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Technology use in secondary level of English language teaching: A literature review

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Technology has been widely used in the education field, especially for teaching language. Many teachers and students believe in the advantages of technology to enhance language learning. There have been many studies investigating the use of technology in secondary language classrooms. Some studies approve that technology can be applied to increase students' language competence. This paper comprehensively analyzed the use of technology for English language teaching in the secondary level based on empirical studies. Fifty-seven selected articles from reputable journals and publishers were reviewed to identify the trends in technology use, types and purposes of technology use, and challenges and solutions encountered in the implementation of technology in ELT secondary levels are scrutinized in this study. Results have indicated that the study on technology use in ELT secondary level is consistently growing over the time, but future studies need to conduct more in qualitative or mixed-method research and there is also an urgency to examine the effectiveness of technology in listening, speaking, and reading skills. To sum up, the need to emphasize on the integration of technology, pedagogy, and language content in proper ways should be taken into account in order to obtain more meaningful future studies. Some potential topics for future research are discussed further in this study.

Keywords: English Language Teaching (ELT), secondary level, technology use

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INTRODUCTION

There is a growing body of literature that recognizes the importance of technology in English language teaching in 21 era of education. Many studies revealed the effectiveness of technology application in enhancing language learning as it assisted the teaching and learning activities of language skills and competencies for any levels of education (Bhattacharjee & Deb, 2016; Boonyopakorn, 2016; Ghavifekr & Rosdy, 2015; Graham et al., 2019; Lee et al., 2020; Radhakrishnan, 2017; Zhang & Zou, 2020).

Technology, in the form of ICT has provided teachers and students with vast learning resources for teaching language. Digital materials enable teachers to improve their creativity in material development as well as allow students to improve their English. E-book as digital learning material has proven to be more effective and attractive for language learners in reading comprehension and vocabulary enrichment (Hsieh & Huang, 2020; Love et al., 2017; Turchi, 2020).

Technology also supports language teaching strategy and improves students writing ability. Computer-assisted language learning application helps students to create the better composition and improve their writing skill. It also supports teachers with a variety of material resources, teaching strategy and methods in giving clear instruction for assignments and assessments in writing courses (Curcic & Johnstone, 2016; Engeness, 2018; Ha, 2016; Lee et al., 2020; Morgan & Chenowith, 2017; Park et al., 2018; Syafryadin, et al. 2021).

Many studies exposed that technology is able to enhance students' English skills and motivate students in language learning. Some research findings showed that technology is effective in improving student speaking performance (Ahn & Lee, 2016; Hwang et al., 2016) and listening ability (Hong et al., 2016; Hwang et al., 2016). Technology support students' self-regulated learning with the technology tools and applications that were able to give feedback on their speaking production as well as assessed their listening comprehension.

Along with the increasing interest and number of publications, several studies have been conducted reviewing the use of technology applications and devices for ELT. The result showed that the technologies were successful in generating students' motivation and autonomous learning as well as catering positive learning environments and resources. Yastibas & Yastibas (2015) reviewed literature and found out that e-portfolio-based assessment developed students' self-regulated learning in ELT. Ahmed & Nasser (2015) investigated the benefits of utilizing IPad in the ESL classroom and revealed that IPad paved the way for more motivating and engaging English language learning. It also provides information that guides ESL teachers in choosing appropriate apps for transformative lessons and information on apps that have been used in ESL classrooms.

Some studies also reviewed Facebook (Barrot, 2018); a digital game-based (Acquah & Katz, 2020); and Geospatial application (Kangas et al., 2019) as technologies that provide an encouraging learning environment in the secondary level of ELT. Another study also claimed that electronic books (e-book) could be an effective multimedia resource that is used as supplementary standards-based instruction and pre-teach content area vocabulary specifically designed for students with exceptional language needs (Love et al., 2017). However, there was a limited study to examine the empirical evidence of the effectiveness of technology applications in ELT and how it applied in the language classroom to support teaching and learning activities.

Several studies were focusing on application review and proposing new ideas of technology applications that can be applied in ELT such as digital technology in low-resource context and the importance of technology for special need education and intercultural awareness (Hockly, 2015; Hockly, 2016). Nevertheless, the research result has not been proven empirically that certain types of the technology proposed did not support the ELT classroom method and strategy.

Most of the studies related to technology integration in ELT were conducted at a higher education level. Teachers and students in this level were claimed to have more ICT literacy compare to the lower level of education. They also got enough exposure on technology use through their professional development and education program (Ansyari, 2015; Aşık et al., 2019; Dooly & Sadler, 2020; Hafifah & Sulistyo, 2020). Additionally, some studies found that teachers and students have a good perception toward technology use in language teaching (Goodwin et al., 2015; Liu et al., 2017; Muslem et al., 2018; Silviyanti, T. M., & Yusuf, 2015; Valtonen et al., 2017)

Moreover, technology is proven to be an effective strategy and method applied at a higher education level (Anikina et al., 2015; Ersanli, 2016; Fix et al., 2015; Sokolova et al., 2015; Zarzycka-Piskorz, 2016). A Number of studies claimed that technology integration was able to increase the students' motivation and autonomous learning (Averkieva et al., 2015; Lamb & Arisandy, 2020). Some application such as web-quest (Averkieva et al., 2015), hypertext reading application (Shang, 2015), corpus-based writing application (Ha, 2016), and social media application like twitter-based pronunciation (Mompean & Fouz-González, 2016) were investigated and proven to be effective teaching strategy and method and supported students learn independently.

Numerous studies of technology implementation were conducted at the primary level of education, most of the findings concluded that technology supports the classroom teaching-learning activity for the children and improve their English competency, especially vocabulary (Blau & Shamir-Inbal, 2017; Ghavifekr & Rosdy, 2015; Gürkan, 2019; Hong et al., 2016; Lan, 2015). However, studies on the effectiveness of technology integration at the secondary level are under scrutiny.

To fill in the gaps of the previous studies which lack exploring the empirical result of the effectiveness of technology implementation, especially in the secondary level of ELT, the present study aims to review some articles from reputable journals that are published during 2015-2020 focusing on the use of technology in ELT secondary level. The study attempts to find out some trends in technology use, types and purposes of technology-supported ELT, and the challenges and solutions of using technology in secondary level of ELT.

METHODS

To address research questions, the study employs a semi-systematic review method or simply literature review method. The method is less scrutiny than a critical systematic review study. It reviews and concludes the progress of relevant literatures in certain area over the time by identifying the patterns of studies for synthesizing the state of knowledge,

developing theoretical perspective, and suggesting the potential future research. Based on the previous study from Zhang and Zou (2020), the present literature review study was conducted using the following three stages:

Journal Selection: The researchers search journals from reputable databases like Science Direct, ERIC, Taylor Francis, Elsevier, J-Wiley during September and October 2020. For quality assurance, the researchers picked reputable journals that were indexed by SSCI and Scopus in quartile one to two, and specifically chose journal that the topic and scheme were related to technology and ELT. The journals were CALL, JACL, Re-CALL, Australian Journal of Education Technology, Language Learning and Technology, Learning Media and Technology, Computer Education, ELT Journal, British Journal of Educational Technology, and English Teaching and Practice.

Article Selection: At the first attempt, we inclusively selected the articles based on the specific keywords, such as Technology Use, ELT, and Secondary Level in the publication timeline from 2015-2020. The keywords were assigned to get the relevant articles that are in line with the objectives of the study. This attempt generated 1299 articles. Next, the abstract of articles were screened and specifically selected based on the research variable, method and participants. Some articles that discussed about teachers and students perspective, policy of technology integration in ELT, literature review articles, and the research subject was not secondary level were excluded and we had 108 articles left. Furthermore, to narrow down the focus on the use of technology in ELT secondary level, we specifically chose articles that show the result of empirical study and examine the technology implementation in secondary level of ELT and 56 articles remained and used as the data of this present study.

Data Analysis: A semi-systematic review study is commonly analyzed using qualitative approach, specifically using a content analysis. In analyzing the data, we attempt to list the selected articles in a spreadsheet, categorize the themes (e.g., year of publication, research purpose, research method, participants, types of technology devices and application, benefits, problems and solutions of technology use in ELT),analyze and synthesize the data, and then report them descriptively.

RESULTS AND DISCUSSION

The results of the study cover three main findings, namely: trends in using technology, types and purposes of technology use, and challenges and solutions in technology use at the secondary level of English language teaching. The findings are discussed respectively in sequence.

Trends in Technology Use in Secondary Level of English Language Teaching

The trends of technology use from fifty-seven examined articles are categorized into three points. They are the rate of year publications, research method, and participants of the study. The following part explores each category:

The Rate of Year Publications

The distribution of research studies over the years is displayed in figure 1. It depicts that the trend of technology use in the secondary level in English language teaching publications is generally increased over the years (2015-2020). There are 6 publications of this area found in 2015 and by the end of 2020 it has more than double the increasing number of publications (n=14). The data shows that there is a great interest among scholars to investigate the use of technology in the ELT context, particularly at the secondary level.

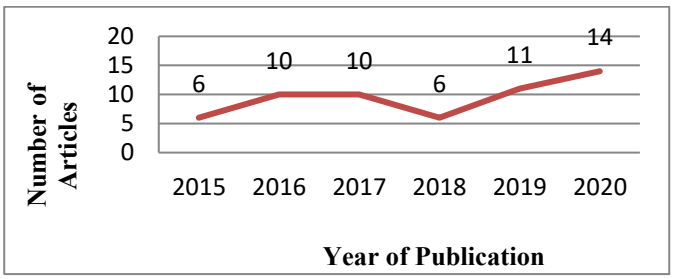

Figure 1 | The Number of Years by Publication

Research Method Trends

The present study merely includes empirical studies to be reviewed. The research methods are categorized into quantitative, qualitative, and mixed-method groups. Figure 2 illustrates the research methods deployed in review articles. The most common method used is the quantitative method, specifically experimental study (n=36). In contrast, the qualitative study about technology use in ELT secondary level is quite sparse to be discovered. 11 out of 57 articles are classified into the qualitative study and 8 of them clearly mention that they use case study.

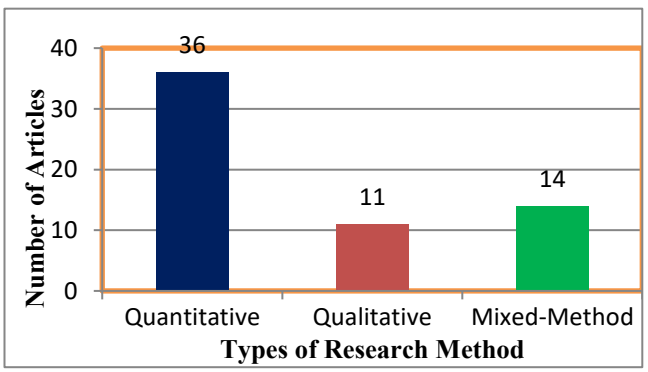

Figure 2 | Research Methods Used in Review Articles

Finally, the rest of the reviewed articles are categorized into mixed-method (n=14).

Sample of Participants

Figure 3 shows that the researchers prefer to involve students rather than teachers as the sample of participants. 49 out of 57 articles selected secondary students as the sample to use a certain technology tool for learning English language either inside or outside the classroom and 7 studies invited secondary teachers as the participants of the study. Unlike the other reviewed articles, one study from (Wilson and Roscoe, 2020) involved three English language teachers and 114 six grade students to examine the effectiveness of Automatic Writing Evaluation (AWE) system.

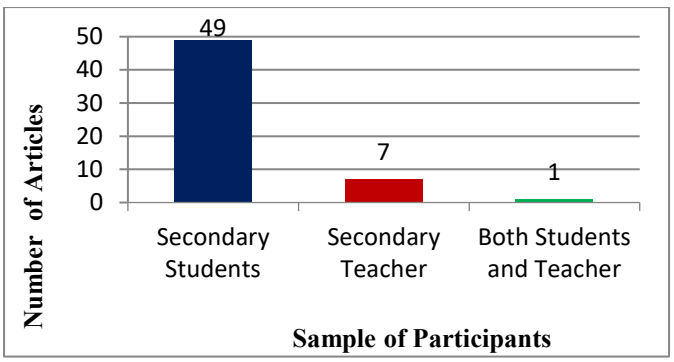

Figure 3 | Sample of Participants

Types and Purposes of Technology-Supported English Language Teaching

This part explores the findings to answer the second research question. The data classify the types of technology tools used in reviewed articles, the language skills area, and the way how the tools support the English language teaching.

Technology Tool Types

The reviewed articles utilized various types of technology tools in the studies. To ease the reader in mapping out the tool types, we attempt to categorize them into five terms (see figure 4).

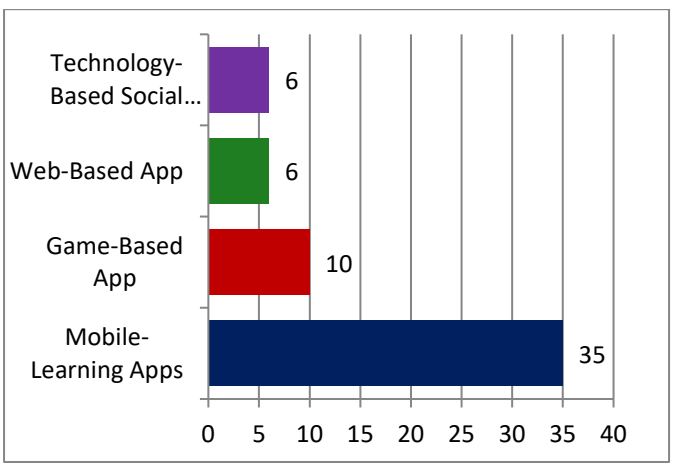

Figure 4 | Types of Technology-Supported English Language Teaching

The vast majority of the technology tools category is mobile learning applications (n=38). It refers to any mobile devices utilized for learning and it is commonly owned as personal digital assistants (Sung et al., 2016). Besides, mobile learning applications can assist students to adapt English language content to the context they are familiar with (Hwang et al., 2016). There are two types of mobile learning apps in the reviewed studies. 6 studies integrated hardware-mobile apps in English language teaching, such as camera, laptop, desktops, iPod, iPad, digital pen (Andrei, 2017; Chen et al., 2016), and 32 studies employed software-mobile apps in ELT classroom, such as mobile instant messenger, mobile-based graphic organizer (Regan et al., 2018), Android-based smartphone apps (Chou et al., 2017), and mobile speaking apps (Ahn & Lee, 2016).

The second favorable category of technology tools utilized in reviewed articles is the game-based application (n=10). It is an effective learning tool that provides a sense of playing a game, such as competition, challenges, rewards, rules, or goals. Game-based learning activities can encourage learners' motivation, engagement, and interaction in learning (Yükseltürk et al., 2018). In this review, (Sundqvist, 2019) conducted a study which examines the nexus of vocabulary proficiency of the students who play a commercial-off-the-shelf (COTS) game and the students who do not play the game. The finding reveals that the learner's habit of playing game matters for their vocabulary improvement. The more current study conducted by (Hong et al., 2020) argues that Tip On, one the gamification platform designed to let the students pose and address questions based on different modes of game to practice English grammar, can motivate students in learning, especially to increase their curiosity in learning. The merits of using the game-based application can be found more in the literature.

The next category is technology-based social media and web-based technology tools. We found 6 reviewed articles for each category. The role of social media has recently developed. It is not only as a medium for communication in the social network but also as a medium for learning English language (Balchin & Wild, 2020; Börekci & Aydin, 2020; Chang & Lu, 2018; Chu et al., 2017). A study argues that Facebook can create a positive learning environment to facilitate students' interaction in English class and their academic development (Börekci & Aydin, 2020). In a more specific context, Chang and Lu (2018) use LINE for consolidating students' ideas in a prewriting activity and for evaluation. Similar to the previous study, Chu et al., (2017) admit that Wikis can facilitate learners in collaborative writing. Thus, it is undeniable that social media has some merits in English language teaching.

Furthermore, the use of the web-based application, such as Moodle and Learning Management System (Gunduz and Ozcan, 2017; Lam et al., 2017) can facilitate the teachers to provide teaching materials, exercises for students, discussion boards, and evaluation and provide an opportunity to the student in learning independently based on their own pace. Besides, web-based applications can be used in blended learning which combines face-to-face learning and online

learning. Based on the review, the sum of technology tools is more than 57 because some of the studies integrated more than one technology tool. The use of technology in the secondary level of ELT is sufficiently varied and it offers some options for the teachers who teach in a similar context to adopt some technology tool categories in their classroom.

Language Skill Area

Figure 5 portrays that the dominant English language skill employs in reviewed articles is writing skill (n= 21). Vocabulary as one of English language sub-skills is discussed in 17 articles, followed by reading skill (n=14) and speaking skill (n=9). The remaining skills are listening (n=5) and grammar as a sub-skill (n=5). Finally, 6 out of 57 reviewed articles do not mention clearly a specific skill. Some study harnessed technology in ELT to support more than one skill. Therefore, the sum is more than 57 skills.

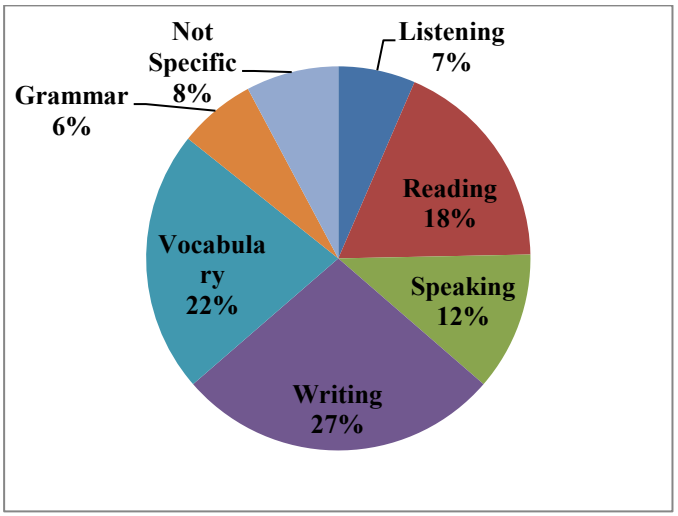

Figure 5 | Language Skills Studied

Technology Supports English Language Teaching

This part explores the use of technology to support ELT at the secondary level. There are two main parts discussed; first, the purposes of technology-supported language teaching, and second, the benefits of technology on students' learning performance.

As shown in figure 6, 39 out of 57 reviewed articles they reveal that the use of technology in ELT secondary level have a dominant purpose for learning activities. Learning activities can be an activity inside and outside the classroom. For instance, Woodrich and Fan, (2017) and Selcuk, et.al., (2019) implemented collaborative writing activity using two different tools. Woodrich and Fan (2017) utilized Google Docs as a tool to promote collaborative writing inside the classroom. The students were set in a different sitting arrangement, so they cannot verbally discuss their paragraph. They should use Google Docs to have a discussion and work collaboratively in writing tasks. Meanwhile, Selcuk et al., (2019) focused on collaborative writing activity outside the classroom using a web-based collaborative tool. It happened due to the limited time allocation controlled by curriculum and the trend of using web-based collaborative tools among teenage students in Turkey.

The other purpose of technology use to support ELT at the secondary level is to promote students' exercise or task (n=12). A study from Ahn and Lee (2016) reported that Speaking English 60 Junior App which is designed for middle school students is effective to assist students in speaking practice independently. Another study from Chen et al., (2019), they conducted a quasi-experimental study to investigate the effect of caption and gender in learning using i-Map-enhanced contextualized-learning. The students learn English using i-Map to get the authentic context as their learning activities and students' worksheet.

10 out of 57 reviewed articles emphasized the use of technology as students' learning assessment tools and a medium to provide feedback effectively. The researchers utilized Socrative (Chou et al., 2017), a spherical video-based virtual reality (SVVR) (Chien et al., 2020), CAT (Tseng et al., 2016), lexis board (Mirzaei et al., 2015), podcast (Hamzaoğlu & Koçoğlu, 2016) to assess the students' grammar, vocabulary, speaking, and writing skills. Some technology tools also can facilitate automated feedback, peer-feedback, and self-feedback (Neumann & Kopcha, 2019).

Finally, the rest of the reviewed articles used technology as a tool for teaching materials delivery (n=8). A study from (Hsieh & Huang, 2020) examined the effect of incorporating e-book into reading and listening materials. In a more specific context, Curcic and Johnstone (2016) investigated the effect of an intervention writing materials using digital interactive books to improve students' writing ability, especially for students with a learning disability in reading. The recent study uses Shakespeare's digital book to support students' engagement in sophisticated reading text, evidence-based analysis, and meaningful creative productions (Turchi, 2020).

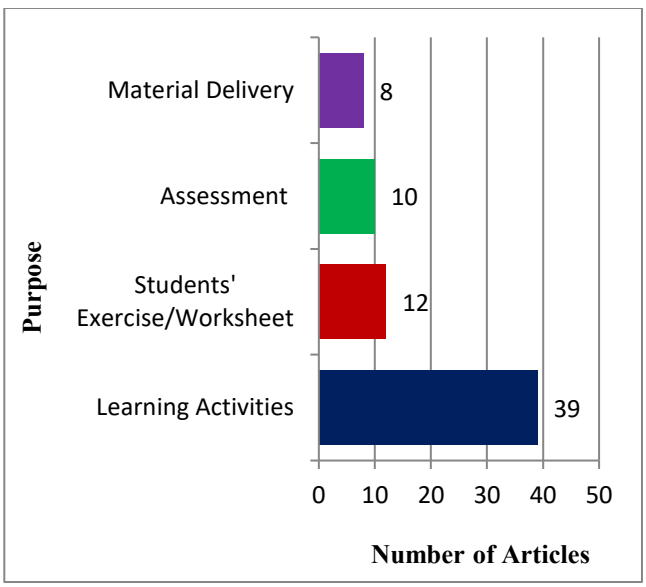

Figure 6 | The Purposes of Technology Use in ELT

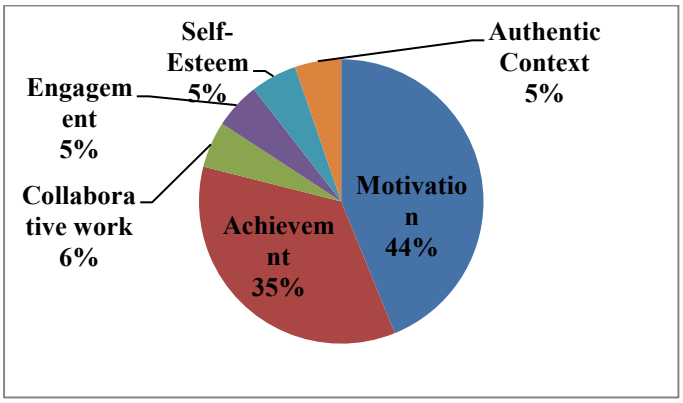

Figure 7 | Benefits of Technology in Secondary English Language Teaching

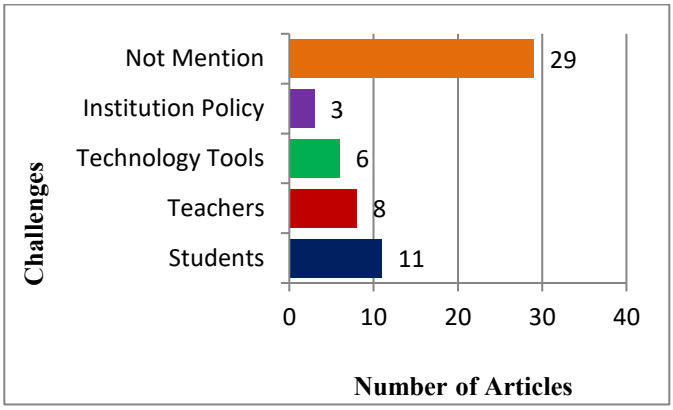

Figure 8 | Challenges Encountered in Technology Integration

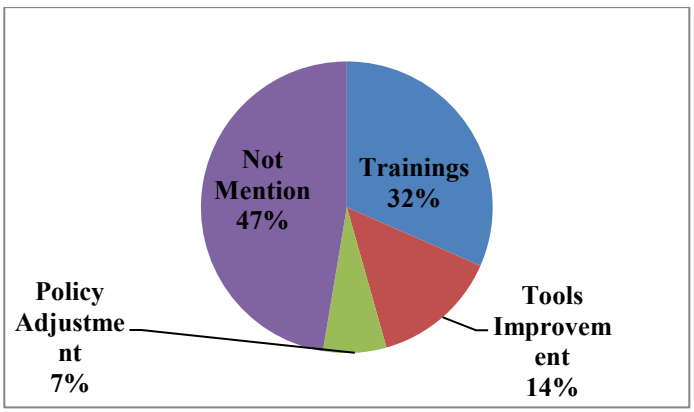

Figure 9 | Alternative Solutions Offered

As shown in figure 7, the use of technology in English language teaching gives a more significant impact on the students' motivation (n=25) than students' learning achievement (n=20). Incorporating technology also can facilitate students' engagement in learning, allow students to work collaboratively, develop students' self-esteem, and provide authentic materials and environment for students to learn the English language in meaningful and enticing ways.

Challenges and Solutions in the Use of Technology in English Language Teaching

Although the use of technology in English language teaching has numerous advantages, the implementation process is not always successfully executed. Some challenges are found in few reviewed articles. As described in Figure 8, the common problems are coming from students due to their lack of knowledge, experience, and confidence in using some technology tools (n=11). The next challenges are perceived by teachers in terms of teachers' lack of awareness, knowledge, and willingness to integrate technology into their ELT pedagogical practices (n=8). Technology tools also contribute some obstacles hindering the teaching-learning process (n=6), such as the tools are not friendly used and require high-expenses for a certain context, and some tools are failed to facilitate learning for students who have different proficiency level. The last challenge is related to curriculum demand and other institutional policies (n=3).

Some reviewed articles also implicitly suggest solutions to solve the obstacles found in ELT technology integration. Teachers and students need some trainings to enrich their knowledge and change their attitude towards technology use in class (n=18). Several technology tools need improvement in a specific function that can facilitate the learners' needs (n=8). And some institutions are required curriculum adjustment that allows the implementation of a blended-learning instructional model (n=4). Although most reviewed articles do not offer an alternative solution to tackle the challenges, teachers can take into consideration the existing ways to enhance the quality of technology use in the secondary level of ELT context.

The growing interest on technology integration study has been noted by previous studies since the last two decades. A study reviewed sixty-nine articles from SSCI journals focusing on the trends in mobile-assisted language learning from 2000-2012. The finding shows that none of articles that met the criteria were found in 2000-2003 and a number of studies is gradually increased and reached a peak point in 2008-2012. In a longer interval from 1995 to 2019, a literature review study by Zhang and Zhou (2020) found that the remarkable publications on the use of technology for second and foreign language learning referred from SSCI journal grew significantly in the last three years. The similar trend is also occurred in the present study that the number of publication on technology use in a specific context, secondary level of ELT, is consistently growing in 2015-2020. It indicates that the implementation as well as the interest in conducting study on technology integration in language teaching becomes numerous over the period.

In terms of research method, most of the reviewed articles adopted quantitative method, followed by mixed-method, and less studies employing qualitative method. The trends are identical with the findings from previous literature studies (Hwang & Fu, 2018; Lee, 2019, and Wang &Tahir, 2020). They identified that the articles typically investigate the effect of a certain digital platform and the perceptions of teachers or students towards the use of technology.

Furthermore, the reviewed literatures are dominantly recruited students as a sample of participants rather than teachers. Researchers preferred to conduct a study with a large size of participants in a certain level of education or a group of age (Elaish, Shulbi, Ghani, & Yadegaridehkardi, 2017).

Based on fifty-seven articles reviewed, mobile-assisted language learning (MALL)is the most favorable technology utilized in ELT secondary level. The flexibility of use and the personal assistance offered by MALL drive people interest in using and exploring mobile or portable device to enhance teaching and learning activities (Burston, 2015). With the advancement of technology, the use of gamification is also viewed as the technology type that is more preferable than web-based and social media types, because game-based apps can create learning interaction and engagement effectively. A literature review study from Wang and Tahir (2020) investigates the 93 articles focusing on the effect of using Kahoot. It is believed that Kahoot as one of the example of game-based apps enhance the students' performance, facilitate the interaction between students and teachers makes the classroom more dynamic, and reduce the students' anxiety in learning.

The result of the review found the evidence that writing becomes the majority skill in technology use studies. It is in line with the vast argument highlighting the use of technology-enhanced language learning that can assist students to create a better composition and improve their writing skill. It also supports teachers with a variety of material resources, teaching strategy and methods in giving clear instruction for assignments and assessments in writing courses (Curcic & Johnstone, 2016; Engeness, 2018; Ha, 2016; Lee et al., 2020; Morgan & Chenowith, 2017; Park et al., 2018). In addition, the studies found that mostly technology facilitates learning activities both inside and outside classroom. The use of technology as a media in learning can provide impacts on learners' motivation in learning rather than learning achievement. Some explorations on the use of technology that can enhance motivation, achievement, self-esteem, and engagement in learning are still obscure.

Furthermore, some challenges in the implementation of technology in ELT secondary level are discovered from fifty-seven reviewed articles. The majority of studies identified that teachers and students' limited knowledge and negative attitude towards technology integration becomes a typical hindrance of successful implementation. Besides, some settings are still struggling with the facilities and access supporting technology integration. A recent time-series survey study from Francom (2019) supports the present findings. It is believed that there is a silver lining on the development of access and facilities supporting technology integration recently as it is becomes more proliferate in our life. However, teachers and students' digital knowledge remains the same and their belief and attitude towards technology tend to be diminishing over time. This might be occurred due to they enable to keep up with swift changing in technology. It can be a factor that can decrease their self-efficacy and shift their beliefs and attitude towards technology (Ertmer & Leftwich, 2010).

Dealing with the issues, some solutions are offered in the reviewed literatures, such as providing professional trainings on technology integration to enrich their knowledge and change their attitude towards technology use in class, adjusting the curriculum that allows the implementation of a blended-learning instructional model, and improving the quality of technology tool that enables facilitating more learning activities.

CONCLUSION

The current literature review on the use of technology in ELT secondary level from 2015-2020 shows that there is a growing interest among scholars to scrutinize the effectiveness of integrating technology tools in the ELT classroom. It can be seen from the increasing numbers of publications over the years. All the studies in this review are empirical studies that dominantly employed the quantitative research method and involved secondary students and teachers as sample participants. It is rare to find mixed-participants. The tools types are generally classified into four categories; mobile-learning application, game-based application, web-based application, and social media. Interestingly, writing skill becomes the most frequent skill studied using technology in reviewed articles. The technology uses empirically as a tool to assist learning activities, students' exercise or tasks, assessment and feedback, and material delivery. Some merits of technology use in secondary ELT classroom focus more on students' motivation, collaboration, self-confident, and engagement rather than students' English proficiency. On the other hand, the implementation of technology in the ELT context provides some obstacles, such as students' and teachers' knowledge and attitude towards technology use, the limitation of the technology itself, and the demand from the institutional policy. However, some studies suggest that professional training, technology improvement, and policy adjustment can be an alternative attempt to tackle an unexpected situation.

Having gone through the experience of selecting articles on technology use at a specific level, a secondary level of ELT, the authors perceive that the empirical studies on the use of technology in secondary ELT levels are sparse, compared to other levels of education. It confirms that there are many opportunities to conduct further research in this area. The review also reveals that most of the studies attempted to present the technology integration by providing specific pedagogy settings which are highly prescriptive instead of reviewing the technology in a real learning context. The evidence shows that scholars tend to set the content and pedagogy first before the technology to obtain meaningful and contextual experiments and discussion in academic circumstances. The reviewed studies also seem not to purpose novelty solutions to common problems concerning teachers, teachers, technology, and policy challenges. Interestingly, the finding unveils a fact that technology use in the ELT context contributes more to students' learning strategies, such as learning motivation, engagement, collaborative work, rather than the

improvement of students' learning outcomes. This finding can be a rationale to rectify the common logical fallacy encountered among studies that claimed that technology can improve particular language skill. To sum up, using technology in the teaching and learning process cannot guarantee that the teaching instruction will be automatically perfect, but the integration of technology, pedagogy, and language content in proper ways results in a meaningful learning experience.

Finally, the present study limits the coverage of the studies reviewed, only empirical studies are included. Further research can conduct more studies of technology use in the ELT context, especially at the secondary level which involve both teacher and students as research participants to obtain two different perspectives. There is a need to conduct more qualitative and mixed-method studies in the future and to examine the effectiveness of technology in listening, speaking, and reading skills. It is suggested to the future researcher to take into account pedagogical aspects of the technology integration study.

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