Volume 1 | Issue 2 | 2021

http://langedutech.com

Language Education & Technology

A Review on Technology Competencies of Language Teacher Educators via Web of Science Database

Yaşar Erdin[a] *

[a] Beykent University, Turkey; https://orcid.org/ 0000-0002-5309-7470

Suggested citation: Erdin, Y. (2021). A Review of the Literature on Language Teacher Educators' Technology Competence. *Language Education and Technology*, 1(2), 79-89.

Article Info

Date submitted: 02.02.2022

Date accepted: 09.02.2022

Date published: 10.02.2022

Review Article

Abstract

Technology integration into education has become inevitable in the 21st century and been found to provide lots of advantages. Unfortunately, technology is not benefited in today's classrooms at a satisfactory level. There are many and various factors effective in this regard. Technology-related practices during teacher training is one of them. Teachers must gain the belief in the usefulness of technology during their pre-service. Only then will they use it willingly and effectively. To have them form this belief, responsibilities fall on the shoulders of teacher educators. At this point, their technology competence comes into prominence. Starting off with this idea, the present study focuses on language teacher educators' technology competence and aims to find out what the current literature holds concerning this issue. To this end, the Web of Science database was reviewed using the keywords "language teacher educators" and "technology". Only 6 studies appeared, which indicates that this is an understudied topic and needs more consideration. Despite the limited number, the studies reviewed provided useful insights. They showed that language teacher educators' technology competence is a context-specific phenomenon. Having good social relations with colleagues affects their technology use positively. Policy and hierarchy were found to affect language teacher educators' technology use.

Keywords: Language teacher educators, technology competence, digital literacy, technology use

1. Introduction

Lots of innovations have been introduced into our lives with the 21st century. Most of them have developed out of technology. Language education has also taken its share from this development. To illustrate, intelligent personal assistants such as Google Assistant, Alexa and Siri have been successfully integrated into language classrooms (Dizon, 2020), image-to-text recognition software was found to assist learners in acquiring vocabulary (Shadiev et al., 2020); tailor-made animated cartoons were proven to have positive impact on learning punctuation (Bakla, 2019); social robots started to be used in class with success (Vogt et al., 2019); augmented reality was successfully incorporated into teaching (Lee, 2020); computers are now able to evaluate open-ended written assignments (Hockly, 2019). Thanks to these advancements, education has become much more different than it used to be. Besides, it does not have to

* Corresponding author: Yaşar Erdin, School of Foreign Languages, Beykent University, Turkey.
e-mail address: yasarerdin@yahoo.com

take place between walls any longer due to the emergence of online education, blended learning, flipped classroom, massive open online courses, virtual classrooms etc.

Despite offering such advantages, "the use of ICT (Information and Communication Technology) in schools is still not satisfactory, in terms of both quality and quantity" (Raman et al., 2019, p.425). Many barriers to technology integration have been identified in the literature. Francom (2020), for instance, identified five categories of barriers based on the previous literature, which are "access to technology tools and resources, training and technical support, administrative support, time to prepare for technology integration, and teacher beliefs about the value of technology tools and resources, and personal ability to use these tools and resource" (p.1). Similarly, the barriers that Hamutoglu and Basarmak (2020) identified are as follows:

> "beliefs towards learning-teaching activities, beliefs towards the expert support, technological self-efficacy beliefs, family resistance, assessment, and pedagogical self-efficacy beliefs, [which] are located under internal barriers and … lack of vision, lack of money, lack of training, infrastructure, content, and time [which] are all part of external factors" (p.18).

In addition, Ertmer (1999) probably introduced the most well-known distinction between technology barriers. She stated that there are first- and second-order barriers to technology integration into education. The former, i.e. external barriers, refer to barriers external to teachers. For instance, insufficient access to technological devices, lack of technology training and support etc. On the other hand, the latter, i.e. internal barriers, refer to those internal to teachers. For instance, their beliefs on the usefulness of technology in class, their technology competence etc. As observed, these different identifications of barriers do not contradict with each other, but they bring an explanation to the issue from different perspectives.

Digital competence plays a significant role in the elimination of these barriers. It is one of the most required skills in the 21st century. In the same vein, the European Union listed digital competence among the competences for lifelong learning, and these are "communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, and cultural awareness and expression" (European Union, 2006, p. 13). Ferrari (2012) defines digital competence as follows:

> the set of knowledge, skills, attitudes, abilities, strategies and awareness that are required when using ICT (Information and communications technology) and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning and socialising (p. 30).

This definition holds that digital competence is not only concerned with how competent a person is in using digital devices. It is a more complex phenomenon than that. Teachers' digital competence, on the other hand, is even more complex in that they are also supposed to transfer what they know to their audience (Krumsvik, 2008). This complexity is also revealed by ISTE (International Society for Technology in Education) Standards, according to which, educators have to "facilitate and inspire student learning and creativity", "design and develop digital age learning experiences and assessments", "model digital age work and learning", "promote and model digital citizenship and responsibility", and "engage in professional growth and leadership" (ISTE, n.d.). However, teacher-training institutions seem to fail to

produce such teachers since pre-service and early-career teachers do badly in incorporating ICT in their lessons (Batane & Ngwako, 2017; Tondeur et al., 2012; Tondeur et al., 2016). The teacher training that a teacher candidate receives will be effective in how he/she will teach in the future, his/her self-efficacy and attitudes towards integrating technology (Chen, 2010). Therefore, technology integration must be an indispensable part of teacher-training curricula (Drummond & Sweeney, 2017; Krumsvik, 2014), but it does not seem so (Instefjord & Munthe, 2016). Although they receive courses about technology integration, early-career teachers do not feel themselves competent in it (Demir et al., 2011; Tondeur et al., 2017) which indicates the problems in teacher training. Pre-service and early-career teachers of today do not seem to possess must-have skills of the 21st century though they are members of the most digital native generation (Mouza et al., 2014). To get the most out of technology use in class, teachers must possess TPACK (Technological pedagogical content knowledge) (Koehler & Mishra, 2009). In addition, their beliefs affect their classroom practices even more than what they know does (Pajares, 1992), so pre-service teachers should be convinced in the effectiveness of technology use in class. In the same vein, Mei et al. (2018) discovered that their beliefs about ICT integration and their attitudes towards it, and their attitudes and their technology self-efficacy are positively related. Thus, teacher-training programmes must be designed in a way to internalize this multifaceted relationship. Today, most of them attempt to have pre-service teacher acquire technology integration skills via single one-term long courses, and this conflicts with the idea of integration. Therefore, universities fail to produce technology-competent teachers (Herro et al., 2021; Instefjord & Munthe, 2016; Uzun, 2016).

Brenner and Brill (2016) investigated the barriers to technology integration experienced during pre-service training, and revealed that co-workers' attitudes, lack of cooperation between pre-service teachers, insufficient time and infrastructure, insufficient guidance from their schools, insufficient technology-integrated courses, and lack of opportunities to practice are among the barriers. Besides, technology integration is attempted to be taught via stand-alone semester-long courses, and this is at odds with the idea of integration (Foulger et al., 2017). "If the use of technology to enrich learning is ever to become effective, we must stop regarding it as a separate entity and see it as part of everyday instruction" (Johnson, 2013, p. 84). Another issue to be considered in this regard is teacher educators' technology proficiency, which forms the focus of the present study. Concerning this issue, Uerz et al. (2018) states that "teacher educators first need to be able to use technologies themselves and understand how they work" (p.17). Their technology competence did not receive attention as much as pre- or in-service teachers' until Foulger et al.'s (2017) study. Having realized this gap in the literature, Foulger et al. (2017) introduced Teacher Educator Technology Competencies (TETCs), in which there are 12 competencies concerning knowledge, skills, and attitudes that each teacher educator must have. These are provided below:

1. Teacher educators will design instruction that utilizes content-specific technologies to enhance teaching and learning.

2. Teacher educators will incorporate pedagogical approaches that prepare teacher candidates to effectively use technology.

3. Teacher educators will support the development of the knowledge, skills, and attitudes of teacher candidates as related to teaching with technology in their content area.

4. Teacher educators will use online tools to enhance teaching and learning.

5. Teacher educators will use technology to differentiate instruction to meet diverse learning needs.

6. Teacher educators will use appropriate technology tools for assessment.

7. Teacher educators will use effective strategies for teaching online and/or blended/hybrid learning environments.

8. Teacher educators will use technology to connect globally with a variety of regions and cultures.

9. Teacher educators will address the legal, ethical, and socially-responsible use of technology in education.

10. Teacher educators will engage in ongoing professional development and networking activities to improve the integration of technology in teaching.

11. Teacher educators will engage in leadership and advocacy for using technology.

12. Teacher educators will apply basic troubleshooting skills to resolve technology issues (Foulger et al., 2017, pp.432-433).

With all these in mind, the present study aims to reveal what the current literature holds about language teacher educators' technology proficiency through a literature review.

2. Methodology

In line with the aim mentioned above, the studies published in Web of Science (WoS) database were reviewed. The keywords "language teacher educators" and "technology" were looked up between quotation marks by choosing "topic" criterion, which searches for titles, abstracts, author keywords and Keywords Plus within the database. Six studies appeared, which were published between 2013-2021. The details of the studies are provided in Table 1.

The studies by Akayoglu et al. (2020), Kuure et al. (2016) and Roux et al. (2014) were excluded from the study since they are not related to language teacher educators. As a result, three studies (Andema et al., 2013; Moradkhani, 2017; Rubadeau, 2018) were investigated.

3. Results and Discussion

3.1. Research Methodologies

Andema et al. (2013) performed a descriptive qualitative case study with 6 Ugandan teacher educators to examine their digital literacy. This study was a part of comprehensive project run by the University of British Columbia in Canada. The researchers aimed to obtain insights into the participants' digital literacies and practices. They carried out field observations and collaborated with the participants. Two questionnaires were applied at the beginning and end of the research process. They also organized two workshops and held a focus group interview. The participants were asked to keep a journal reflecting their experiences and take part in group discussion when they could.

Table 1

Details of the reviewed studies

Akayoglu, S., Satar, H. M., Dikilitas, K., Cirit, N. C., & Korkmazgil, S. (2020). Digital literacy practices of Turkish pre-service EFL teachers. *Australasian Journal of Educational Technology*, *36*(1), 85–97. https://doi.org/10.14742/ajet.4711
Andema, S., Kendrick, M., & Norton, B. (2013). Digital literacy in Ugandan teacher education: Insights from a case study. *Reading & Writing*, *4*(1), 1–8. https://doi.org/10.4102/rw.v4i1.27
Kuure, L., Molin-Juustila, T., Keisanen, T., Riekki, M., Iivari, N., & Kinnula, M. (2016). Switching perspectives: From a language teacher to a designer of language learning with new technologies. *Computer Assisted Language Learning*, *29*(5), 925–941. https://doi.org/10.1080/09588221.2015.1068815
Moradkhani, S. (2017). Language teacher educators' pedagogical knowledge: Validating a proposed model Iranian Journal of Language Teaching Research. *Iranian Journal of Language Teaching Research*, *5*(2), 91–111. https://doi.org/10.30466/ijltr.2017.20332
Roux, R., Trej Guzman, N. P., & Fernanda González, E. (2014). Distance Education for EFL Teachers: Perceptions of Learner Support. *Gist Education and Learning Research Journal*, *9*(July-December), 157–178.
Rubadeau, K. (2018). Internal and external forces: Technology uses among English language teacher educators in South Korea. *Australasian Journal of Educational Technology*, *34*(5), 44–57. https://doi.org/10.14742/ajet.3369

Moradkhani (2017) aimed to find out the constituent elements of language teacher educators' pedagogical knowledge and to examine the differences between the opinions of teachers, teacher educators and university professors. In this mixed-methods study, data were collected from 436 participants (teachers, teacher educators and professors) in the quantitative phase, and from 15 (5 teachers, 5 teacher educators and 5 professors), who were selected via purposive sampling, in the qualitative phase. First, the qualitative data were collected via a questionnaire, and semi-structured interviews were carried out to collect qualitative data.

Arguing that "technology-related roles and practices of teacher educators" (p.44) has received very little attention in the literature, Rubadeau (2018) investigated internal and external factors affecting the use of technology among English language teacher educators in South Korea. In this in-depth instrumental multiple case study, data were collected in a 20-week long period. There were 5 key participants who were native English language teacher educators, and they employed 9 non-Korean teacher educators. The researcher conducted 4 one-on-one interviews, and 2 classroom observations with each teacher educator.

3.2. Summaries

As a result of their extensive study conducted in Uganda, where great efforts have been exerted aiming at technology integration, but not much is known regarding their outcomes, Andema et al. (2013) found out three main themes "ICT and educational policy, ICT and educational practice, and ICT use by teacher educators" (p.3). Regarding the first theme, the researchers were informed by the interview with the

Ugandan Minister of ICT and some national policy documents related to education. These revealed that Uganda has a detailed policy and a good vision towards integrating ICT. Regarding ICT and educational practice, the institution they observed did well in promoting ICT thanks to the support they had received. However, there were still attempts that had not achieved their aims, which were the ICT training the participants had received; their use of ICT for both professional and personal reasons; and the challenges they had experienced in using digital technology (Andema et al., 2013). The semi-structured interviews revealed that 5 of the participants received some kind of formal training in ICT. The remaining one learnt how to use computers informally thanks to a friend, which shows how significant informal network is in this regard. Their statements indicated that they were all dedicated to train themselves in ICT use. As for their use of ICT for professional reasons, they stated they mostly used ICT to prepare for their lectures and lecture notes. Their remarks also showed that ICT eased their burden, improved their attitudes towards teaching, enhanced their teaching, helped them keep a question bank, and helped them establish a professional network in which they exchange and discuss ideas, share articles and materials, and assist each other. As for their use of ICT for personal reasons, the participants reported that they used ICT to send and receive e-mails, to keep up with news, to receive information about health, and to entertain themselves. Next, the challenges the teacher educators face while using ICT were identified. These are limited access to ICT facilities and the internet, small computer lab, electricity outages, inadequate training, and materials irrelevant to the local context. The researchers introduced eGranary to partly eliminate these challenges. It is "an offline digital library that comprises of a 750 GB hard drive with specialised browsing software, which can be attached to a personal computer or a local area network" (Andema et al., 2013, p.7), and it yielded positive outcomes such as providing internet access to areas with inadequate resources, developing ICT skills, and faster and cheaper internet connection.

Investigating language teacher educators' pedagogical knowledge, Moradkhani (2017) aimed to propose and validate a questionnaire. To this end, he conducted a thorough review of literature on teacher educators and their pedagogical knowledge. Based on his findings, he came up with a questionnaire with 47 items under 11 factors. The first factor is knowledge of teacher education, which holds that teacher educators ought to possess basic knowledge about curricula and materials to be used in a teacher education program, how to transfer their knowledge to pre-service teachers, and teacher assessment. Knowledge of ELT-related theories and knowledge of relevant disciplines constitute the second and third factors. Thanks to these components, theoretical foundations of teaching and learning could be provided. The fourth factor is knowledge of technology, which is related to the purpose of this study, and it involves being competent in using digital devices well, and teaching teachers how to use them effectively in their classes. The next factor is knowledge of the context, which refers to being acquainted with the social, economic, and ethnic structure of where teaching takes place. Knowledge of research, another factor, refers to teacher educators' knowledge of research designs and processes. The next one is knowledge of social relations, and it is related to establishing rapport with co-workers, educational shareholders, and pre-service teachers. Another component is knowledge of language-related issues, which incorporates teacher educators' proficiency in the language they teach, being acquainted with the culture of that language, and metalinguistic awareness. The next one is knowledge of teachers, which refers to being aware of teachers' needs and emotional well-being. Finally, knowledge of socio-political issues indicates "the importance of teacher educators' knowledge of the power hierarchy in the educational context" (Moradkhani, 2017, p.100) and the impacts of political and social elements on teacher education. The results obtained within the scope of this study can be used to investigate teacher educator applicants' knowledge. The questionnaire the researcher developed could also be benefited in developing a test that assesses pedagogical knowledge of teacher educators. The differences observed between the three groups of participants is an indicator that pre-service teachers start their training with some expectations that do not comply with the aims teacher educators set. At the beginning of the program, both parties ought to negotiate over the aims and objectives. If effective communication is established between all

shareholders, common expectations may be set, which would lead to more effective teacher education programs.

In her multiple case study, Rubadeau (2018) examined internal and external forces effective in integrating digital technologies into English teacher educators' teaching practices. She identified 5 key forces, namely perceived market pressure, downward force from an accredited program, a hierarchy of program directors, coordinators, and teacher educators, teacher educators forcing trainees to use technologies, and individual teacher educators forcing themselves to adopt a behaviour. In addition to being considered as a profession or service, ELT could also be considered as a business. Due to market-related forces, institutions might have to take pragmatic measures. The researcher also states that creating an attractive external image of an institution is a significant force. Uploading a nice video on the website, making the building look architecturally more attractive etc. could indirectly improve the status of that institution. Such forces are also effective at individual level. Teacher educators tend to use their credentials to attempt to make themselves more visible on blended learning and online platforms so as to attract their peers and potential employers, or to network. As for the second force, the researcher mentioned that there are several reasons forcing institutions to receive credibility and accreditation from a transnational institution. The accrediting institution mentioned in this study hold that "though content could be adapted, adherence to a general curriculum and syllabus was compulsory; creating a course on technology use, for example, would require approval" (Rubadeau, 2018, p.49). This could create extra burden on teacher educators, and jeopardize the accreditation status of the institution. The next force is related to a hierarchy of program directors, coordinators, and teacher educators. The researcher observed that the participants were autonomous teacher educators, and there was a strong collaboration between them, which also positively affected ICT adoption within the institution. However, regarding decisions on technology integration, organisational hierarchy played an important role. As blended learning programs began to emerge, this hierarchy became more visible. Some teacher educators were eager to take part and improve themselves in online teaching while some were disappointed since they were asked to prepare a new program in exchange of little extra income and what they were asked was not within the limits of their work contract and was beyond their training. The fourth force is teacher educators forcing trainees to use technologies. The teacher educators participating in this study were forcing to educational technologies such as, Google+ or ClassJump. They were found to offer affordances and increase performance. However, training should be provided to guarantee that these options are effective. The participants employed technology integration and expected high performance in return in spite of difficulties in effort expectancy. The final force Rubadeau (2018) found was individual teacher educators forcing themselves to adopt a behaviour. Teacher educators put themselves under pressure to implement ICT. This could be due to social influence, market factors or their self-perception.

3.3. Discussion

Although the number of studies on language teacher educators' technology proficiency that have been published in the WoS database is very limited, they have provided detailed and significant insights into the current status of this multifaceted phenomenon. Highlighting the context-specific nature of technology use, Schmitz et al. (2022) "found country-specific patterns, with a higher negative impact of technological barriers in less technologically developed countries and teacher-belief related barriers prevalent in developed countries" (p.1). Having been conducted in three different countries, namely Uganda, Iran and South Korea, these studies helped their readers observe different patterns of technology use. To illustrate, Andema et al. (2013) state that making use of PowerPoint presentations in class is considered as an unusual and relatively novel practice in Uganda while it is considered obsolete in western countries today. On the other hand, Rubadeau (2018) describe South Korea as a "technology-rich nation" (p.44), where using cutting-edge digital technologies in class is considered normal. These differences reflect on teacher educators' attitudes as well. For instance, those in Uganda seemed to be more enthusiastic and to exert

more efforts than the others to keep up with technological developments, but they suffer from insufficient internet access and technology training, expensive internet costs, frequent power outages, and materials inappropriate to the Ugandan context (Andema et al., 2013). These barriers are not likely to be observed in developed countries, where other problems arise. For instance, Rubadeau (2018) stated that some South Korean teacher educators feel discontented as they are expected to make use of technology for educational purposes, but they are not paid in return and this exceeds their responsibilities.

All these studies revealed that establishing social ties with related parties is of great significance in terms of language teacher educators' technology competence. To illustrate, Andema et al. (2013) highlighted the importance of both informal and professional networking. Language teacher educators may receive technology-related assistance from their peers informally, or they might establish a professional network in which they share ideas and materials, and hold discussions. Moradkhani (2017) also signified how significant it is for language teacher educators to establish good relations with other related parties. In the same vein, Rubadeau (2018) underlined that strong collaboration between language teacher educators affects ICT integration attitudes in a positive way.

These studies also showed that issues related to policy and hierarchy are of common concern in all of them. The policy ministries of education and other institutions apply is effective in the process. In the same vein, "ICT and educational policy" (Andema et al., 2013) is listed among three main themes effective in technology adoption. Moradkhani (2017), on the other hand, stated that knowledge on political elements and hierarchy-related issues concerning language teacher education affect technology practices. Rubadeau (2018) also listed "a hierarchy of program directors, coordinators, and teacher educators" among effective issues.

The studies also revealed the context-specific nature of language teacher educators' technology use. Andema et al. (2013) implied that course materials sometimes do not conform with the context of the country in question. Focusing on the same issue, Moradkhani (2017) argues that language teacher educators ought to be familiar with the social, economic, and ethnic structures of that country.

4. Conclusion

The studies reviewed within the scope of this study revealed some common findings and various insights concerning language teacher educators' technology-related practices. The review indicated the context-specific nature of technology use of language teacher educators, who perceive the use technology for educational purposes differently in different countries. In addition, having good relations with colleagues was observed to have positive impact on technology use and integration in class. Finally, all studies showed that policy and hierarchy have effects on language teacher educators' technology-related practices.

5. Limitations and Suggestions for Further Research

Only studies published in the WoS database were reviewed within the scope of the present study. A review of other databases would have provided more in-depth insights into language teacher educators' technology use.

As observed, there is very scarce literature on this issue, so conducting studies similar to those reviewed in this study in different contexts will yield meaningful data.

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