

Harnessing Digital Literacy Practices of Undergraduate Pre-service English Language Teachers in Tanzania

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Abstract

This paper examines undergraduate pre-service English language teachers' digital literacy practices to establish whether their digital skills predict effective integration into language teaching and learning. A total of 410 undergraduate pre-service English language teachers enrolled in an education programme participated in the study. The findings revealed that the transfer of digital skills from non-academic to academic purposes was limited among the participants. According to the results, digital experience outweighed age as a factor in integrating technology into educational practices. Mobile devices were also frequently used to access the Internet for teaching and learning. From a pedagogical viewpoint, this study emphasises mobile literacy in universities, where efforts should be made to code transferable digital skills that may aid language teaching and learning.

Keywords: digital learning resources, digital skills, pre-service teachers, Tanzania, TPACK

Introduction

Studies have affirmed that the integration of digital learning modes in higher education supports the development of digitally-literate students capable of operating comfortably and creatively in technology-enabled environments in all aspects of their lives (McGuinness & Fulton, 2019). Yet, the concept of digital literacy has been critiqued over the past 30 years (Lankshear & Knobel, 2008; Littlejohn, Beetham & McGill, 2012) although there are indications of substantial educational and psychological benefits. As such, this study has adopted a broader definition of digital literacy, mainly as presented by Osterman (2012) to mean: (a) the capacity to apply electronic innovations, specialised gadgets, or systems to discover, utilise and make data; (b) the capacity to comprehend and utilise data from a wide assortment of sources; and (c) an individual's ability to function proficiently in a technology-enhanced setting. However, this definition lacks a link between generalised ideation and application capacity in teaching. This linkage emerges from the technological

pedagogical content knowledge (TPACK) framework (Koehler & Mishra, 2009). The TPACK framework, adopted from Shulman's (1987) pedagogical content knowledge (PCK), focuses on teaching with technology. TPACK has three key knowledge areas, namely technology, pedagogy, and content knowledge. Koehler and Mishra (2009) modified the PCK framework by adding technology and emphasising interactions, connections, and limitations that teachers deal with in the three knowledge areas. As illustrated in Figure 1, the three primary knowledge forms—Technology Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK)—are represented by a three-set Venn diagram highlighting the intersections of these key aspects that triangulate what constitutes TPACK. Each intersection is critical in representing a complete understanding of how to teach with technology to enhance student learning experiences and lesson preparation for teachers. Since its inception, teachers have widely applied TPACK in designing lessons that utilise various forms of technology.

Indeed, the TPACK framework developed by Koehler and Mishra (2009) is a leading theory in integrating technologies in education, research, and professional development activities of researchers worldwide. Not only does the framework provide a compelling foundation for integrating technologies in teaching but it also differentiates knowledge types based on how content is prepared and taught. TPACK denotes teachers' ability to select appropriate technology that adequately works with their respective subject matter, and it is the result of all these knowledge combinations that create an effective foundation for teaching subject contents using technology.

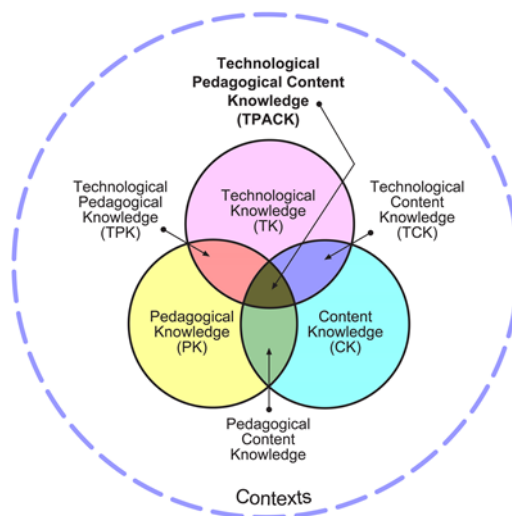


Figure 1: TPACK Framework (Koehler & Mishra, 2009)

TPACK has been explored in a wide range of studies that confirm it as a successful framework for teaching with technologies (Dudeney Hockly & Pegrum, 2013; Mahdum, 2015; Pamuk, 2012; Saudelli & Ciampa, 2016; Weerankanto, 2019). Despite the framework's strengths, several studies have identified areas of weakness in its implementation. One of the framework's limitations is the dominance of some aspects over others, especially in the overall TPACK perceptions indicated by teachers (Chai, Koh & Tsai, 2010; Mahdum, 2015; Pamuk, 2012; Weerankanto, 2019). Some studies indicate that the PK was the most important and whose limitation could impede technology use rather than facilitate it. Moreover, in some cases, prolonged PK experience affected decisions of integrating technology (Chai, Koh & Tsai, 2010; Pamuk, 2012; Saudelli & Ciampa, 2016). Mishra and Koehler (2009) maintain that TPACK is a professional knowledge construct limited to suggesting essential elements pertaining to teaching effectively using technologies because of the technology-associated complexities. Still, other researchers proffer that TPACK helps to frame technology integration for pre-service teacher training and in-service professional development courses (Dudeney, et. al., 2013; Saudelli & Ciampa, 2016).

A critical view of the framework questions the efficacy related to the breadth of its application in places with limited resources, such as Sub-Saharan Africa (SSA). SSA comprises upper-middle-income to low-income countries with some of the lowest literacy levels in the world. Even though basic digital literacy is widespread in at least 50 percent of the adults in countries like Mauritius, Gabon, Tunisia, Sudan, Morocco, and South Africa but it is also rare in 10 percent or less of the adults in countries such as Mali, Niger, and Madagascar. It is argued that the level of formal education primarily shapes citizens' readiness to use technology for remote learning purposes (Krönke, 2020).

The English Language Teacher in the Tanzanian Context

The oldest form of educational technology that has been in use in Tanzania is educational broadcasting through television and radio (Upur, 2021). The use of this format was declining even before the COVID-19 pandemic that exposed the need for active engagement of technology in modern Tanzania alongside traditional formats for remote learning purposes (Upur, 2021). Efforts of technology integration in education have varyingly been researched (Mtebe & Raphael, 2017; Stanfield, Calder, Mlowe & Kaemdin, 2018). Key observations for technology application in higher education point to the emergence of blended learning programmes witnessed in higher learning institutions, widening of access to learning opportunities, increased awareness of e-learning, and improved quality of on-campus face-to-face delivery (Lwoga, 2014; Mtebe & Raphael,

2017). Whereas in lower education levels, Stanfield, Calder, Mlowe & Kaemdin (2018) argue that the perceived benefits of digital literacy for both teachers and students include improved English language skills, access to educational materials, improved social skills, reduced dependency on teachers, increased understanding in other subject areas, and awareness of technology. On the one hand, these descriptions of technology applications at tertiary and lower education levels in Tanzania suggest the probability of limited functionality of the TPACK framework among English language teachers. On the other hand, it raises the question of whether the framework needs to consider the environmental context as part of its functionality. Weerankanto (2019) highlighted one of the limitations of the TPACK connection to subject content in the face of a severe lack of research in the area (Voogt & McKenney, 2017). The rationale is that failure to integrate technology, pedagogy, and content during pre-service teacher education can isolate and limit its application in the future, hence making the educational programmes unamenable to developing TPACK (Horlescu, 2017; Voogt & McKenney, 2017). In the Tanzanian context, these observations raise the question of whether higher education can adequately prepare trainee teachers to acquire necessary TPACK during their pre-service experience in the deficiency of protocols for TPACK enhancement for teacher training. Consequently, in this age of rapid growth in non-academic technology applications, what can be done to achieve successful teaching? This paper, therefore, aims to examine digital literacies among pre-service English language teachers in the Tanzanian context and determine the possibilities of harnessing their self-acquired digital skills to develop their future TPACK capacities. Three research questions guided the study: 1) What are the digital literacy capacities of the pre-service English language teachers? 2) How do pre-service English language teachers use digital technologies? 3) Can such usage be harnessed to facilitate language learning and teaching?

Methodology

This paper reports the results of a study that was carried out on digital literacy among pre-service English language teachers. The data was generated at the University of Dar es Salaam in Tanzania from 410 undergraduate pre-service English language teachers (male=224; female=186) with diverse socio-economic backgrounds. The pre-service language teachers were enrolled in a three-year secondary education degree programme. This cross-sectional study utilised a quantitative research approach and random sampling technique. The only criteria that limited participants required them to be pre-service language teachers taking English as the teaching content subject. Participants filled out an online questionnaire designed to collect data on their digital literacy (knowledge and skills) concerning language teaching and learning. The questionnaire

included 53 items that resulted in a total of 21,730 tokens for analysis. The study employed IBM® SPSS® Statistics Version 20 package for data analysis. Table 1 provides descriptive details of the study participants.

Table 1. *Description of Participants*

Characteristics	N	%
Participants		
<i>First-year</i>	115	28
<i>Second-year</i>	141	34.4
<i>Third-year</i>	154	37.6
Gender		
<i>Total</i>	410	100
<i>Male</i>	224	54.6
<i>Female</i>	186	45.4
Age groups		
<i>Below 20</i>	5	1.2
<i>20-24</i>	335	81.7
<i>25-29</i>	65	15.9
<i>Above 30</i>	5	1.2
Access to the Internet through		
<i>Desktop/laptop</i>	11	2.7
<i>Smartphone/Mobile device</i>	398	97.1
<i>Tablet</i>	1	0.2
Self-perceived skills		
<i>Desktop Computer</i>		
<i>Very low</i>	21	5.1
<i>Low</i>	42	10.2
<i>Average</i>	227	55.4
<i>High</i>	88	21.5
<i>Very high</i>	32	7.8
<i>Mobile device</i>		
<i>Very low</i>	2	0.5
<i>Low</i>	8	2.0
<i>Average</i>	102	24.9
<i>High</i>	167	40.7
<i>Very high</i>	131	32.0
Use of Internet resources		
<i>1st-year students</i>	48	41.7
<i>2nd-year students</i>	129	91.5
<i>3rd-year students</i>	133	86.4

The study adapted Eshet-Alkalai's (2004) digital literacy model to determine the study participants' digital literacies. To begin with, the study picked three skill sets: Reproduction literacy which refers to the ability to create new meanings or new interpretations by reproducing and manipulating any form of

pre-existing media; socio-emotional literacy which is the ability to share own data and knowledge with others, evaluate data, possess abstract thinking, and design knowledge); and information literacy – ability to consume information critically and identify false, irrelevant and biased information. A fourth skill set, basic typing/writing skills, was included since it did not require the participants to create or manipulate pre-existing forms of media. Other literacies identified by Eshet-Alkalai (2004) (photo-visual and branching literacies) were excluded from the study due to limited resources.

Moreover, the study loosely adapted a classification of digital learning resources (DLR) developed by Zehler, Yilmazel-Sahin, Massoud, Moore, Yin and Kramer (2012). The DLRs can be applications (*apps*), software, programmes, or websites that engage students in learning activities and support their learning goals. The DLRs included digital academic tools (tools that offer academic content resources and/or engage students in activities to learn academic content or skills, including, but not limited to, language and literacy content or skills), digital productivity tools (tools used to plan, document, organise, and analyse content), and digital communication tools (tools used to communicate, collaborate, network, or present information). Both digital productivity tools (DPT) and digital communication tools (DCT) do not have academic content. However, based on the local context, it was not possible to identify specific DLRs instead we explored several technological resources at the disposal of the participants to determine whether the skillsets they possessed for handling these resources are extendable to applying technology in the English language teaching and learning. Ultimately, the analysis of the study results and its subsequent discussion explicates how the digital literacies of the pre-service language teachers are transferable to language learning and teaching. To this end, the relationships between Eshet-Alkalai's (2004) model of digital literacy, the TPACK model (Mishra & Koehler, 2009), and the classification of digital learning resources (DLR) developed by Zehler, Yilmazel-Sahin, Massoud, Moore, Yin, and Kramer (2012) in this study shall be represented by the following hypotheses:

H1a: The year of study (experience) has a positive effect on participants' use of computers/mobile devices (H_1)

H1b: There is a positive effect on the usage of digital learning resources among participants (H_1)

H1c: The study participants did not face difficulties applying their digital skillsets (H_1)

H1d: The digital skills of the study participants have a positive effect on the development of the Technological Pedagogical Knowledge (TPK) (H_1)

Findings and Discussion

The present study examined the digital literacy practices of undergraduate pre-service English language teachers enrolled in a selected Tanzanian university to establish the capabilities in their practices. The analysis of data was three-fold: 1) results from a self-assessment tool of the participants' state of digital literacy; 2) results indicating actual usage and levels of difficulties they faced in their use of digital resources, and; 3) results determining a relationship between digital literacies and learning resources. This section presents the findings into which their respective discussions are integrated

Self-assessment of Digital Skills among Pre-service Language Teachers

The pre-service language teachers indicated their perceptions of skills in using technologies for educational purpose. A one-way ANOVA was performed to compare the effect of the year of study on participants' self-perceived skills in using both desktop computers/laptops and mobile devices, particularly smartphones. The results show that there was a statistically significant difference in their digital skills between the groups ($F(2, 407) = 5.913, p = .003$) for desktop computer/laptop and ($F(2, 407) = 5.501, p = .004$) for mobile devices. Therefore, *H1a* is not rejected. Multiple comparisons using the Games Howell test indicate that the mean value of the skill set of the participants in using desktop computers/laptops significantly differed between first-year and third-year students ($p = .003, 95\% CI = -.64, -.10$). Meanwhile, that of participants using mobile devices significantly differed between first-year and third-year students ($p = .007, 95\% CI = -.59, -.08$). However, there was no statistically significant difference between second-year students and other groups in desktop computer/laptop use skills ($p > .05$) and mobile devices ($p > .05$). The study also established that the participants were more proficient in using mobile devices than desktop computers and thus rated themselves as possessing average skills which can be attributed to accessibility.

Since most of the first-year cohort was relatively younger than their predecessors (i.e. second-year and third-year students), expectations were that the younger learners would possess a higher capacity in digital skills. Although studies have documented how younger learners, (digital natives) have better digital skills than older learners (Eshet-Alkalai, 2002; Prensky, 2001), this study and a few others indicate that age does not influence digital skills acquisition. Burton, Summers, Lawrence, Noble and Gibbins (2015) contend that empirical and

anecdotal evidence does not support the claim that digital natives should know and apply educational technologies more instinctively and effectively than their older counterparts. Nevertheless, there are definite indications that the use of the Internet increases with age. A study by Bevort and Bréda (2008) found that older participants increasingly used the Internet, indicating that advancement in maturity correlates with heightened Internet usage. Experience is shown to be a factor in integrating technology into the curriculum and teachers' instructional practices (Eshet-Alkalai, 2002; Virmani & Williamson, 2016).

However, a peculiarity emerged with the results of the intermediate pre-service language teachers (that is second-year students). The study results indicate that this group neither significantly differed from their low-level counterparts nor their advanced level counterparts. The self-perceived assessment of this cohort's use of computers and mobile devices suggests the characteristics of the developmental stages of pre-service teachers. Although this cohort has demonstrated an increased use of both the Internet and technology (91.5%) for learning purposes relative to first-year students (41.7%) and the advanced pre-service language teachers (86.4%), the group did not outperform the more advanced cohort. We can assert that this cohort has exhibited limited growth from the survival stage (41.7%) where they began to use technology as a resource for learning. We can argue that their increased use of technology stems from their first-year experiences of limited access and their desire to consolidate their skills, particularly how to apply them to facilitate both their learning and practical teaching skills. Although linear developmental research suggests that each stage a learner reaches results in a gradual improvement from the previous stage, there is limited evidence to support cohort-based results in terms of digital skills performance. As a result, there is a misalignment between previous literature and the current study results.

Usage of Digital Learning Resources among Pre-service Language Teachers

To determine the use of DLRs among the pre-service language teachers, the following results indicate no significant difference between groups in how they used digital academic and communication tools. The Kruskal-Wallis test results for each digital learning resource are as follows: Digital academic tools $\chi^2(2) = 4.105, p > .05$, digital communication tools $\chi^2(2) = 2.887, p > .05$, and digital productive tools $\chi^2(2) = 18.510, p < .05$. There was a statistically significant difference in the study participants' use of productive digital tools. Hypothesis *H1b* is rejected for the use of digital productive skills, however *H1b* is retained for the use of digital academic tools and digital communication tools.

Table 2. Usage of Digital Learning Resources (DLRs)

Technical Knowledge	Level	N	Mean	Chi-Square	df	Asymp. Sig.
Digital academic tools	First-year	115	188.73	4.105	2	.128
	Second-year	141	205.24			
	Third-year	154	218.26			
Digital communication tools	First-year	115	190.89	2.887	2	.236
	Second-year	141	206.34			
	Third-year	154	215.64			
Digital productive tools	First-year	115	172.72	18.510	2	.000*
	Second-year	141	200.44			
	Third-year	154	234.61			

*Significant at $p < .05$

The results in Table 2 demonstrate that pre-service language teachers were more proficient in their use of word or text processing tools, communicating a narrative using texts and images, and demonstrating their abilities in sharing music, images, or short video clips. Limited use of digital academic tools appeared attributable to limited access to technological resources. Similar trends have been reported by Kajee and Balfour (201) in South Africa. These results demonstrate that the pre-service English language teachers can use references/resources such as dictionaries, e-books, topic blogs, and topic-focused websites as information resources on one hand although, there was no evidence of the participants' dynamic modelling or simulation abilities. While the participants' use of mobile devices is supposed to support digital communication tools (DCTs) fully, there were limitations noted in their application of the same tools for academic purposes. As such, this study argues that the DCTs are not coded for easy transferable skills and information, which limited the ability of the pre-service language teachers to seize the opportunity to use these resources for teaching and learning language. Rivoltella (2008) argues that as an educational model, digital learning is supposed to be structurally virtual and accept transference and knowledge updating. But still, the educational institution is in question when it comes to whether transference of digital knowledge is still its primary task or whether point-and-click demos are the best way to transfer skills (Sharkey & Brandt, 2008). These arguments confirm the compartmentalisation of skills among pre-service language teachers, which impedes the current and future application of digital skills in language teaching and learning contexts. Moreover, the conditions for preparing language teachers to become digitally literate are not fully and effectively integrated, let alone being operational in this context of the study, hence this observable anomaly.

In other contexts, studies have indicated that the possibility of preparing digitally-literate teachers where a singular course is offered on the latest digital tools and resources is not necessarily successful. Indeed, these practices do not only offer teachers with limited authentic experiences using and learning about technology in their content areas but also often make them feel grossly under-prepared for the classroom (Ottenbreit-Leftwich, Brush, Strycker, Gronseth, Roman, Abaci, van Leusen, Shin, Easterling, & Plucker, 2012; Tondeur, Van Braak, Sang, Voogt, Fisser, & Ottenbreit-Leftwich, 2012; Virmani & Williamson, 2015).

Difficulties participants faced in applying digital skillsets

Apart from establishing the participants' digital skills through self-assessment, the study identified areas in which they faced challenges. The digital skills were first listed using a Likert scale for study participants to rank items based on their perceived level of difficulty between 1 (very difficult) and 5 (very easy). In this regard, we evaluated whether the number of pre-service language teachers who faced difficulties using technology for academic purposes was equal to the number of students who did not face any difficulties. The data was analysed using a chi-square goodness-of-fit test. The *H1c* null hypothesis was retained, $\chi^2(2) = 4.106, p > .05$. More than half of the pre-service language teachers faced such difficulties when using technology for academic purposes. Table 3 presents results from a Kruskal-Wallis test that categorised the skill sets into DAT, DCT, and DPT factors:

Table 3. *Difficulties Experienced in Skills Levels of Students*

Technical Knowledge	Level	N	Mean	Chi-Square	df	Asymp. Sig.
Digital academic tools	First-year	115	185.99	4.704	2	.095
	Second-year	141	217.19			
	Third-year	154	209.37			
Digital communication tools	First-year	115	185.58	7.058	2	.029*
	Second-year	141	201.87			
	Third-year	154	223.70			
Digital productive tools	First-year	115	172.72	18.510	2	.000*
	Second-year	141	200.44			
	Third-year	154	234.61			

*Significant at $p < .05$

The study results indicate that the pre-service language teachers acknowledged facing difficulties in applying technology. More than half of the pre-service

language teachers indicated that they faced difficulties using technology for academic purposes, hence making DATs pose the most difficulties. Gonzalez-Vera (2016) noted similar experiences in her study on the application of technology in foreign language learning. She discovered that the difficulties encountered were a result of the learners finding mastery of the tools introduced to be time-consuming and complicated. Other studies have associated such difficulties with critical literacy skills that require learners to think about their responses to and not treat the technology as the problem (Santos Costa & Xavier, 2016). In this study, the students engaged in academic activities that included using mobile devices to learn English, using the university learning management system (LMS) to access course materials, and using digital platforms to do their assignments and view their results. The students also reported using mobile apps for learning and getting course content, vetting the authenticity of online information, and determining the sources of online information and the viewpoint of online information.

Relationship between digital literacies and digital learning resources

Eshet-Alkalai's (2004) categorisation of digital literacies proposes a conceptual framework for more precise identification of skills as an integral part of determining digital literacies. A Kruskal-Wallis test was performed on the participants' self-assessment of their digital literacies. The findings indicated that there were statistically significant differences in writing $\chi^2(2) = 20.784, p < .05$, reproduction literacy $\chi^2(2) = 13.377, p < .05$ and information literacy $\chi^2(2) = 6.429, p < .05$. However, there was no statistically significant difference in socio-emotional literacy $\chi^2(2) = 2.268, p > .05$. These findings demonstrate the need to establish whether there is a correlation between digital literacies and digital learning resources identified by Zehler, Yilmazel-Sahin, Massoud, Moore, Yin, and Kramer (2012). To facilitate such analysis, data from the Likert items was transformed to generate means. Therefore, a correlation coefficient was computed to examine the intercorrelations of the variables and determine whether there was a statistically significant association between digital literacies and digital learning resources. All the items were skewed as follows, writing literacy (-.724), socio-emotional literacy (.019), reproduction literacy (-1.023), information literacy (-.012), digital academic tools (-.244), digital communication tools (.542), and digital productive tools (-.275). Thus the Spearman rho statistic was calculated and the results are presented in Table 4. The direction of the correlation was positive for all the items implying that the pre-service language teachers who possess advanced digital literacies tend to perform better in their application of digital learning resources in the teaching and learning processes. The strongest positive correlation, which would be considered a very large effect size, was between writing literacy

and digital production tools, $r_s(407) = .84$, $p < .001$, information literacy and digital academic tools, $r_s(407) = .77$, $p < .001$ and, socio-emotional literacy and digital communication tools, $r_s(407) = .78$, $p < .001$. Similar trends were noted for digital academic tools and information literacy and digital productive tools and reproductive literacy. In other words, every pre-service English language teacher who had higher digital literacies could potentially perform better in applying the corresponding digital learning resource.

Table 4. *Correlation between Digital Literacies and the Use of Digital Learning Resources*

Items	WL	SL	RL	IL	DCT	DAT	DPT
Writing literacy (WL)	-	.477**	.615**	.562**	.511**	.607**	.837**
Socio-emotional literacy (SL)		-	.544**	.476**	.776**	.518**	.627**
Reproduction literacy (RL)			-	.560**	.518**	.623**	.741**
Information literacy (IL)				-	.495**	.774**	.599**
Use of digital communication tools (DCT)					-	.612**	.559**
Use of digital academic tools (DAT)						-	.624**
Use of digital productive tools (DPT)							-
Mean	4.03	3.10	4.22	3.49	3.12	3.81	3.75
Standard Deviation	0.73	0.92	0.59	0.82	0.63	0.58	0.69

** . Correlation is significant at the 0.01 level (2-tailed).

The findings indicated that there was a strong positive correlation with a larger than typical effect size between three pairs of digital literacies and DLRs – writing literacy (WL) and digital production tools, information literacy (IL) and digital academic tools, and socio-emotional literacy (SL) and digital communication tools. Other pairings had positive correlations with medium to larger than typical effect sizes (See Table 4). The study did not show optimal results for reproduction literacy, however a prominent study by Eshet-Alkalai

(2002) has reported that older participants were the most reproductive literate learners and possessed abilities in re-using and moulding prior information into new forms of knowledge. Nikou and Aavakare (2021) in their study on the interplay between digital literacy and technology in higher education found that higher levels of IL among university students and staff influences their use of digital technology for learning and teaching purposes in addition to enhancing productivity. Also, they argue that individuals with high literacy skill levels can apply digital technologies in teaching and learning with relative ease and better performance than those with lesser skills. Their predictions are consistent with the findings of the current study.

TPACK and the ecology of pre-service language teacher preparation

As previously mentioned, the duration of training the pre-service language teachers is three years at the University of Dar es Salaam. English language teaching content courses and general education courses are taught throughout the programme. The programme also offers teaching practice placements for 16 weeks divided equally between the first and second years of learning. However, an introductory pedagogy course is only taught in the first year and the language teaching methods course is taught in the second year of study. Also, the university offers a course in educational media and technology in the second year of study. The Educational Media and Technology course is designed to introduce students to the concept, production, and application of instructional media. The course content includes modules on management and use of overhead projectors and familiarisation with emerging technologies. The module on emerging technologies is unfortunately limited to displaying and demonstrating modern electronic equipment for effective communication. At the end of the course, the students are required to develop an instructional media project of their choice (UDSM, 2020).

With this context in mind, we managed to collect data only related to the Technology Knowledge (TK) and the Technological Pedagogical Knowledge (TPK) aspects of the TPACK. A Kruskal-Wallis test was performed on the TK of the participants. The findings indicated that there was a statistically significant difference $\chi^2(2) = 12.699, p < .05$ with a mean rank TK of 178.01 for first year students, 201.67 for second-year students, and 229.54 for third-year students. Pair-wise comparisons indicated significant differences between first and third-year students and not for the other pairs. These findings imply that the pre-service language teachers possessed TK abilities that could be supported by the duration of the programme with continued access to such technology. Similarly, a Kruskal-Wallis test was performed on the TPK of the participants. The findings indicated that there was no statistically significant difference χ^2

(2) = 1.478, $p > .05$, and, therefore, the *H1d* hypothesis was rejected. The mean rank TPK was 194.43 for first-year students, 211.83 for second-years, and 207.97 for third-years. These findings indicate that the pre-service English language teachers' digital skills to enable their pedagogical activities do not necessarily project as expected. Therefore, the context for preparing digitally literate pre-service teachers has not been successful. A standalone course in educational media and technology has failed to provide experiences that would aid the future use of these technologies in actual language teaching. Similar observations have been made in other studies such as Ottenbreit-Leftwich et al. (2012), Tondeur et al. (2012), Virmani and Williamson (2015).

Conclusion

This study has explored the possibility of harnessing the digital literacies of undergraduate pre-service English language teachers to transform language teaching and learning. The study has accomplished this purpose by applying Eshet-Alkalai's (2004) model of digital literacy, aspects of the TPACK model (Mishra & Koehler, 2009), and an adaptation of the classification of digital learning resources (DLR) developed by Zehler, Yilmazel-Sahin, Massoud, Moore, Yin and Kramer (2012). Moreover, the study adopted quantitative methods to analyse data collected from three cohorts of participants (first-, second- and third-year undergraduate pre-service English teachers). Its results support prior research on the effect that the age of learners does not necessarily influence their use of digital technologies for teaching and learning (Burton, et.al., 2015) but rather accumulated experience does (Virmani & Williamson, 2016). Similarly, the duration of accessing teacher education coupled with exposure to the use of technology in learning and teaching at the university influenced usage (Bevort & Bréda, 2008). Significantly, the study found that participants had limited adaptive transfer capacities of digital skills from non-academic purposes to academic purposes. These findings are further supported by Kajee and Balfour (2011) whose study attributed challenges to using digital technologies to limited access. These findings are also consistent with Virmani and Williamson (2015) who found limitations in offering authentic experiences in the preparation of digitally-literate teachers. Furthermore, Virmani and Williamson's (2015) proposition is strongly supported by the findings that demonstrated that the digital skills of the participants do not enable their pedagogical activities, and therefore harnessing these skills would require concerted efforts and time.

Overall, the findings have pedagogical implications for both policy and practical use of digital resources for teaching and learning in universities with limited access points for their students. To begin with, evidence from the digital literacy

practices of the pre-service English language teachers suggests that they possess minimal access to digital technology outside the university context and before joining the university. An over-reliance on mobile devices, on their side, for accessing content demonstrates a possible shift towards ‘mobile literacies’ as a form of digital literacy (Parry, 2011). The Ministry of Education, Science and Technology ought to consider mobile literacy as a crucial format for learning. The adoption of mobile literacy in Tanzanian higher learning institutions shall require deliberate efforts to code transferable skills to language teaching and learning. García-Martin, Merchant and García-Sánchez (2016) and Parry (2011) argue that teachers must help learners to get onto the right side of the digital divide by teaching learners how to apply technologies effectively. Unfortunately, a standalone course on educational media and technology cannot support the adoption of technologies for teaching let alone accessibility to resources on the ground.

Second, experience from other studies (see, for example, Horlescu, 2017) has exposed limited interrogation of language teachers’ TPACK. Similarly, this study has only interrogated the TK and TPK dimensions of TPACK due to the fact that other dimensions were not fully supported. Kramsch (2008, p. 403) has cautioned that teachers of foreign and second languages are ‘teachers of meaning’ and not ‘teachers of linguistic codes’. As such, there is a pressing need to reconcile language learning and teaching with approaches to fostering digital literacies. Notably, focusing on TK and TPK does not necessarily render other aspects of TPACK valueless. Third, this study serves as a starting point for universities to design pre-service English language teachers’ programmes and engage appropriate and relevant technologies in enhancing their teaching and learning capacities. Finally, due to the study design and the nature of data collection of the current study, the generalisability of its findings to other universities is limited and can only be done based on the similarity of operational context. Thus, future studies should seek to broaden their perspectives in investigating digital literacies in terms of the linguistic codes used by language learners and online language instruction. In addition, these studies may consider triangulating other factors that could influence the application of digital resources in language teaching and learning.

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