we had missed any technology-related sections.

Within the main document, there are two sections explicitly related to technology, entitled Information Technology in Education (ITE) and IT for Interactive Learning: Towards Self-Directed Learning. It also includes an appendix that details the expected achievements of students (with examples) related to IT skills at various key stages (Curriculum Development Council, 2017). Technology is also referenced in other areas of the document. These relevant sections were extracted from the document for analysis. In addition, another Education Bureau document relating to the use of technology in school, the *Information Literacy for Hong*

Fig. 1 Literature review process



Kong Students Learning Framework (Updated Version) (2023), was also reviewed.

Stage 3: Qualitative-Dominant Online Survey of English-Language Teachers

In the third stage, a qualitative-dominant online survey was developed to gather data related to the practices and perceptions of in-service English language teachers in Hong Kong. It went through two rounds of piloting. The survey addressed the knowledge and skills beginning teachers need to use technology in their schools (See Appendix 1 for the survey instrument). The survey was distributed in April and May 2022 and completed by 83 English language teachers. The respondents differed in terms of experience level (> 15 years: $n = 19$ / 11–15 years: $n = 17$ / 5–10 years: $n = 18$ / < 5 years: $n = 28$), gender (male: $n = 29$ / female:

$n = 54$), school location (new territories: $n = 40$ / Kowloon: $n = 23$ / Hong Kong Island: $n = 35$ [the three major regions of Hong Kong]), teaching context (primary school: $n = 48$ / secondary school: $n = 35$).

Stage 4: In-Depth Interviews with English Language Teachers

In the fourth stage, in-depth interviews were conducted with 22 English language teachers who completed the survey. A semi-structured interview guide was constructed, drawing on Stages 1–3 (See Appendix 2 for the interview guide). Interviewees were asked to provide examples of digital tools they use, the professional tasks they use them for, how they use them and their considerations when using technology. They were also asked about the role of technology in developing students’ digital competence.

The interviews were conducted face-to-face or through video-conferencing software and lasted between 30 and 55 min. They were audio-recorded and transcribed to facilitate data analysis.

Data Analysis and Expert Feedback

The four stages of the study yielded a large dataset. As the aim was to develop a context- and subject-specific PDC framework, the analysis focused on identifying skills and knowledge to include. To do this, the researchers completed both inductive and deductive thematic analyses following the steps adapted from Braun and Clarke (2006).

Step 1: The researchers first read and re-read the data from each stage to familiarise themselves with the data

Step 2: The researchers identified initial themes within each dataset that indicated a specific skill or knowledge needed to use technology to teach English language in Hong Kong. For example, the kinds of digital tools mentioned and their uses in the literature review, document analysis, survey, and interviews were categorised in a spreadsheet by their uses for language teaching. These were then combined in step 3.

Step 3: The researchers combined the initial themes into one document and organised them, referring to existing PDC frameworks. Themes from different data sets were also compared to see if patterns emerged. For example, when analysing the literature, survey and interview data, the researchers became aware that there are a variety of hardware configurations in Hong Kong classrooms that affect the ways teachers use technology. We coded and classified the types of technology-enabled classrooms in Hong Kong and created themes, ‘digital tools use is dependent on hardware availability’ which was later re-wrote into an ability descriptor along with another theme, ‘Select digital tools based on hardware availability and technology policies’ and categorized under the PDC aspect of ‘**Technological proficiency**’

Step 4: The researchers refined the themes and categories and re-wrote them to include ability descriptors (see Table 2 for an illustration). An initial draft of the PDC framework was created.

After these four steps, the researchers gathered expert feedback from four authorities on using technology for English language teaching. They were invited to review the draft framework and comment on its content, clarity and comprehensiveness. The feedback was used to make final refinements to the framework.

Table 2 An illustration of the combined data associated with a PDC aspect

PDC Aspect	Ability descriptor	Data source and codes		
		Literature review	Document review	Surveys
Technological proficiency	Select digital tools based on hardware availability and technology policies	Classrooms equipped with PCs, projectors Tablets available for teachers to borrow (Gu & Lai, 2019) Tablets used to collaboratively brainstorm ideas (Bai et al., 2019)	X	Diversity of hardware configurations e.g. - 1 to 1 (e.g. BYOD) - Communal tech only - ...
				Use different tools depending on hardware available

Proposed Context- and Subject-Specific PDC Framework for Beginning English Language Teachers in Hong Kong

The final proposed PDC framework consists of five aspects (see Fig. 2):

1. Technological proficiency
2. Pedagogical compatibility
3. Preparing students for the digital world
4. Risk, well-being and ethical awareness
5. Professional work

Combined, these five aspects constitute the PDC that beginning teachers need to successfully enter the teaching profession in Hong Kong. Each aspect and its related ability descriptors are introduced (see Appendix 3 for the ability descriptors under each PDC aspect).

Technological Proficiency

The technological proficiency aspect of PDC refers to the knowledge beginning language teachers need in relation to the availability, use and functions (including

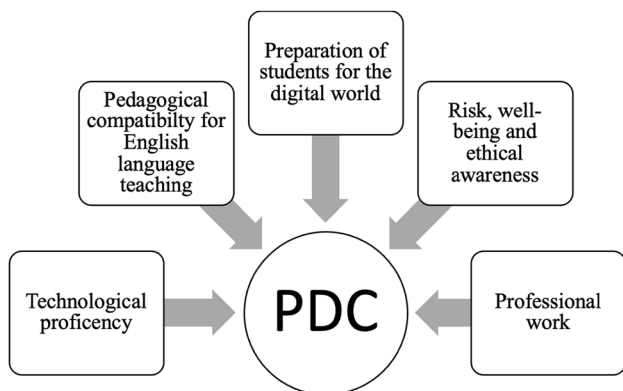


Fig. 2 PDC framework for beginning English language teachers in Hong Kong

multifunctionality) of various digital tools (TP1; see appendix 3 for all ability descriptors). They must recognise the potential affordances of these tools for teaching English (TP2), review and select tools based on various considerations (e.g. price, functionality, ease of use; TP3) and keep current with advancements and changes (TP4).

Beginning teachers need to be ready to use a wide range of digital tools. The analysis of the survey and interview data revealed that the respondents use various digital tools in their teaching and identified 98 unique tools. These included various kinds of tools (see Table 3). In addition, Moorhouse and Yan (2023) provide a comprehensive list and analysis of the tools adopted by language teachers in Hong Kong and their uses for teaching. The ELE: KLA (Curriculum Development Council, 2017) corroborates the need for teachers to be familiar with various digital tools:

Schools are encouraged to enhance English language learning and teaching through ... electronic materials with multimodal features, multimedia resources such as videos, e-books, interactive games, application software and authentic online resources.

Similarly, several studies reviewed in Stage 1 reported that the effective use of technology is dependent on teachers' technological proficiency (e.g. Mak & Wong, 2018).

Technological proficiency must be contextualised within the possible contexts in which a beginning teacher may work because they need to select digital tools based on hardware availability and technology policies (TP5). The analysis of the survey and interview data revealed that Hong Kong English language teachers work in diverse school contexts with different technological resources and hardware. Technology-enabled classrooms range from those with 'communal tech only' to '1-to-1' student-owned digital devices (see Table 4 for the classroom contexts identified). Teachers need to be able to operate and navigate the various levels and forms of hardware and resources to select digital tools appropriate to the classroom context (TP6). As digital tools are constantly

Table 3 Examples of English language learning activities using digital tools

Type of digital tool	Tool	Learning activities
Collaboration	Padlet	Collaborative brainstorming Displaying student work
Quiz and games	Quizlet	Making flashcards to study vocabulary Practicing vocabulary
Video hosting sites	Kahoot!	Practicing grammar points
	YouTube	Providing content and language input, such as songs and short stories
Interactive presentation software	Nearpod	Delivering lessons Encouraging multimodal student participation
Digital library	EPIC!	Reading English language materials

Table 4 Types of technology-enabled classrooms in Hong Kong

<Technologically-enabled classroom>				
Student-owned digital devices – any device (mobile, tablet, laptop)	Bring Your Own Device (BYOD) scheme – specified device (tablet/laptop)	Class suite of tablets/laptops	School suite of tablets/laptops	Communal tech only (teacher computer/projector)

changing, beginning teachers need to keep up-to-date with advancements (TP4).

Pedagogical Compatibility

The pedagogical compatibility aspect of PDC concerns teachers' ability to use technology to supplement and enhance their students' English language learning. The ELE: KLA (Curriculum Development Council, 2017) provides directions to schools on the ongoing revision of the English language curriculum, with a major emphasis on

leveraging information technology to facilitate e-learning, developing new literacy skills, enhancing collaboration and interaction inside and outside the classroom, building learning networks, encouraging self-directed learning to prepare students for the challenges of the rapidly-changing digital world and promoting information literacy to equip students with the ability and attitude necessary for using information effectively and ethically.

The document emphasises the role technology can play in the English language classroom and the knowledge and skills teachers need to implement it effectively. These aspects have been integrated into the eight ability descriptors of the pedagogical compatibility aspect of PDC.

Teachers must align their use of digital tools with their learning objectives (PC1). As with other resources and tools, teachers must be able to articulate the pedagogical purpose of using a specific digital tool and design lessons and learning activities that integrate it meaningfully. In the survey and interviews, teachers shared examples of learning activities involving digital tools (see Table 3).

The literature reviewed in Stage 1 highlighted that teachers need to design English language lessons and learning activities that integrate digital tools (PC2). For example, Wang, (2023) conducted a study in which primary school English language teachers in Hong Kong used digital tools with their students at different stages of the writing process.

Beginning teachers may also need to set up and maintain a space for learning English in and out of class (PC3). In Hong Kong, assigning out-of-class activities (i.e. homework) is a common and expected part of teaching. The survey and interview responses showed that teachers use technology to facilitate the assignment, submission and

grading of homework, as well as blend in- and out-of-class learning. Specifically, they use learning management systems (e.g. Google Classroom).

Relatedly, teachers need to understand various technology-enhanced pedagogical models (e.g. blended learning, gamification and the flipped classroom approach) and their utility in the English language classroom (PC4). These pedagogical models integrate digital tools into the learning process. The data analysis suggests that they are being implemented at some schools in Hong Kong. For instance, a study conducted by Zou and Zhang (2021) examined the use of the flipped classroom approach in primary EFL classrooms.

Beginning teachers should use digital tools to monitor and conduct formative and summative assessments of their students' English language progress and performance; this can include using data analytics, digital libraries and e-portfolio assessment (PC5). English language teachers in Hong Kong, for example, use voice recorders for speaking assessments, quiz-designing programmes for listening, vocabulary and grammar assessments and LMS-based tools for e-portfolio and writing assessments. In addition, teachers need to cater to diverse learners (PC6). Assistive technology (e.g. text-to-voice software) has the potential to aid learners with different levels of language proficiency and needs.

The COVID-19 pandemic led to a dramatic shift in teaching modalities. In preparation for school closures, teachers need to be able to use digital tools to implement flexible, hybrid and remote English language teaching when necessary (PC7). This includes familiarity with the relevant tools (e.g. video conferencing software) and competencies necessary to teach English language learners remotely.

Finally, teachers need to the ability to consider ways the unique sociocultural contextual factors that exist in Hong Kong may impact on their use of technology and find ways to navigate these as they design and implement technology for teaching (PC8). For instance, teachers may need to prepare students for high-stakes assessments and therefore they require the ability to select digital tools that help them to do that. For example, providing additional study materials or revision exercises on an LMS for students' assessment preparation.

Preparing Students for the Digital World

In addition to using technology to deliver content, teachers are responsible for preparing their students to live in the digital world. The English curriculum in Hong Kong recognises this responsibility (Curriculum Development Council, 2017). One of its two overall aims is.

to prepare every student for the changing socioeconomic demands resulting from advances in information technology, which include the interpretation, use and production of materials for pleasure, study and work in English.

This aspect includes four ability descriptors (see Appendix 3). First, because technology continuously changes human behaviours, communication practices and literacies, English language teachers must promote the skills, knowledge and literacy students need to engage with digital media (PS1). This must be appropriate to students' age and grade level. The ELE: KLA (2017) provides a detailed list of learning objectives and ability descriptors for each key stage and technology skill students are expected to master. Beginning teachers should be familiar with this list and help students master the skills.

The document encourages teachers to leverage technology to promote self-directed learning, (i.e. help students plan, monitor and evaluate their own learning; PS2) and provides six suggestions. The survey and interview responses attest that beginning teachers must promote self-directed learning. The teachers shared that they teach students to use specific digital tools for support (e.g. Google Translate, digital libraries and online dictionaries). In August 2022, the Bureau issued an updated draft of the 'Information Literacy for Hong Kong Students Learning Framework'. This document is not specific to the subject of English; it is intended to be used by all teachers. It explicitly addresses issues pertaining to the use of technology, such as disinformation, cyberbullying and Internet addiction. Awareness and skills to implement the document recommendations are required.

The interview participants raised concerns regarding the use of technology and student well-being. A review of the framework and associated data from Stage 4 of the study led to the addition of two ability descriptors (PS3 and PS4).

Risk, Well-Being and Ethical Awareness

Although it is related to the previous aspect of the PDC framework, it is necessary to include an aspect specifically related to risk, well-being and ethical awareness to ensure that it is addressed in teacher preparation. This aspect includes two ability descriptors. Beginning teachers need to understand the potential risks of using digital tools with children and adolescents and their own role in promoting

well-being and ethical behaviour (EA1). The teachers interviewed expressed concern that their students use digital tools excessively, so they need to be critically aware of when, why and how they use technology.

The second ability descriptor relates to compliance with government regulations pertaining to copyright, security, privacy and Internet use (EA2). Hong Kong has several laws pertaining to technology (e.g. the Personal Data (Privacy) Ordinance, 1995; 2021) and copyright (e.g. Copyright Ordinance, 1997; 2007). Teachers must be familiar with these laws and follow them in their professional work.

Professional Work

The last aspect is concerned with teachers' professional work outside of the classroom, which often requires technology. The data analysis revealed three associated ability descriptors. First, beginning teachers use digital tools to store, organise and share teaching and learning materials/resources and keep records (PW1). Many aspects of school administration have been automated. In the survey and interviews, teachers mentioned using cloud storage to store, share resources and collaborate on lesson plans and assessments.

Beginning teachers also need to use digital tools to access and engage in teacher professional development, including developing online learning communities and resource banks (PW2). Survey respondents mentioned locally available online resources (e.g. edcity.hk/home/en) and professional development opportunities, as well as online training programmes offered by technology companies (e.g. Google Educator).

Finally, teachers must use digital tools to communicate and collaborate with parents, students and colleagues (PW3). Teachers can inform students and parents about academic progress and performance, assign homework and respond to questions and concerns through digital channels.

Discussion and Conclusion

To effectively prepare beginning teachers for the profession, ITE providers must understand the competencies they need in subject- and context-specific aspects, which are changing rapidly as technology becomes increasingly integrated into education (Starkey, 2020). This study provides a customised PDC framework for English language teachers in Hong Kong and informs local ITE providers about the competencies pre-service teachers need to develop.

The study reviewed that PDC for this subject and context consists of five aspects, each with its own ability descriptors (see Fig. 2; Appendix 3). We believe that constructing and presenting a PDC framework allows for implementation; each aspect and ability descriptor can be put into action

and measured. ITE providers can integrate the aspects into the learning outcomes of their courses and programmes to explicitly address technology use. However, not all descriptors are exclusive to English language teachers or the Hong Kong context. For example, the use of technology in the ‘Professional work of teachers’ aspect is likely to be similar in other contexts and subject areas. We adopted a ground-up approach to developing the framework and a holistic view of teachers’ use of technology. Therefore, the competencies are general, as well as subject- and context-specific.

There are many existing PDC frameworks that detail the knowledge and skills needed by teachers to integrate technology into their professional practice (see section: Professional Digital Competence), and, it can be seen that the framework developed here has some overlap with existing frameworks (e.g. Instefjord & Munthe, 2017) but also unique features that reflect the context and subject-specific nature of the framework (e.g. TP6; PC4; PC6; PS3). Furthermore, the framework reflects the fact that local literature and curriculum documents were used for data collection. Of course, we anticipate that the framework aspects and ability descriptors will require revision as technology develops and teachers’ professional practices change. All modifications must be informed by an empirical exploration of the curriculum documents and teachers’ technological practices. Of course, ITE can go beyond this PDC framework in preparing teachers for the profession. For example, it could introduce pre-service teachers to the potential of virtual reality or augmented reality technologies for language learning. However, this should not come at the expense of these teachers’ core needs.

One challenge of integrating such a framework into ITE relates to the PDC of teacher educators themselves. Recent studies have shown that teacher educators rate their PDC as low, making them reluctant to integrate such content into their programmes and courses (e.g. Lindfors et al., 2021). For a PDC framework to be adopted and integrated into ITE curricula and instruction, it is necessary to ensure that teacher educators have the requisite PDC as well (Lindfors et al., 2021).

From our experience and relevant literature, we can attest that not all aspects of the PDC framework are currently addressed in ITE (Park & Son, 2022). There is an overemphasis on technological proficiency and less emphasis on the other aspects, which can lead to a simplistic view of technology and a lack of critical thinking about how and why it should be used. We suggest that if ITE providers refer to our framework to reform their programmes then beginning teachers will gain a more holistic development of their PDC. However, this study did not explore the current state of ITE provision. Further studies should examine what ITE providers are doing to prepare their students and identify gaps. Our study was limited to the Hong Kong context and drew on locally produced data. We believe that scholars in other

subject disciplines and contexts can adopt the methodology used in this study to develop their own context- and subject-specific PDC frameworks, as a localised and personalised framework, is more likely to be relevant to teachers.

Funding The study was funded by the Early Career Scheme 2021/2022 of the Research Grants Committee, Hong Kong (Ref No: 22612121).

Data Availability The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval The study is approved by the Hong Kong Baptist University, Human Research Ethics Committee on in November 2020. The reference number is REC/20–21/0218.

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