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Master's degree programmes and the development of language teacher TEL expertise in times of digital transformation

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Abstract

The potential of digital technologies to transform the way languages are learned has long been widely recognised and researched. However, the issue of developing teachers' TEL (technology-enhanced learning) expertise has received less attention. This study employed a qualitative survey methodology and TPACK as a theoretical lens (Mishra & Koehler, 2006) to better understand how UK master's programmes in TESOL/ Applied Linguistics help teachers to develop their TEL expertise. Based on an analysis of publicly available programme documents and ten semi-structured graduate interviews, the study found that not all programmes pursue the development of teachers' TEL expertise; where they do, that is accomplished either through standalone TEL-related modules or through TEL-related content within TESOL/Applied Linguistics modules. The key takeaway from this analysis is that merely offering these structures does not suffice, as much depends on whether there is a purposeful blending between technology, pedagogy, and content in the module, as well as on the instructional design of the entire programme. Considering the need for deeper and wider digital transformation in language education, especially following the Covid-19 pandemic, these findings are important to formal language teacher education programmes that seek to develop courses that enhance teacher TEL expertise.

1. Introduction

The concept of *digital transformation* in education has attracted global interest over the last decades with government agendas, educational institutions, and technology companies developing, testing, and implementing new educational solutions. Language education has also strived to stay at the cutting edge of the digital transformation movement in order to meet the needs of 21st-century students in an increasingly digital and interconnected world (Mavridi & Xerri, 2020).

Digital transformation is a buzzword that may mean different things to different people but it is usually associated with innovative changes driven by the use of digital technologies (Nagel, 2020). From a commercial perspective, such changes generally aim to increase productivity and automated workforce (Bates et al., 2020) whereas from an educational perspective they often aim to make education more effective, accessible, and inclusive. In the context of educational systems, digital transformation goes beyond the growing use of educational technologies to include other pertinent digital dimensions such as *policies*, *infrastructure*, *administration*, and *competencies* (Qayyum, 2023). In addition, teachers play an important role as agents of change, since it is often the teacher who decides whether and how to integrate technology in their teaching (Haydn & Barton, 2008; Sang et al., 2010). Yet, as Qayyum (2023) notes, digital transformation has often been attempted without adequate preparation and support for teachers. In his words, “there is an unfortunate and long history in the field of education where the use of educational technology has been encouraged and undertaken without recognizing the importance of training and support of educators” (p. 254).

This study positions *digital transformation* within the context of language teacher education and defines it as the use of digital technologies to amplify, enhance, or redefine traditional approaches to language teaching, learning and assessment. Implicit in this definition is that digital transformation involves pedagogical changes that go beyond simply using technology to teach a language. As Angeli and Valanides (2009) pointed out, “technology in and of itself is not a transformative mechanism or a vehicle for change” (p. 157). Rather, it is a powerful tool that provides possibilities to those who have the skills, knowledge, and mindset to bring about change. From the perspective of CALL (computer-assisted language learning), Chappelle (2003) pointed out that “technology is not only for solving practical problems, but also for posing theoretical ones” (p. 128) urging teachers

to reflect on how technology transforms “English language teaching in particular and applied linguistics as a whole” (p. 1).

Clearly, developments in artificial intelligence, machine learning, multimedia, and networked communication have added multifaceted new dimensions in the field of language learning. For example, the way learners access input through technology; make linguistic choices via written, oral, or visual modes (e.g., emoji), either face-to-face or online; and (co)-construct knowledge when communicating with peers, teachers, and the machine, can significantly affect their linguistic, communicative, and intercultural development. All these have direct implications to the way languages are taught but for language professionals to fully understand and act upon these implications, they need a solid epistemological, pedagogical, and technological grounding. Therefore, if digital transformation is to be undertaken in language education, this set of expertise is crucial for teachers.

Unfortunately, while the possibilities of technology for language teaching have been the focus of much research, the development of language teacher expertise has been somewhat underexplored, particularly in the context of *formal* teacher education. Older scholarship indicates that formal teacher education may not provide teachers with adequate grounding for effective technology implementation (Hubbard, 2008). Recent scholarship on this topic largely focuses on some flagship initiatives (for example, see Son & Wind-eatt, 2017) without providing much insight into the actual state of formal language teacher education programmes.

As a lecturer working at the intersection of TEL (technology-enhanced learning) and TESOL (teaching English to speakers of other languages), I have also observed that the development of teacher TEL expertise is relatively underdeveloped in formal language education settings e.g., master's degrees. The pandemic and the chaotic switch to online teaching seem to confirm that, despite their best intentions, language teachers had major difficulties teaching online, adjusting materials, and evaluating technologies (Moser et al., 2021; Mavridi, 2022a). Hence, while the Covid-19 crisis seems to have accelerated the adoption of digital technologies, it also highlighted important pedagogical unpreparedness and knowledge gaps (Mavridi, 2022b). This does not suggest that the difficulties of the transition should be attributed to teachers or that institutional and national infrastructures did not play a significant role. Rather, it aims to highlight that teachers—all with formal education backgrounds—found themselves unprepared to cope in the highly digital environment that the pandemic necessitated.

The present study argues that for digital transformation to be undertaken, the development of teachers' TEL expertise requires imperative attention. Essentially, as the demand for language teachers to use technology in the classroom is growing—and was amplified by the pandemic and the shift to emergency remote teaching—formal language teacher education programmes may need to reconsider their teacher preparation approaches and account for the actual TEL expertise of the teachers.

As such, this study aims to contribute to scholarship on digital transformation and language teacher TEL expertise, with a particular focus on programme and module structure within higher education. As a UK-based academic, I am motivated to situate this enquiry within UK higher education contexts, in particular *postgraduate degree programmes in TESOL/ Applied Linguistics* (hereafter MAs). I am especially interested in these programmes because they are usually aimed at in-service teachers who, as Hubbard (2021) explains, can “make immediate, experience-based judgments regarding the relevance—and feasibility—of a given CALL application in their specific settings” (p. 60).

By employing a qualitative survey methodology design and TPACK theoretical framework (Mishra & Koehler, 2006) this study explores the following overarching research question (RQ):

- How do MA programmes in TESOL/ Applied Linguistics help teachers develop their TEL expertise?

To answer this research question, the following sub-questions are employed:

- RQ1: What role does the development of teacher TEL expertise play in the official module structures of the programmes?
- RQ2: How do graduates perceive the development of their TEL expertise in the programmes?

For the purpose of this study, the terms *CALL* and *TEL* will be used interchangeably. Also, the term *modules* will be used to refer to courses within master's programmes.

2. Literature review

Research on how formal language teacher education can help teachers to develop their TEL expertise tends to emphasise issues of programme structure (e.g., whether the programme offers TEL-related modules) as well as some flagship initiatives from particular programmes. These

themes will be examined after reviewing literature related to formal teacher education in TESOL/Applied linguistics and TEL.

2.1 Teacher professional development in TESOL/ Applied Linguistics

English is the lingua franca of the 21st century (British Council, 2013) with a predominant role in global communication, business, and research. In response, the field of TESOL has reached a higher level of professionalism that requires both theoretical and practical knowledge (Richards, 2008). Several certificates and degree programmes have been developed to meet the demand for formal qualifications with scholarship emphasising the importance of obtaining a master's degree in TESOL/ Applied Linguistics (Stapleton & Shao, 2016).

TESOL and Applied Linguistics are fields that overlap in that they are both concerned with the use of language. TESOL focuses on the pedagogical and practical aspects of language teaching and learning while Applied Linguistics investigates and provides solutions to language-related, real-life issues. Consequently, Applied Linguistics can directly inform language pedagogy and TESOL. Although as a field, applied linguistics has significantly broadened its scope to include a diverse range of foci, such as, multilingualism; computer-mediated communication; corpus linguistics to name only a few (Cook, 2015), language pedagogy continues to be its major focus (Rose & McKinley, 2017).

Master's in TESOL/ Applied Linguistics (MAs) are generally designed to enable teachers to deepen their professional grounding by bringing together both the practical and theoretical aspects of language teaching and learning. Also, depending on the context (e.g., the UK), prior teaching experience may be required from those applying to study (for example, see University of Manchester, 2022).

2.2 The development of teacher TEL expertise in MA programmes

As technology plays an integral part in language teaching (Crystal, 2020), it is important for advanced degree programmes to help teachers connect language theory and methodology with pedagogical applications of technology (Chapelle, 2003; Son & Windeatt, 2017). Yet, there is a shortage of recent research examining the extent to which MAs fulfil this role.

Older studies (e.g., Hubbard, 2008) found that the role of TEL in North American MA programmes was underdevel-

oped, despite an increased need for TEL-proficient teachers. Specifically, Butler-Pascoe (1997, cited in Hubbard, 2008) found that 42% of the programmes surveyed did not use technology, and only 18% offered TEL-related modules. Moreover, Christopher (2005, cited in Hubbard, 2008) found that 63% of the 172 programmes surveyed did not mention any technology coursework in their syllabi and only 13% had a core TEL-related module while 24% offered an elective. Finally, Kessler (2006) surveyed 240 MA graduates and found that more than half did not receive formal TEL training as part of their MA, and more than three-quarters believed their programme did not adequately develop their TEL expertise.

In light of this scholarship, the next themes will look more closely at MA module and programme structures in recent literature.

2.3 MA programme and module structures

Research on language teacher education suggests that one way for programmes to develop teachers' TEL expertise would be to include TEL-related modules in their curricula (Hubbard, 2021; Kessler, 2017; Son & Windeatt, 2017). This scholarship situates TEL-related modules within CALL and mainstream SLA (second language acquisition) to enable teachers to critically select, evaluate, and use technologies in the classroom. A key point that is emphasised, regardless of the syllabus, is that TEL-related modules should provide a good balance of theory and practice (Hubbard, 2017).

Yet, some general teacher education scholars have questioned the effectiveness of standalone TEL-related modules (Bakir, 2015; Wachira & Keengwe, 2011); they argue that any TEL training should be incorporated into all modules of the programme rather than approached in isolation within a TEL-related one (Bakir, 2016). The position of TESOL in this debate appears to be missing, however.

2.4 Flagship initiatives in on-campus and distance MAs

The scholarship on TESOL/Applied Linguistics MAs usefully highlights some flagship initiatives in TEL-related modules that seem to be promoting innovation in developing teachers' TEL expertise. However, it rather obscures the actual situation in more typical MAs.

Specifically, Moran's (2017) and Windeatt's (2017) on-campus, elective modules (UK) provide theoretical and practical insight into CALL as well as digital literacy. Further, Bauer-Ramazani's (2017) fully online elective module (USA) is based on the TPACK framework, and views interaction

and ongoing dialogue among participants as the "lifeblood of any online/ distance course" (p. 138). Finally, Motteram's (2017) TEL-related module (UK) offers both face-to-face and distance learning options, focusing on instructional design for both modes.

What this scholarship seems to highlight is that certain MAs develop teachers' TEL expertise through TEL-related, standalone modules, either core or elective; however, as argued earlier, these are flagship initiatives, providing limited insight into more typical MAs. Therefore, there is a need for scholarship on how MAs develop teachers' TEL expertise, not only in exemplary programmes but in more typical ones as well. To address this gap, this study will apply a qualitative survey design to examine MA programmes across the UK. UK TESOL/ Applied Linguistics programmes are a *good* case to study because they are (a) influential in other countries and (b) are actually taken by a range of students from across the world (ElGasette, 2021).

3. Methodology

The purpose of this study is to investigate how formal language teacher education helps teachers to develop their TEL expertise. As such, the overarching research question is:

- RQ: How do MA programmes in TESOL/ Applied Linguistics help teachers to develop their TEL expertise?

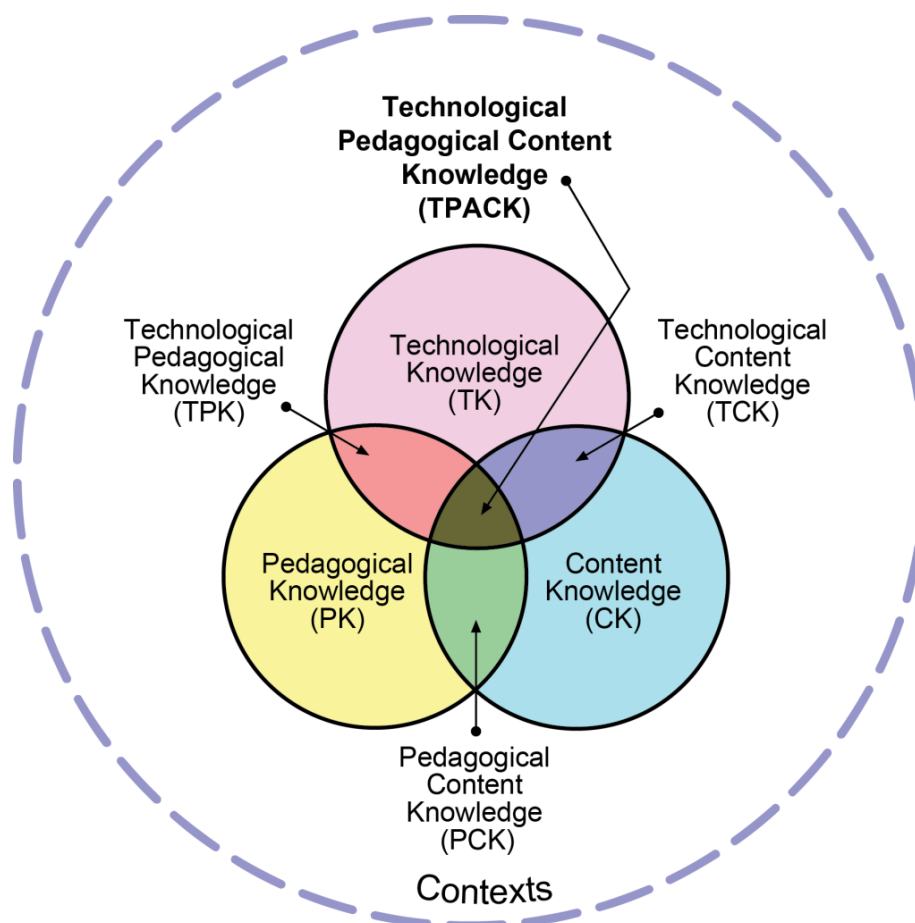
To answer the RQ, the following sub-questions will be employed:

- RQ1: What role does the development of teacher TEL expertise play in the official module structures of the programmes?
- RQ2: How do graduates perceive the development of their TEL expertise in the programmes?

3.1 Theoretical framework

As technology continues to radically shape the way languages are learned, there seems to be an ongoing need to revisit approaches to teacher preparation and account for the actual expertise of the teachers who will use this technology in the classroom. A useful framework for conceptualising this is TPACK which stands for technological, pedagogical, and content knowledge (Mishra & Koehler, 2006; Koehler et al., 2007; Koehler & Mishra, 2009). What TPACK usefully highlights is that teachers need the intersection of these different forms of expertise to effectively integrate technology into educational settings. In their words, teachers need

Figure 1. TPACK framework. Graphic used with permission from: <http://tpack.org/>



knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones. (Mishra & Koehler, 2006, p. 1029)

The framework explicitly acknowledges that teachers who master TPACK can effectively combine their technical knowledge with their pedagogical and content knowledge to enhance student learning (Graham et al., 2012). As such, it can provide researchers with "theoretical guidance for how teacher education programmes might approach training candidates to use technology in content-specific ways" (Graham, 2011, p. 1959).

Built on Shulman's (1987) Pedagogical Content Knowledge (PCK), TPACK adds technological knowledge to the framework and is commonly represented by a diagram with three overlapping circles, each representing a specific form

of teacher knowledge (Figure 1). These are dynamic and interwoven to form an ideal learning environment (Mishra & Koehler, 2006).

TPACK has had considerable and widespread impact on research in teacher education (Soler-Costa et al., 2021; Lee et al., 2022) but it has also been criticised for theoretical unclarity between some of its components (see Brantley-Dias & Ertmer, 2013 for a discussion of it) and a lack of consideration of other factors beyond content, pedagogy, and technology; for example, teachers' epistemic beliefs and values about teaching and learning (Angeli & Valanides, 2009); infrastructure etc. Since, as already discussed in the introduction, these factors may be equally important to consider in the context of digital transformation, I decided to use TPACK in the following ways:

1. As a theoretical lens to understand and define what *teacher TEL expertise* means. As such, TPACK and teacher TEL expertise will be used interchangeably.

2. As a secondary analytical tool employed to make sense of Dataset 2 (interviews). Specifically, I utilised the framework shown in Figure 2 to interpret Dataset 2 *after* I had grouped it into initial codes. For more details on the methodological approach, see section 3.2.2.2, *Interviews*.

3.2 Research design

This study employed a qualitative survey methodology to explore MA TESOL/ Applied Linguistics programmes across the UK. This methodology was deemed appropriate because it can help study the diversity within a population (Jansen, 2010). In contrast to quantitative surveys, which aim to establish means or other parameters, qualitative surveys aim to determine the meaningful variation (relevant dimensions and values) of a particular topic within a given population. Section 3.2.2 describes the population and sampling decisions.

3.2.1 Ethics

After applying for, and being granted, ethics permissions to carry out the research under the regulations of Lancaster University, human participants received a brief explaining

the purposes and procedures of the study, the interview protocol, and their right to withdraw at any time. Written informed consent was obtained from all participants for their interviews to be video-recorded, stored on a password-protected computer until they were transcribed by the researcher, and then permanently deleted. Participants also consented to the anonymised transcriptions being kept in a password-protected folder indefinitely.

3.2.2 Data collection and analysis

The data collection was implemented in two phases in March and April 2022: first, to answer RQ1 I engaged with publicly available documentation of MA programmes across the UK; then, to answer RQ2, I interviewed ten participants, each having graduated from a different MA programme.

3.2.2.1 Document analysis (RQ1)

To answer RQ1, I used document analysis to engage with *publicly* available documentation of MA programmes in TESOL and related areas (Applied Linguistics/ ELT) across the UK. Document analysis is a systematic qualitative research method to analyse and interpret documentary evidence (Cardno, 2018).

Figure 2. TPACK categories adapted from Koehler and Mishra (2009)

TPACK Category	Description
Pedagogical knowledge (PK)	A deep understanding of the general principles and practices of teaching and learning.
Content knowledge (CK)	Thorough knowledge of the subject matter being taught.
Technology knowledge (TK)	Technical knowledge and skills.
Pedagogical content knowledge (PCK)	How specific aspects of subject matter are organised and adapted to facilitate instruction.
Technological content knowledge (TCK)	How technology and subject matter are reciprocally related; which specific technologies are best suited for addressing subject-matter learning.
Technological pedagogical knowledge (TPK)	How technology can be used in teaching, not for its own sake but for the sake of advancing student learning and understanding; how teaching might change as a result of using specific technologies.
Technological pedagogical content knowledge (TPACK)	Constructive and pedagogically sound ways for using technology to teach subject matter; how technology can be used to develop/ strengthen knowledge. A dynamic equilibrium among all components.

The sample of MAs was selected from ElGasette's list (2021) which comprised 138 postgraduate programmes. By using a list, I was able to make my research more systematic and select institutions from across the UK, rather than only well-known ones. For consistency reasons, I decided that only taught master's degrees would be explored and therefore, MPhils and PGCEs were excluded; an MA in Phonology was also excluded as being highly specialised. This refinement resulted in 132 programmes, which are referred to as MAs in the study (although MSc and Meds were also included).

To obtain a manageable sample, I decided to survey 50% of the total population ($n=66$) and, to ensure this sample was non-biased, I used Excel to select a random sample from across the list (Statology, 2021). In this way, every programme was selected by chance and was equally likely to be chosen.

Each of the 66 MAs' websites was searched on Google for publicly accessible documents. To identify the websites, the programme and university name were used as keywords; for example, MA in Applied Linguistics & TESOL, University of [name]. In each search, the top two matches were evaluated based on whether the information they provided answered RQ1. Hyperlinks within the original matching results provided additional details about programme specifications, modules, and module syllabi. Overall, 203 documents were identified for close review and using the search function, each document was searched using keywords (i.e., *technology*; *CALL*; *TEL*; *TELL*; *digital*; *edtech*). This refined search yielded 98 documents (Dataset 1).

Dataset 1 was analysed following Bowen's (2009) approach to document analysis which "combines elements of content analysis and thematic analysis" (p. 32). I first skimmed through the documents to identify preliminary themes related to RQ1. I then scrutinised the dataset for references to TEL (or relevant terms, such as CALL). This was followed by a thorough reading of the entire dataset again to refine and organise it into themes and check them for consistency and discrepancies. To get a "crude overall picture of the material being reviewed" (Bowen, 2009, p. 32), I also counted the frequency of occurrence of the themes (see Table 3) before I interpreted the data.

3.2.2.2 Interviews (RQ2)

To gain a deeper understanding of the programmes, this phase used semi-structured interviews to explore the perceptions of graduates of a small sample of MA programmes ($n=10$). The purpose of qualitative interviews is not just

to gather facts, but rather to see beyond the observable and draw from the speaker "the richest and fullest account possible" (Richards, 2003, p. 50). The interviews were semi-structured because I had a list of six broad questions related to RQ2 (Figure 3) but also wanted the freedom to probe or follow up on any relevant or interesting points that came up (Thomas, 2009). The bullet points in the interview protocol (Figure 3) indicate follow-up questions and prompts I used when appropriate to encourage participants to elaborate or clarify.

In terms of participant selection and criteria, a call for potential interview participants was posted on social media where I have a large network of teachers. To be eligible, participants must have graduated from a UK TESOL-related MA after 2010 (hence the data would be relatively recent). Purposeful sampling (Patton, 2002) was used to maximise the diversity of graduates selected e.g., teaching contexts, length of teaching experience. As mentioned earlier, because UK TESOL programmes attract a range of students from across the world, I also aimed for good geographical distribution i.e., participants who studied on a UK TESOL-related programme but were based in different countries. Additionally, because participant selection occurred after the document analysis (see previous section) I tried to recruit graduates from a variety of programme structures based on the document analysis results (see themes A-E, Table 3). As a result of this process, I recruited 10 participants whose characteristics can be seen in Table 4.

Interviews took place via Zoom and lasted between 20 and 30 minutes. This generated a dataset of a 126-page transcript containing 31,362 words (Dataset 2). Dataset 2 was added to Atlas.ti 9—a qualitative data analysis tool—and was analysed thematically in an inductive manner. Consistent with Braun and Clarke (2006), I first read the transcripts multiple times to familiarise myself with the data, taking notes on repeated and salient patterns. Following this, I worked systematically back and forth between the transcripts identifying interesting features, connections, and repeated patterns until I established a comprehensive set of 14 initial codes.

The next step of the analysis was to make sense of the data in TPACK terms; that is to say, my aim was to understand what participants' perceptions meant in terms of the *technological*, *pedagogical*, and *content expertise* that their programmes helped (or did not help) them to develop. I, therefore, went through each of the 14 initial codes one by one, categorising quotations within each code in accordance with the TPACK framework (Figure 2). An example is shown in Table 1.

Figure 3. Interview protocol

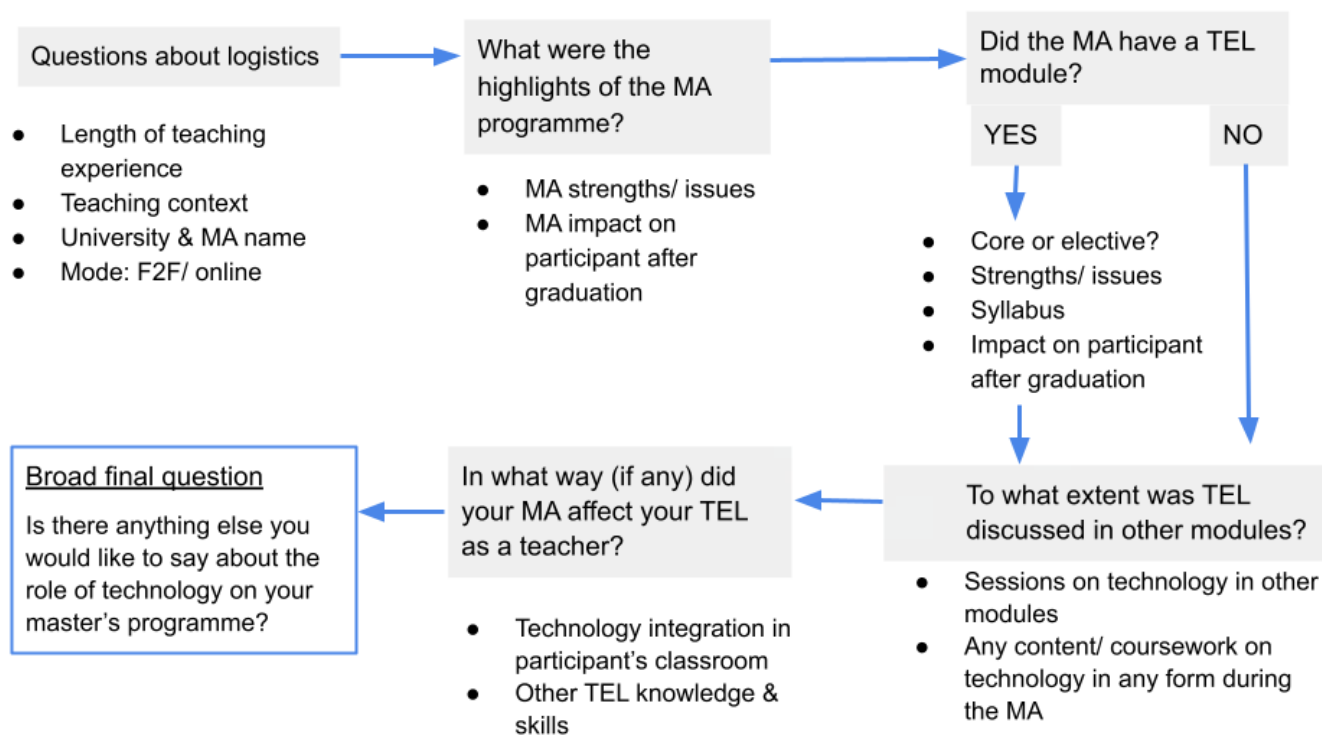


Table 1. An example of data categorisation.

Initial code	Quote	TPACK
Impact of TEL module after graduation	The module gave me a lot of input but when I went into the classroom my confidence to actually use these tools in my day-to-day teaching wasn't very strong.	TCK

Table 2. Examples of how TPACK can be used to code and interpret qualitative data.

TPK	<i>I chose to use PhotoStory because it gives students an opportunity to work together in collaborative groups</i> (Graham et al., 2012, p. 538)
TCK	<i>Yes it's good to show examples of diversity of marine life and habitats. Through media such as video the natural beauty can be demonstrated.</i> (Anderson et al., 2013, p. 556)

The quote in Table 1 was classified as TCK (technological content knowledge) because *input* pertains to tools that aid in language acquisition. The emphasis on content knowledge was also evident in the context where this quotation appeared. Yet, I sometimes found the boundaries between TCK and TPK (technological pedagogical knowledge) somewhat ambiguous, as noted by Angeli and Valanides (2009) in their analysis of TPACK, suggesting a potential weakness of the framework to provide an accurate categorisation of the knowledge components. To ensure accuracy in coding, I therefore paid particular attention to reflexivity. Braun and Clarke (2021) maintain that reflexive approaches to qualitative analysis fully embrace “the subjective skills the researcher brings to the process” (p. 333). Even so, the reader should be aware at this point that all rounds of coding and analysis were completed by the researcher alone (as opposed to a team of coders), and, despite significant attention to reflexivity (see below), they may still be subject to some personal bias.

As a way of ensuring accuracy and consistency in coding, I used the codebooks of Graham et al. (2012) and Anderson et al. (2013) which provide examples of how TPACK can be used to code and interpret qualitative data. Two examples are provided in Table 2.

Other ways of ensuring robust coding and reflexivity were i) taking reflective notes when facing ambiguity and ii) revisiting the coding at a later time to see if it yielded different perspectives.

The final step of analysis involved reviewing the 14 initial codes I had developed and categorising them into higher-level themes. Themes in qualitative research are broad units of information that consist of several codes “aggregated to form a common idea” (Cresswell, 2013, p.186). After multiple reviews of how best to synthesise these codes, four main themes and one subtheme were generated (see Figure 4).

4. Results

Presented below are the findings for each research question, organised according to the themes identified from my analysis. At the end of this section is a summary of the overall findings.

4.1 The role of TEL in MA programmes (RQ1)

On the whole, the development of teacher TEL expertise does not appear to play a prominent role in the official module structures of the programmes. Table 3 shows the themes identified in the document analysis associated with different module structures, and the frequency of these themes across the sample population. For ease of reference, these themes are labelled A-E.

As can be seen in Table 3, a small number of programmes have a *core* TEL-related module i.e., a compulsory module that all students will take (Theme A), while several programmes have a TEL-related module as an *elective*, i.e., an optional module to allow students to tailor their learning

Table 3. The role of TEL in the official module structures of the MA programmes (RQ1)

Different MA module structures	Number of MA programmes	%
A. Core TEL-related module	7	10.6%
B. Elective TEL-related module	25	38%
<i>B.1. One TEL-related elective module</i>	17	26%
<i>B.2. More than one TEL-related elective module</i>	2	3%
<i>B.3. Half TEL-related elective module</i>	2	3%
<i>B.4. TEL-related elective and 1-2 TEL sessions in other core modules</i>	4	6%
C. Only 1-2 TEL-related sessions within a core module	4	6%
D. Only 1-2 TEL-related sessions within an elective module	2	3%
E. No TEL-related module or session within other modules	28	42.4%
Total	66	100

according to their special interests (Theme B). The data analysis revealed some distinctions within the latter (see B1-B4). The overwhelming majority of programmes in this theme have one TEL-related elective (B1), while fewer may have up to five TEL-related electives (B2); half modules covering TEL plus another topic, e.g., materials development (B3); or both an elective and some TEL content in core modules (B4).

To gain a deeper understanding of *all* the TEL-related modules (Themes A & B), the next aim of the document analysis was to identify the contents of the syllabus and what knowledge they aimed to equip student teachers with. Of the 32 TEL modules, 22 provided brief descriptions that offered limited insight into their contents while 10 had publicly available details that revealed a balanced approach to teaching theory, pedagogy, and practice. These 10 modules covered topics such as SLA and CALL theory; multimedia design and development; computer-mediated communication; teaching and learning online; digital literacy and its role in language education; virtual exchanges; game-based language learning; critical evaluation of learning technologies; developing language teaching materials; and mobile-assisted language learning.

Programmes in Themes C and D offer one to two TEL sessions within their core or elective general (non-TEL-related) modules e.g., methodology, sociolinguistics. While TEL appears to be minimal in both structures, there is a significant difference between the two: all students will attend TEL sessions in core modules (Theme C), but only students who have taken the elective module will do so (Theme D). Thus, integrating TEL content into a core module may have a greater reach than integrating it into an elective one.

Finally, a significant number of the surveyed programmes (42.4%) do not appear to offer TEL-related modules or make any reference to technology in their syllabi (Theme E) in their publicly available documents; it is, therefore, unclear whether these programmes pursue the development of teachers' TEL expertise.

All in all, almost half of the programmes surveyed (48.6%) seem to pursue the development of teacher TEL expertise by offering TEL-related modules of varied degrees of coverage and reach (Themes A & B), while in more than half of the programmes (51.4%) the development of teacher TEL expertise appears to be limited or absent (Themes C-E).

4.2 Graduates' perceptions of the development of TEL expertise (RQ2)

Below, I present the findings for RQ2 grouped into four main themes based on my analysis (see Figure 4). Namely, how teachers perceive their development through i) the entire MA programme ii) TEL-related modules ii) TEL-integration in the programme ii) distance MA programmes. Whenever relevant, I include how data has been interpreted through the lens of TPACK by adding the corresponding code in brackets e.g. (CPK).

Furthermore, the subtheme *participant & programme information* is summarised in Table 4 providing useful insights into participants' experience, geographical distribution, and programme details. Pseudonyms have been used for all ten participants.

Apart from geographical representation and other variables listed in Table 4, I also sought to recruit graduates from a variety of module structures as identified in my documentary analysis (see themes A-E, Table 3). Specifically, one MA (Julio's) offered one core TEL-related module and one elective (Theme A). Four MAs (Ann's, Deppy's, Fotini's, and Charles') offered one *elective* TEL-related module (Theme B1). Two MAs (Antonio's and Dario's) did not offer standalone TEL-related modules, but rather offered some TEL-related sessions within core modules, such as materials writing or methodology (Theme C). One MA (Gerald's) did

Figure 4. Final themes and subthemes on participant perceptions of their programmes (RQ2)

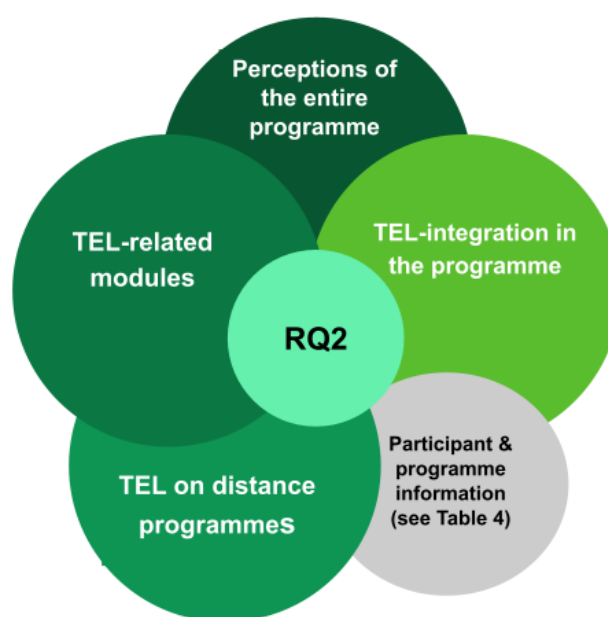


Table 4. Participant and programme information

Pseudonym	Lives in	Years of teaching	Current teaching context	Master's programme in	Graduated in	Mode
Ann	UK	10	Foundation degree tutor	ELT	2018	F2F(face-to-face)
Antonio	Ireland	16	Teacher Educator in training institute	ELT	2016	Distance
Charles	Poland	16	Language school teacher	Applied Linguistics & TESOL	2021	Distance
Fotini	Greece	7	Language school teacher	Applied Linguistics	2019	F2F
Gerard	South Korea	22	Professor	Applied Linguistics & TESOL	2014	Distance
Iris	UK	17	Lecturer	Applied Linguistics	2013	F2F
Julio	Mexico	6	Language school teacher	TESOL	2018	F2F
Mustafa	Egypt	21	Language school owner	TESOL	2015	Distance
Dario	Portugal	10	Secondary school teacher	TESOL	2016	F2F
Deppy	Canada	16	Lecturer	TESOL	2017	Distance

not offer a TEL module, but it did have some TEL sessions within an elective module (Theme D). Lastly, two MAs (Iris' and Mustafa's) did not have any TEL-related modules or sessions within other modules. Overall, the participants came from a range of programme structures, with five of them having dedicated TEL-related modules, three of them with only sporadic TEL-related content within other modules, and two of them with no TEL content at all.

4.2.1 Perceptions of the entire programme

This theme provides insight into the perceived quality and effectiveness of the entire MA programme that the participants completed. Overall, participants appear to be satisfied with their programme and believe it had a positive impact on them as professionals in the field.

I became a specialist in second language acquisition. (Iris)

I became more innovative with my teaching because I learned to think outside the box. (Julio)

A specific point of interest was that most participants (n=6) highlighted the CK they received, while others (n=2) described the MA as helping them with their research skills and academic careers. While generally there seems to be a reasonable balance of CPK on the programmes, there was some criticism that CK was overemphasised and rather generic, leaving participants unclear as to its application in their classrooms.

I know a lot of students come into MA programs wanting to develop themselves with things that they can utilise, and they end up, you know, being kind of just filled with knowledge, unable to understand how it connects to things practically. (Gerard)

In a similar vein, two participants make powerful observations about content and pedagogy on the programme pointing out how the PK, rather than the CK of their lecturers had the most significant impact on their growth as teachers.

It was not about the subject, you know, SLA or phonology or whatever they taught. It was about the way they supervised, the way they approached education in general. It's about the traces that people leave in your heart and your life, and they define you as a teacher. And I think that's what I've learned. (Antonio)

An interesting pattern emerged regarding how MAs helped participants to cope during the pandemic. Despite the overall positive perceptions of their programmes, the overwhelming majority of the participants (n=8) felt that their programme did not adequately prepare them to handle the challenges of teaching during the pandemic. In fact, most of them (n=7) point out that they struggled with understanding the pedagogical adaptations necessary to teach languages online (TPACK) and had to either learn through trial and error or seek additional training.

In my school, we started using zoom and it was all learning by doing. And we were quite traditional at first, you know just PowerPoints, and sharing our screen. But after some time, the learners began to lose focus and engagement. So we began to learn about some different techniques and tools to keep them more motivated and we also had some in-service training. That helped a lot. (Mustafa)

I wouldn't say it actually helped with the switch to online learning. And really, I think that it should've had. (Iris)

Fotini and Julio, on the other hand, believe their MAs were highly effective in this regard pointing out that the combined technical, pedagogical, and content knowledge (TPACK) they developed prepared them to cope with the highly digital environment they found themselves in during Covid-19.

I had never experienced online teaching before, but I knew how to evaluate technologies for language learning, where to look for new ones, how technology affects language, and what activities to use for students to keep them motivated. So after the initial shock, I realised I could be much more creative with my online classes. (Fotini)

4.2.2 Perceptions of TEL-related modules

TEL-related modules were present in half of the participants' MAs (n=5), but different levels of perceived effectiveness were reported among participants. Specifically, two participants (Fotini and Julio) express high satisfaction with the TEL-related modules; interestingly, TPACK emerges

several times as they describe how the module promoted a better understanding of the synergy between technology, pedagogy and subject matter, both on a practical and theoretical level.

I learned about the theoretical part of technology not just the practical. When we use this technology for example what is the rationale behind it? How we're going to benefit our language students? And theories about the social, cultural learning and how the brain works, and how we can integrate technology to improve this process. (Julio)

I already had been using technology, but it was mostly platforms based on gamification. With my MA the scope opened up and I also learned how to integrate technology more productively and how to involve students, not only how the teacher uses it but also how students engage and learn the language. (Fotini)

The other two TEL-related modules appear to be less satisfactory. Although participants acknowledge they were central to developing their TK and TCK, they describe them as context-neutral and generic. Thus, participants had difficulty applying this knowledge in their own classrooms. They did mention, however, that both the TK and TCK they developed in the module served as a starting point for the TPK they later developed on their own.

The module was very much based on building a website, and it was directly related to language teaching which was great. But when you get onto your employment, you're not teaching from your website, you're teaching based on a scheme of work and teaching techniques. (Ann)

The module gave me a lot of input but when I went into the classroom my confidence to actually use these tools in my day-to-day teaching wasn't very strong, so I really did need to take time of my own to really develop it. (Deppy)

Notably, the fifth MA (Charles') offered a TEL-related module, but the participant opted not to take it. Since he could only choose a limited number of electives, he selected those he considered more relevant. This is something he regrets given the pandemic and the sudden switch to online learning.

As I could only choose two electives, I did teacher education and materials development because I could immediately see how I would write those papers. Looking back if I were to do the masters again, I would probably have done something on technology in teaching. (Charles)

Finally, all participants whose MAs did not offer TEL-related modules (n=5) wish they had. It was felt that this hindered the development of their TEL expertise and that the programme design was lacking a forward-looking perspective on teachers' future needs.

All programmes should think ahead and understand what teachers WILL need in the future. My programme lacked that vision in a sense. And I find that somewhat problematic in terms of technology, although I developed other skills. (Dario)

4.2.3 Perceptions of TEL integration in the programme

Only one participant said that TEL was fully integrated into her MA. She noted that not only did this provide her with more opportunities to use technology in her learning, but it also served as a form of modelling, since she could observe how her tutors in non-TEL modules used technology in practice.

In the material development module, we had to create a unit of materials and we were encouraged to integrate technology and reflect on it. Also, the lecturers were using a lot of technology in other modules and so it worked as some kind of modelling for me. (Fotini)

Antonio also said that TEL was somewhat integrated into two core modules, something that helped with his TCK. For example, in the module *Language Teaching Methodology*, there were discussions about the role of technology in language teaching. Also, in the *Materials Design module*, students developed materials using tools and then justified how their choices would facilitate language learning. He describes this approach as useful, but rather lacking in theoretical and pedagogical depth. Therefore, he admits that it only helped him to apply technology intuitively and that a deeper understanding (TPACK) would have helped him to make more informed pedagogical decisions.

I used Twitter intuitively with my students and it worked fine, but I wish I had a more theoretical grounding of why I'm doing this rather than 'Yes, this worked for me so I can do it with other classes'. And that wasn't part of my MA. (Antonio)

The overwhelming majority (n=8) did not feel that there was TEL-related content in other modules or that tutors across the programme used TEL in their teaching. Participants felt that this hindered their TPK development since they were unable to see how TEL could be used in a real classroom setting.

Technology was isolated into one module when really technology has so many facets and is everywhere. So, I couldn't see how you could actually use that in a day-to-day lesson. (Ann)

Some participants suggested that MA tutors' lack of TEL expertise could explain the lack of TEL content in other modules.

Tutors weren't very tech-savvy. I remember being a bit frustrated that even the way they presented or shared their materials was a bit old school. (Deppy)

4.2.4 Perceptions of distance programmes

Of particular interest were the perceptions of those who had taken the MA online (n=5). Participants emphasised that the online delivery of the programme played a major role in developing their TK since technology was the medium of instruction. Yet, they noted that this was not sufficient, and when they used technology to actually teach (e.g., during the pandemic), they learned through trial and error.

We used technology as a medium for completing the course and this helped develop my technical skills. (Mustafa)

Interestingly, three of the five distance MA participants found that the instructional design of their programmes was TPACK lacking (i.e., not having a clear connection between technology, content, and sound pedagogy), inhibiting the development of their TEL expertise.

The way my university approached the master's degree was a little bit backwards facing. It was just making PDFs of everything available and then we had to do the assignments. If the students came to my classroom, would I give them a PDF as a handout and expect them to learn? That feels like something out of the 1970s (Deppy).

As well as PDFs, other instructional materials were also found to be pedagogically ineffective. For example, Charles shares his experience with a lecture on phonology; a long, low-quality recording of a face-to-face lecture that the lecturer repurposed as instructional material for her

distant cohort. Charles expresses serious criticism about the low standard of TPACK in the instructional material while comparing it to free materials that he considers superior.

It was a 90-minute recording, most of which is inaudible because she's away from the screen. But if you compare this to some of the free phonology courses on Future-Learn, where it has built-in buttons that you click, and it will show you which part of the mouth is in operation; why did I pay 8000 pounds for poor recordings when there is a free course for this sort of thing? And that's a question that I think universities might want to think about. (Charles)

Participants also criticise the low social interaction element of the course through collaborative activities, forum discussions or synchronous sessions.

There was no real effort on the side of the university to encourage people to kind of connect up with one another to do work together. By the end of the course, I didn't even know the names of half the people on the course.. even though that was a two and a half year long course, so there was no kind of social element. (Charles)

There was a forum on which you could discuss different topics, but it was pretty quiet because there was no

obligation to use it. So there was no real interaction there. (Deppy)

Antonio also mentions that the complete lack of synchronous sessions from his online programme did not suit how he likes to learn.

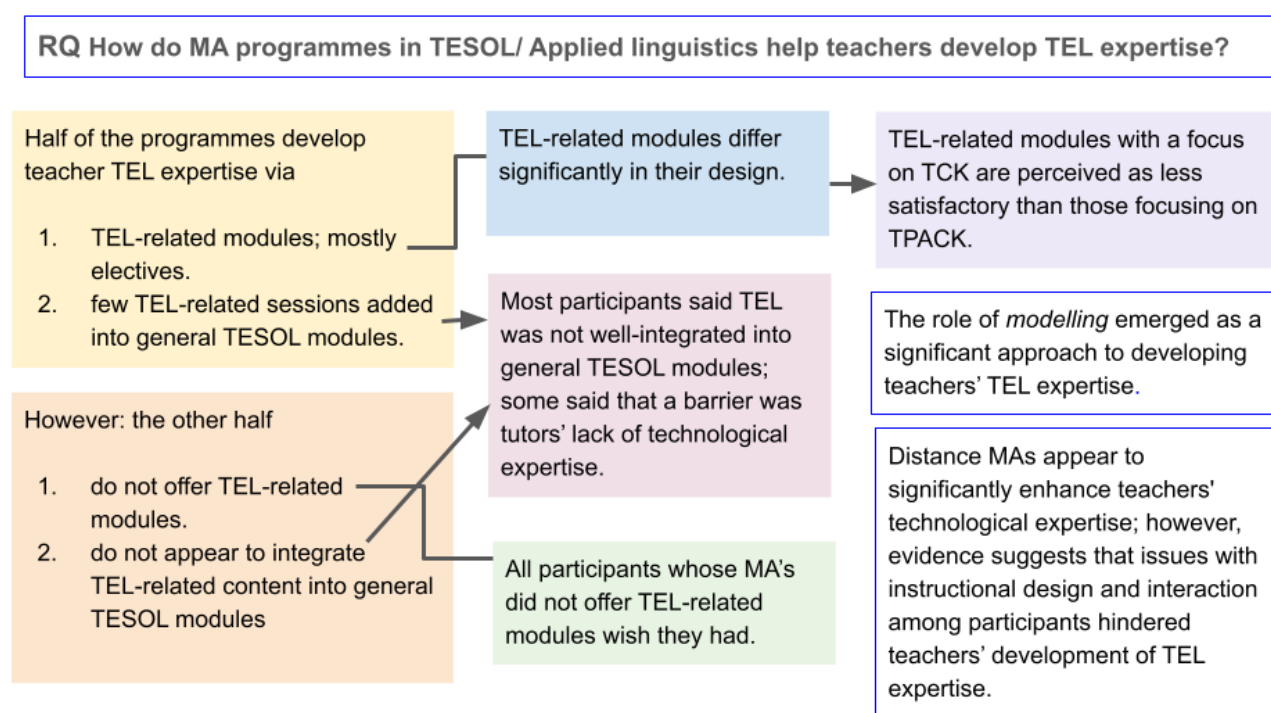
Honestly, I don't have an issue remaining online until the end of time. I don't need to be in a physical space with my teachers or my students, but I do see the value of synchronous sessions. And the absence of that in my course just made it feel less like a course. (Antonio)

Yet, he acknowledges that his tutors' overall availability provided a model of how teaching presence can benefit online students. Indirectly, this seems to have contributed to his TEL expertise, as he now demonstrates the same level of care to his own online students.

They were always minutes away from responding to an email. And of course, I do exactly the same with my students, and this is something I learned from them. (Antonio)

Before I discuss the overall findings of this study, I have summarised them in Figure 5.

Figure 5. Summary of the findings



5. Discussion

This section discusses how my findings relate to the literature reviewed in section 2.

Overall, the findings suggest that MAs can be important avenues for TESOL/ Applied Linguistics professional development, but they do not significantly contribute to the development of TEL expertise. Specifically, the development of teacher TEL expertise does not appear to play a prominent role in MAs, although it does seem to be moving from the periphery of language teacher education toward a more mainstream role, at least in the UK. In comparison with Hubbard (2008), more MAs include TEL-related modules (core or electives) and there is generally more technology-related coursework in their syllabi. Yet, a significant number of the surveyed programmes do not appear to offer TEL-related modules or TEL coursework in their publicly available documents. As technology plays an increasingly prominent role in 21st-century language education, I argue that these results are concerning.

Looking more closely at programme and module structures, the findings revealed that merely having TEL-related modules may not be sufficient, as much depends on the quality of the module design. Specifically, the data suggest that TEL-related modules designed to leverage the synergy between pedagogy, technology, and subject matter on both a theoretical and practical level contribute positively to teachers' TEL expertise. Those focusing solely on TCK—while still useful—may not provide teachers with the necessary grounding for making informed decisions and tailoring technology use to their own contexts and students' needs. This is consistent with the TPACK theoretical framework which emphasises that TEL requires the intersection of all three constructs of expertise (content, pedagogy, and technology). Teachers who understand this relationship, know that it is constantly evolving and dynamic “sometimes driven by newer content-related ideas that emerge and at other times by newer technologies that allow for different kinds of representations and access” (Mishra and Koehler, 2006, p. 1044).

Furthermore, the findings indicate that both core and elective TEL-related modules can achieve optimal results. However, it has been shown that electives may not be chosen by students (see section 4.2.2). Therefore, this study agrees with Angeli and Valanides (2009) that TEL-related modules may need to be a core component of the programme. However, as already mentioned in the literature section, an issue for further discussion and debate is whether TEL-related

modules are needed at all. For example, some scholarship on general teacher education (Bakir, 2015; Wachira & Keengwe, 2011) argues that learning about TEL in isolation may not prepare teachers to integrate technology into their classroom and recommends that TEL-related coursework be infused into all modules of the programme instead (Bakir, 2016). In what follows, I explain why this approach may not be viable for TESOL, at least for the time being.

On the one hand, there is evidence that when TEL was not integrated across all modules of the programme, it hindered the development of TPK because participants could not see how technology could be applied in practice. On the other hand, however, it was also pointed out that tutors of general modules (e.g., language methodology, sociolinguistics etc) may not have been tech-savvy enough. If TEL is to be infused throughout the MA, tutors need to be tech-savvy as well as TPACK-savvy (Mishra and Koehler, 2006). Yet, evidence in the data and the literature (Hubbard, 2008) indicates that this may not be a typical characteristic among TESOL/Applied Linguistics tutors. Certainly, the pandemic has led to a shift towards TEL as language professionals (including teacher educators) had to adapt and embrace technology to teach online. However, as several empirical studies have shown, most of this development was ad hoc and based on emergency remote teaching approaches (for example, see Moser et al., 2021; Mavridi, 2022a). For MA tutors to effectively model the use of technology to in-service teachers, they would require a robust understanding of CALL as well as how technology can enhance their subject matter (for example, sociolinguistics, phonology etc).

Furthermore, this study showed that TEL infusion into the programme is a complex matter and simply adding some TEL content into general modules is not enough to develop teachers' TEL expertise (see section 4.2.3). Indeed, the field of CALL has such a broad scope that even the optimal TEL-related modules explored in the literature acknowledge that critical decisions must be made regarding the depth and breadth of topics to include as well as how much time is allocated to theory and practice (Hubbard, 2017).

Consequently, I argue that while infusing TEL throughout the programme has its place, it may not be a viable solution for typical TESOL MAs, at least at present. Rather, TPACK-informed standalone modules could be prioritised. Specifically, these modules should aim to promote an understanding of the complexities of teaching languages with technology; how technology can alleviate some of the problems students face when learning languages; how students can engage with content and peers through technology; how theories can inform digital pedagogies; and how these pedagogies

can be applied in context-specific ways to teach languages. There are some excellent examples of TEL-related MA modules in the literature (e.g., see Son & Windeatt, 2017). However, this paper emphasises that if MAs are to follow this paradigm, attention should be paid to the expertise of those designing and teaching these TEL-related modules. Kessler (2016) argues that such a role requires professionals with considerable expertise in CALL, and I would argue for TPACK proficiency as well.

Regarding distance MAs, participants unanimously agreed that taking an MA online helped them to develop their technological knowledge (TK) because technology was the medium of instruction. Nevertheless, they found that issues related to instructional design, online materials, and opportunities for interaction with peers hindered the development of their TEL expertise. While this evidence represents only a snapshot of the entire population of online MAs, it should not be disregarded. It first contrasts the flagship initiatives that demonstrate distance MAs as highly attentive to instructional design and student interaction (Bauer-Ramazani, 2017; Motteram, 2017) and suggests that mainstream distance MAs may fall short in this regard. On a broader scale, it contradicts notions that distance higher education was carefully planned prior to the pandemic and that lower-quality online courses resulted solely from emergency remote teaching (Hodges et al., 2020). Rather than maintaining the dichotomy of pre-pandemic and post-pandemic education, this study suggests that it would be better to assess programmes based on their instructional design.

There are, however, some positive findings on the development of teacher TEL expertise in distance MAs; tutors' availability and timely responses to questions *indirectly* helped participants develop their TPK, as they now model the same degree of *teaching presence* to their own online students. Indeed, the role of teaching presence, a key element in the Community of Inquiry model (Garrison et al., 2000), is widely acknowledged in the literature as crucial for maintaining students' engagement when learning online. Likewise, the role of *modelling* emerged in the data as a highly effective approach to developing teacher TEL expertise, both online and face-to-face. This is consistent with the literature showing that student teachers acquire their practices from observing their mentors (Bennett, 1991) and that modelling quality technology-enhanced teaching can help them construct pedagogical knowledge, strategies, and ideas that they can then mimic and integrate into their own classrooms (Ottenbreit-Leftwich et al., 2010; Bakir, 2016).

6. Conclusion

Digital transformation is a multifaceted process aimed at making education more effective, accessible, and inclusive. Teachers are key players in this process, as they are the ones who will need to navigate the complexities of teaching with technology and make informed decisions about its integration. The present study positioned digital transformation within the context of language teacher education, highlighting the importance of supporting teachers in acquiring a nuanced understanding of the complexities involved. As developments in artificial intelligence, machine learning, and networked communication will continue to radically shape the way languages are used and learned, it is imperative that teacher preparation programmes adapt and equip teachers with the expertise to critically evaluate and harness this potential in the classroom. One solution proposed in this study is to review and enhance formal language teacher preparation programmes, specifically master's degrees.

While the study acknowledges the significant contribution of these programmes to language teacher education, it raises important issues relating to their robustness in developing teacher TEL expertise. Specifically, while most programmes provided good grounding in language theory and instruction, they did not help teachers to gain a deeper understanding of how content, pedagogy, and technology interrelate and how this may affect their practice. Consequently, on the whole, the programmes did not adequately prepare teachers to establish robust pedagogical connections between the affordances (or limitations) of technology and language teaching. Notable exceptions were the programmes whose TEL-related modules went beyond techno-procedural applications by emphasising the synergy between pedagogy, technology, and subject matter and by balancing theory and practice.

Based on the above, this study contributes to discussions about digital transformation in four principal ways. First, it indicates that the development of teacher TEL expertise in formal language education programmes needs to be strengthened, but that it appears to be shifting to a less peripheral role, at least in the UK. Second, it affirms that TEL-related modules within master's programmes can be a useful way to develop teacher TEL expertise. However, it cautions that merely offering TEL-related modules is not sufficient, as much depends on i) the purposeful blending between technology, content, and pedagogy in the module syllabi, and ii) the overall instructional design of the master's programme. Moreover, it contributes to the debate about whether incorporating TEL into all modules would be

a more effective structure than isolating it in a TEL-specific module. Ideally, both structures are needed; however, the former may be unrealistic for TESOL/ Applied Linguistics (at least for now), since substantial instructional changes and CALL/ TPACK-savvy tutors would be needed across all modules. Finally, it strengthens the significance of modelling within teacher preparation programmes in developing teacher TEL expertise.

These findings have direct implications for both research and practice. For MA programmes that aim to develop teacher TEL expertise, it is crucial that core, standalone modules are designed to foster participants' technological, pedagogical, and content knowledge (TPACK) in relation to CALL theory and practice. Also, it is important that educators teaching these modules be CALL and TPACK experts, and not just TESOL/ Applied Linguistics experts proficient in technology. There is also a need for research to look at how TEL can be infused throughout the master's programme so that participants can see how it is applied to day-to-day teaching. This necessitates a robust dialogue between CALL specialists and other TESOL/ Applied Linguistics subject specialists on how this infusion can be achieved. Research should also examine the implications (e.g., syllabus adaptations) for the non-TEL-related modules as well as tutors' training.

An important limitation of the study, aside from the small number of interviews, is the inability to access documents that were not publicly available. Although programmes make this type of information public for transparency reasons, it is likely that some details (e.g., the extent of TEL infusion within all modules) could be better assessed through non-public documents, such as module handbooks. Additional research on such documents as well as interviews with module designers and tutors could therefore build on this work. Finally, it should be noted that the analysis of this study was conducted solely by the researcher. Although reflexive approaches to qualitative analysis consider the researcher's subjectivity as an asset rather than a limitation, it is likely that some data interpretation could have been different if analysed by multiple coders.

Despite these limitations, the study makes an important contribution to the literature about the development of teacher TEL expertise in formal language teacher education and can therefore inform and enhance future research and practice related to programme and module design. Considering the need for deeper and wider digital transformation in language education, especially following the Covid-19 pandemic, it is hoped that this study will provide useful directions for digital transformation in the field of language teacher education.

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