In-service Middle School Teachers' Cognition in the Use of Technology in English as a Second Language (ESL) Teaching and Learning Context in Dingxi City, China

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Abstract

Many in-service ESL teachers have low interest in using technology in classrooms on account of complex internal and external factors. Thus, guided by Davis's (1989) technology acceptance model and Borg's (2003) language teacher cognition theory, this study, which uses a quantitative descriptive survey, aims to further understand in-service middle school English as a second language (ESL) teachers' cognition in the use of technology in Dingxi city, China. The results show that in-service middle school ESL teachers have general positive cognition toward technology in their classrooms and that these teachers are high-level users of technology. The findings suggest that academic institutions can provide more decent technological support to in-service middle school teachers as this will cater to their needs in ESL teaching and learning.

Keywords: teacher cognition, technological learning, English as a second language

1. Introduction

The use of applications, methods, theories, and practices to reach desirable ends in the industrial and commercial fields reinforces the meaning of the use of technology (The American Heritage Dictionary, 2009; Collins Dictionary, 2003; Random House Kernerman Webster's College Dictionary, 2010). In fact, using technology will help teachers meet ideal educational outcomes in classrooms. The use of technology in ESL classrooms stands for the utilisation of computer technology, helping teachers meet their learners' educational needs (Ahmadi, 2018). With that said, teachers can play an indispensable role in implementing technology in the classrooms since cognition affects their use of technology. To define, teacher cognition embodies complex factors, such as schooling, professional coursework, contextual factors, and classroom practice (Borg, 2003). In other words, teacher cognition is heavily affected by past experiences, expertise, and different context. Hence, teachers might approach technology differently when fulfilling students' learning demands.

Research from the past seven years substantiated that modern teachers are more likely to adopt technology in classrooms as this tool brings immeasurable benefits to achieving educational goals for students, and this trend will continue in the future. Two popular technologies, such as social media and multimedia, have advocated for facilitating language learning. Obar and Wildman (2015) defined social media as disparate categories, including blogs (e.g., Blogger), wikis (e.g., Wikipedia), social network sites (e.g., Facebook), microblogs (e.g., Twitter), photo-sharing services (e.g., Instagram and Pinterest), video-sharing services (e.g., YouTube), products/services review (e.g., Yelp), social bookmarking, and social gaming. Those platforms engage users to discuss, interact, exchange ideas, and seek answers through collaboration (Mansor, 2016 & Hung, M. L., & Chou, C. 2015). Multimedia Information and Communications Technology defined (ICT) as "new multimedia technologies, including computer software, CD-ROM, the internet, television, film as well as internet-based project work, e-mail, chat, blogs, wikis, podcasts, and so forth" (Zhou, 2018, p. 22, as cited in Alobaid, 2021, p. 1). Research from Guan et al. (2018) supported that a multimedia learning environment is a concept of displaying a combination of more than one media type, such as text, image, graphic, drawing, sound, video, and animations, usually with the aid of technology to enhance understanding or memorisation.

Even though integrating technology provides opportunities for teachers to achieve their teaching goals, the thing is that they tend to approach teaching very differently. That is said, the willingness of teachers to integrate technology differs. Those individual differences in views of technology integration in teaching can relate to teacher cognition. Teacher cognition refers to what language teachers think, know, and believe about their works and how this impact what language teachers do in the classroom, e.g., their past experience, their expertise, and contextual factors such as different teaching opportunities, shaped their thinking patterns in utilising technology in various circumstances (Borg, 2003).

This paper attempts to investigate in-service middle school ESL teachers' cognition and the use of technology in Dingxi city, China, as most in-service teachers face technological dilemmas. This scenario raises a question as to why they display apathetic attitudes about technology. The past studies by Borg (2003) found that teachers' cognition had a greater impact on their willingness to infuse technology in classrooms.

Furthermore, Mahmood et al. (2014) argued that the lack of technology infusion was due to manipulative and non-manipulative factors. The former concept draws on teacher attitude towards ICT, knowledge and skills, their commitment to school, and the availability of ICT support. The latter relates to their ages, teaching experiences, computer experiences of the teachers, governmental policy, and the availability of school support. As Borg (2003) stated, teacher cognition can be multifaceted as it evolves many complex factors. Hence, the study examines in-service middle school ESL teachers' cognition toward technology in Dingxi city, China. The purpose is to identify teachers' cognition of the use of technology in ESL classrooms. Therefore, the research questions are as follows:

1. What is in-service middle school teachers' cognition about the use of technology in ESL teaching and learning context in Dingxi city, China?

2. What are in-service middle school teachers' technology usage in ESL teaching and learning context in Dingxi city, China?

Following the impetus for this study, researchers review relevant literature about factors affecting teachers' use of technology and teacher cognition. Afterwards, the methodological approach is described, including the research design, participants, instrumentation, and data analysis. Subsequently, researchers discuss the results. Finally, conclusions and implications are acknowledged, with a future suggestion for avid researchers.

2. The Review of the Literature

The topic covered in the review of the literature would be Davis's (1989) technology acceptance model (TAM) and Borg's (2003) language teacher cognition theory, both of which were the theoretical basis of this research.

First, the technology acceptance model (TAM) was used to explain factors affecting individual acceptance of technology (Joo et al., 2018, p. 51). In TAM, perceived usefulness (PU) and perceived ease of use (PEOU) (Davis, 1989) directly influenced the intention to use technology. Perceived usefulness is also instantaneously affected by perceived ease of use (Davis, 1989, as cited in Joo et al., 2018, p. 51). Davis (1989) elucidated these two terms. Perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort." Perceived usefulness means "the degree to which a person believes that using a particular system would enhance his or her job performance."

Research has confirmed that perceived ease of use and perceived usefulness significantly affected teachers' intention to use technology (Jeung, 2014; Davis, Bagozzi &Warshaw, 1989; Suki & Suki, 2011; Teo, 2011; Wangpipatwong, Chutimaskul, & Papasratorn, 2008, as cited in Joo et al., 2018, p. 50). Data from 350 Korean students from a leading online university confirmed that perceived usability had a significant impact on the perceived usefulness of the integration of a user interface and personal innovation spirit in the TAM for mobile learning (Joo et al., 2014, as cited in Joo et al., 2018. p. 50). In Second Life - a 3D virtual environment, 206 nursing students saw the new system as helpful when they could use it readily (Chow et al., 2012, as cited in Joo et al., 2018, p. 50). Wangpipatwong et al. (2008) found that perceived ease of use and perceived usefulness were positive predictors of intention to use an e-government website (as cited in Joo, et al., 2018, p. 50). In the English as a second language context, the study among 245 Malaysian teachers and students showed that intentions of using computer behaviour could be determined through teachers' perceived usefulness, perceived ease of use, and attitudes toward technology usage, according to Teo et al. (2011). Azlin (2012) demonstrated that information and communication technologies (ICTs) in English literature education benefited students as ICT facilitates understanding, promotes responses to literary texts, improves language awareness, and increases motivation. Subsequently, Mohd & Karacan (2018) noted that using augmented reality games promoted language learning (Liu et al., 2016, p. 374) as well as 21st-century skills such as collaboration (Morschheuser, Riar, Hamari, & Maedche, 2017 p. 179). Likewise, in a study examining the perception of the use of Mobile assisted language learning (MALL) in ESL classrooms, Azli, Shah, and Mohamad (2018) found that respondents felt optimistic about the implementation of MALL. As a result, the use of MALL enhanced the teaching and learning process. Another study concentrated on the effectiveness of using Wiki technology in college writing classrooms for teaching ESL learners. Consequently, students reported that they would receive timely feedback and instant response from their teachers and peers (Lin & Yang, 2011). Therefore, teachers should learn how to use technology in ESL classrooms wisely as it facilitates the teaching process and maximises learning outcomes.

Second, Borg's (2003) language teacher cognition theory (i.e., teachers' "beliefs, knowledge, theories, attitudes, assumptions, conceptions, principles, thinking, decision-making about teaching, teachers, learners, learning, subject matter, curricula, materials, activities, self, colleagues, assessment, and context", ibid, p. 283) conceptualised the relationship between teachers' beliefs and classroom practices under the influence of three interrelated elements of schooling, professional coursework, and contextual factors (as cited in Kartchava, E., & Chung, S. 2015, p. 357). Schooling means teachers' past learning and teaching experiences, which will shape their thinking about technology, while technology integration can be co-influenced by teachers' previous experiences. Professional coursework means teachers' expertise learned through a variety of practices, which allows teachers to maximise their use of technology. Contextual factors include parents, principals' requirements, the school, society, curriculum mandates, classroom and school layout, school policies, colleagues, standardised tests, and the availability of resources (Borg, 2003, p.94). These factors affect teachers' willingness to incorporate technology in their classrooms.

Since 1987 teacher cognition has been a debatable issue. In the beginning, research on teacher cognition involved understanding teacher knowledge, such as practical knowledge, craft knowledge, personal practical knowledge, case knowledge, situated knowledge, and syntactic knowledge (Shulman 1986, 1987, as cited in Borg, 2019) to evaluate teacher cognition. Plenty of definitions of teacher cognition emerged as time passed. Alongside teacher knowledge, in a study of teacher cognition, Borg (2003) referred to this term as what they think,

believe, and do. In addition, he further added that teacher experiences as learners, professional preparation, contextual factors, and classroom practice were influential in shaping teacher cognitions. Golombek and Doran (2014) argued that teacher emotion should be included as part of teacher cognition as the previous theories did not contemplate what teachers feel about what they think. Subsequently, teacher motivation (Richardson et al., 2014), teacher commitment (Al-Mahdy et al., 2018), teacher resilience (Clarà 2017), and teacher identity (Burri et al., 2017) appeared simultaneously, and they need to be studied in the future (As cited in Borg, 2019). Following this case, The relevant paper draws on teacher beliefs. The meaning of teacher belief influences what people feel, think, and how they behave (Rokeach, 1968). This statement was in line with the theory of teacher emotion (Golombek and Doran, 2014), as it means that teachers need to sort out what they feel about what they think. In addition, the belief per se referred to as "a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted true by the individual and is therefore imbued with emotive commitment" (Borg, 2001, p.186, as cited in Saifu, 2019). Williams and Burden (1997) declared that teachers' beliefs about learning languages would have more impact on their class activities than a specific methodology they are told to follow (as cited in Gilakjani & Sabouri, 2017, p. 75). Chamorro, M. G., & Rey, L (2013) supported this view arguing that the study of teachers' beliefs would help to understand the underlined decisions they make about the implementation of technological activities in their classrooms.

In summary, Davis's (1989) technology acceptance model (TAM) and Borg's (2003) language teacher cognition theory paved the way for identifying in-service middle school ESL teachers' cognition in the use of technology in classrooms. However, the research gap for the former theory was that the past literature did not contemplate what made teachers use those technological tools and what was their level of usage regarding technology. For the latter theory, there were multiple domains yet to be uncovered, such as teacher emotion (Golombek and Doran, 2014), teacher commitment (Al-Mahdy et al., 2018), teacher resilience (Clarà 2017), etc.

3. Method

3.1 Research Design

This study is a quantitative descriptive survey as quantitative techniques are particularly strong at studying large groups of people and making generalisations from the studied sample to broader groups beyond that sample (Holton, E. F., & Burnett, M. F, 2005). In other words, generalisation is the extent to which conclusions are developed from evidence collected from a sample that can be extended to the larger population (Burns N & Grove SK, 2005, as cited in Sousa et al., 2007). The reason for using a descriptive survey is that it describes what exists, determines the frequency with which it occurs, and categorises the information (Sousa et al., 2007) when little is known about a particular phenomenon (Burns & Grove, 2005; Walker, 2005, as cited in Sousa et al., 2007).

3.2 Participants

The population in this study would be 63 in-service middle school ESL teachers in Dingxi city willing to participate as these teachers had different experiences in using technology, ranging from 0-2 years to 10 years beyond. This study used simple random sampling as every individual has an equal chance of being selected in the sample from the population (Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A, 2013). Further, simple random sampling represented the target population and eliminated bias. Hence, that elucidated why the sampling mentioned was pertinent in this study.

The sampling process started with a sampling frame to obtain the total number of in-service middle school ESL teachers, which were 63 people. After that, drawing on Krejcie and Morgan's simple random sampling table (1970), the samples obtained will be calculated. The rationale for using the KMT is that it determines sample size when probability sampling (e.g., simple random, systematic, stratified) is the appropriate choice. In this study, KMT was suitable for sampling as it used a random sampling method (Memon, M. A., Ting, H., Cheah, J. H., Thurasamy, R., Chuah, F., & Cham, T. H, 2020).

3.3 Instrumentation

This study used a modified 5-point Likert belief survey from Martha Garcia Chamorro and Lourdes Rey (2013), which had four sections. The first part revealed demographic information about participants, including genders, years of using technology in classrooms, technology tools used in classrooms, and time spent on using technology in ESL classrooms per day. The second part dealt with in-service middle school teachers' understanding of the use of technology in education. The third part concentrated on skills that the in-service middle school ESL teachers apply in the classroom and intentional contextual factors that can affect their use of technology. The last section focused on how in-service middle school ESL teachers achieve their learning and teaching goals considering reflection in ESL classrooms.

The instrument was applicable for measuring teacher belief in experience, expertise, and context of using technology. The participants decided whether they "strongly agree" "agree" "cannot decide" "disagree" or "strongly disagree" about every claim. Subsequently, the researchers would categorise the answered questions into different chunks based on Borg's (2003) framework of language teacher education to demonstrate the comprehensive understanding of in-service middle school ESL teachers' cognition of technology usage in classrooms.

The questionnaire had positive and negative statements. The positive claims were 5, 6, 7, 9, 11, 12, 13, 14,15, 16, 17, 18, 20, 23, 24, 25, 27, 28. The negative statements were 8, 10, 19, 21, 22, and 26. The scoring of positive items would follow a scale of 1-5 and vice versa. The scoring table is shown below.

Table 1. The scoring of the positive statements and the negative statements

Positive Statement	Negative Statement
Strongly Agree-5	strongly agree-1
Agree-4	Agree-2
Cannot Decide-3	Cannot Decide-3
Disagree-2	Disagree-4
Strongly Disagree-1	Strongly Disagree-5

3.4 Data Analysis

Data were analysed interpretively following the scoring tables and IBM SPSS Statistics (Version 27.0).

First, each range in table 2 meant differently in line with the indicated range starting from "very strong agreement" "strong agreement" "neither agree nor disagree" and "strong disagreement" to "very strong disagreement." In addition, the meaning of teachers' beliefs was interpreted as "very positive" "positive" "mixed attitudes" "negative" and "very negative" following chronological order.

Table 2. Teacher's beliefs and the meaning of beliefs

Range	Beliefs	Meaning of beliefs
4.30-5.00	Very Strong Agreement	Very Positive
3.50-4.20	Strong Agreement	Positive
2.70-3.40	Neither Agree Nor Disagree	Mixed Attitudes
1.90-2.60	Strong Disagreement	Negative
1.00-1.80	Very Strong Disagreement	Very Negative

Note. Adapted from *Pre-service and in-service English as second language teacher' beliefs about the use of digital technology in the classroom* (p. 355-383) by Kartchava, E., & Chung, S. (2015). Studies in English Language Teaching, 3(4)

In-service middle school ESL teachers' use of technology was matched with each range following "very high" "high" "median" "low" and "very low" based on table 3.

Table 3. The use of technology among in-service middle school ESL teachers

Range	The use of technology among in-service middle school ESL teachers
4.30-5.00	Very High
3.50-4.20	High
2.70-3.40	Median
1.90-2.60	Low
1.00-1.80	Very Low

Note. Adapted from *Enhancing ICT Competency for Teachers in the Thailand Basic Education System* (p. 2) by Akarawang, C., Kidrakran, P., & Nuangchalerm, P. (2015). International Education Studies, *8*(6).

4. Results and Discussion

The results indicated that in-service middle school ESL teachers in Dingxi city, China, had an overall positive cognition of technology. First, the score of 3.668 confirmed that teachers had optimistic attitudes about their digital technological experiences. Second, the score of 3.681 suggested that teachers held positive beliefs in their expertise in using digital technology. Finally, teachers also positively believed that the context(s) of use was also a crucial factor(s) in affecting teachers' use of technology, due to a score of 4.06. In summary, in-service middle school ESL teachers had positive cognition in the use of technology as they held positive beliefs about their experience with technology, their expertise in technology, and their ability to use technology in different contexts.

Table 4. In-service middle school ESL teachers' cognition in the use of technology in classrooms

In-service middle school ESL teachers' cognition in the use of technology in classrooms	Mean	SD
Experience with digital technology (in terms of the use and importance they assigned to technology)	3.668	.807
Expertise in using digital technology	3.681	.897
The context(s) of use	4.06	.873

4.1 Teachers' Experience with Digital Technology (in Terms of the Use and Importance They Assigned to Technology)

Experiences among teachers had a profound impact on how to use technology. It is worth discussing some intriguing items, such as items 7, 15, 21, and 23, to further the understanding of those given data. To illustrate, 52 teachers reached the consensus on item 7, "When using ICT, I feel creativity is an important part in order to integrate it in class." The mean score of 4.44 implied that teachers had positive beliefs about such an experience. Item 15 "I use technology-integrated activities because they are established in my course guidelines" received positive feedback among those teachers, reflected by the mean score of 4.06. Furthermore, the teachers would hold negative and very negative beliefs about item 21, "I feel that using technology-based activities in class is very challenging for developing English language skills" on account of a score of 1.85. Finally, participants would strongly disagree with item 22, "It's hard to grade technology-based activities because they are time-consuming, especially the written activities" due to a score of 2.02.

Table 5. Teachers' experience with digital technology (in terms of the use and importance they assigned to technology)

Statements	SA	%	A	%	CD	%	SD	%	D	%	M	SD
5. I think it is essential to integrate ICT into teaching.	28	53.8	20	38.5	3	5.8	0	0	1	1.9	4.42	.696
7. When using ICT I feel creativity is an important part in order to integrate it in class.	23	44.2	29	55.8	0	0	0	0	0	0	4.44	.502
8. I feel ICT does not promote learning in class as much as it should.	9	17.3	24	48.1	4	5.8	12	31.2	3	5.8	2.52	1.196
13. I am a high-level user of ICT in class.	12	23.1	29	55.8	5	9.6	6	11.5	0	0	3.90	.891
14. I use ICT because it helps students to learn.	20	38.5	31	59.6	1	1.9	0	0	0	0	4.37	.525
15. I use technology integrated activities because they are established in my course guidelines.	14	26.9	32	61.5	2	3.8	3	5.8	1	1.9	4.06	.850
17. In my opinion ICT can be used to achieve language learning outcomes more effectively.	19	36.5	30	57.7	3	5.8	0	0	0	0	4.31	.579
18. I think ICT in teaching is just a way to motivate students in the classes rather than for teaching and learning processes.	19	36.5	22	42.3	5	9.6	5	9.6	1	1.9	4.02	1.109
19. I believe that ICT activities do not meet my class needs to develop the English language skills.	15	28.8	20	38.5	3	5.8	13	25.0	1	1.9	2.33	1.200
20. I think technology can help students to better develop and comprehend the language topics I develop in class.	18	34.6	33	63.5	1	1.9	0	0	0	0	4.33	.513
21. I feel that using technology-based activities is very challenging for developing English language skills.	20	38.5	26	50	1	1.9	4	7.7	1	1.9	1.85	.937
22. It's hard to grade technology-based activities because they are time consuming, especially the written activities.	12	23.1	32	61.5	4	7.7	3	5.8	1	1.9	2.02	.852
23. I feel technology is useful to develop the four language skills more easily.	20	38.5	30	57.7	2	3.8	0	0	0	0	4.35	.556
27. My use of ICT is to foster collaborative learning in class as well as learning the English language.	15	28.8	32	61.5	2	3.8	2	3.8	1	1.9	4.12	.808

4.2 Expertise in Using Digital Technology

Apart from the impact of teachers' technological experiences on their cognition, their expertise also played a pivotal role. Items 10, 12, and 25 cast light on teachers' technological expertise. Item 10, "I see teachers integrate ICT very superficially into teaching and learning" provided evidence to understand teachers' negative beliefs, with a mean score of 2.00. Item 12, "I think I have developed a lot of skills in

order to adapt the new tools in ICT to my learning and teaching needs," revealed teachers' positive beliefs about the expertise they have developed, based on a mean score of 4.21. Likewise, item 25, "Preparation of technology activities in language teaching and learning requires a lot more time than just regular class and instruction" had a mean score of 4.29, meaning that teachers had positive beliefs.

Table 6. Expertise in using digital technology

Statements	SA	%	A	%	CD	%	D	%	SD	%	M	SD
6. I think ICT requires educators to start teaching in a different way.	25	48.1	26	50.9	0	0	0	0	1	1.9	4.42	.696
9. I see teachers only relate ICT to search engines and commercial websites.	10	19.2	26	50.0	6	11.5	9	17.3	1	1.9	3.67	1.043
10. I see teachers integrate ICT very superficially into teaching and learning.	12	23.1	32	61.5	4	7.7	4	7.7	0	0	2.00	.792
12. I think I have developed a lot of skills in order to adapt the new tools in ICT to my learning and teaching needs.	17	32.7	32	61.5	0	0	3	5.8	0	0	4.21	.723
24. I am very careful when writing instructions to develop a technology integrated activity in class.	20	38.5	25	48.1	3	5.8	3	5.8	1	1.9	4.15	.916
25. Preparation of technology activities in language teaching and learning requires a lot more time than just regular class and instruction.	23	44.2	23	44.2	4	7.7	2	3.8	0	0	4.29	.776
26. I am not interested in developing ICT activities in my language classes.	13	25	13	25	3	5.8	21	40.4	2	3.8	2.73	1.330

4.3 The Context(s) of Use

Last but not least, contextual factors affecting the use of technology among teachers also determined their cognition. Item 11 from table 7, with a mean score of 4.06, "I believe my school has offered me a lot of training in ICT to integrate it into my class," illustrated that teachers were optimistic about the technical training offered by their school.

Table 7. The context(s) of use

Statement	SA	%	A	%	CD	%	D	%	SD	%	M	SD
11. I believe my school has offered me a lot of training in ICT to integrate it into my class.	15	28.8	30	57.7	3	5.8	3	5.8	1	1.9	4.06	.873

4.4 The Use of Technology among In-Service Middle School Teachers in ESL Learning and Teaching Context

The results, based on table 8, lead to a conclusion that further confirmed that the use of technology among in-service middle school ESL teachers was remarkably high in line with teachers' experiences with technology, their expertise in using technology, and their use of technology in disparate context(s).

Table 8. an overview of in-service middle school ESL teachers' use of technology

In-service middle school ESL teachers' cognition in the use of technology in classrooms	Mean	SD	in-service middle school ESL teachers' use of technology
Experience with digital technology (in terms of the use and importance they assigned to technology)	3.668	.807	High
Expertise in using digital technology	3.681	.897	High
The context(s) of use	4.06	.873	High

5. Discussion

5.1 In-service Middle School ESL Teachers' Cognition on the Use of Technology in ESL Teaching and Learning Context in Dingxi City, China

The findings show that in-service middle school ESL teachers have positive cognition toward the use of technology. This discovery is in opposition to the research problem in past studies, as many in-service ESL teachers prefer not to adopt technology in their classrooms. Many

factors, such as beliefs on teaching experiences, expertise, and availability of ICT support, could explain the unusual situation.

First, to understand this unexpected phenomenon, teachers' experiences with the use of technology in Dingxi city are the first area to look up. The data found that 33 ESL teachers had 10 + years of experience, and they perceived them as technophiles who favour multimedia the most in ESL classrooms. Based on Borg (2003), a teacher's experience was from class practice. Teachers would never use technology in the future if they had no past technological experiences. He further argued that teachers' experiences shape their thinking patterns in utilising technology in various circumstances. This finding was consistent with the literature review. Thus, researchers can conclude that the more experience in technology teachers have, the more they will use it in their ESL classrooms. However, it is worth noting that not all experienced ESL teachers support this claim. For instance, 24 teachers argued that technology does not promote learning in class as much as it should, which can contribute to complex reasons that need future investigation among interested researchers.

Second, in-service middle school ESL teachers' professionalism affects their use of technology. 49 teachers perceived technology optimistically since they developed many skills to adapt the new tools in ICT to their learning and teaching needs. Also, the finding reveals that preparing technological-oriented activities in language teaching and learning is time-confusing compared to regular classes meaning teachers do their best to aim for students' learning needs, illustrated by the previous literature (Ahmadi, 2018). Nonetheless, not all teachers, including 26 of them, agreed that they want to infuse technological activities in their classrooms. In other words, although teachers promote technology usage in classrooms, they still decline to develop ICT activities in the language learning process. This issue is worth investigating further in the future.

Third, the influence of contextual factors can affect in-service middle school ESL teachers' use of technology. There are 45 teachers that appreciate their schools for offering technology training. Thus, that explains why they hold positive beliefs about infusing technology in ESL classrooms. Indeed, Borg (2003) has stated that contextual factors could facilitate or hinder teachers' ability to adopt practices that reflect their beliefs. This situation applies to language teachers because unpleasant working conditions affect their doings and vice versa. However, the grey areas are training content and training hours among teachers who stated that they have enough training from the support of their academic institutions.

5.2 The Use of Technology Among In-Service Middle School ESL Teachers in Dingxi City, China

In-service middle school ESL teachers had a high-level use of technology in Dingxi city. The finding challenges the previous research problem that in-service teachers are less likely to use technology in their classrooms. The reasons behind this newest finding relate to the easiness and usefulness of technology. In other words, perceived ease of use and perceived usefulness can determine whether ESL teachers choose to use technology in their classrooms or not. This discovery is in line with the past literature as a deluge of studies examined the benefits of using technology, attended on easy-to-use and helpfulness of these two perspectives. Nonetheless, a limitation to understanding teachers' use of technology is how teachers use a plethora of technology in ESL classrooms - a field that is unknown yet.

6. Conclusion

While it is evident that language teachers tend to use technology in their classrooms actively, In-service ESL teachers can sometimes be an exception due to complex manipulative and non-manipulative factors. Thus, the researchers used a quantitative descriptive survey to study this unsolved issue in Dingxi city, China. The results showed that in-service middle school ESL teachers had positive cognition in technology usage. In addition, these teachers were high-level users of technology.

6.1 Implication

The stakeholder can take teachers' beliefs into account, i,e., experiences, expertise, and several contextual factors toward the use of technology, so that teachers can benefit from having joyous, supporting, and professional teaching and learning experiences regarding the use of technology.

6.2 The Suggestion for Future Research

Future researchers should study cognition in ESL education as cognition involves multiple layers of measurable constructs, such as teacher identity (Burri et al., 2017), teacher emotion (Golombek & Doran, 2014), etc.

References

Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. (2013). Sampling: Why and how of it. *Indian Journal of Medical Specialties, 4*(2), 330-333. https://doi.org/10.7713/ijms.2013.0032

Ahmadi, D., & Reza, M. (2018). The use of technology in English language learning: A literature review. *International Journal of Research in English Education, 3*(2), 115-125. https://doi.org/10.29252/ijree.3.2.115

Akarawang, C., Kidrakran, P., & Nuangchalerm, P. (2015). Enhancing ICT Competency for Teachers in the Thailand Basic Education System. *International Education Studies, 8*(6), 1-8. https://doi.org/10.5539/ies.v8n6p1

Al-Mahdy, Y. E. H., Emam, M. M., & Hallinger, P. (2018). Assessing the contribution of principal instructional leadership and collective teacher efficacy to teacher commitment in Oman. *Teaching and Teacher Education, 69,* 191-201. https://doi.org/10.1016/j.tate.2017.10.007

Alobaid, A. (2021). ICT multimedia learning affordances: role and impact on ESL learners' writing accuracy development. *Heliyon, 7*(7),

e07517. https://doi.org/10.1016/j.heliyon.2021.e07517

Azli, W. U. A. W., Shah, P. M., & Mohamad, M. (2018). Perception on the usage of mobile assisted language learning (MALL) in English as a second language (ESL) learning among vocational college students. *Creative Education, 9*(01), 84. https://doi.org/10.4236/ce.2018.91008

Borg, S. (2003) Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching, 36*(2), 81-109. https://doi.org/10.1017/S0261444803001903

Borg, S. (2019). *Language teacher cognition: Perspectives and debates.* Second handbook of English language teaching, 1149-1170. https://doi.org/10.1007/978-3-030-02899-2_59

Burn, N., & Grove, S. K. (2005). *The practice of nursing research: conduct, critique, and utilisation* (5th ed.). St. Louis: Elsevier; 2005.

Burri, M., Chen, H., & Baker, A. (2017). Joint development of teacher cognition and identity through learning to teach L2 pronunciation. *The Modern Language Journal, 101*(1), 128-142. https://doi.org/10.1111/modl.12388

Chamorro, M. G., & Rey, L. (2013). Teachers' Beliefs and the Integration of Technology in the EFL Class. *How Journal, 20*(1), 51-72. Retrieved from https://www.howjournalcolombia.org/index.php/how/article/view/23

Cheah, J. H., Thurasamy, R., Memon, M. A., Chuah, F., & Ting, H. (2020). Multigroup analysis using smartpls: step-by-step guidelines for business research. *Asian Journal of Business Research, 10*(3), I-XIX. https://doi.org/10.14707/ajbr.200087

Chow, M., Herold, D. K., Choo, T. M., & Chan, K. (2012). Extending the technology acceptance model to explore the intention to use Second Life for enhancing healthcare education. *Computers & education, 59*(4), 1136-1144. https://doi.org/10.1016/j.compedu.2012.05.011

Clarà, M. (2017). Teacher resilience and meaning transformation: How teachers reappraise situations of adversity. *Teaching and Teacher Education, 63,* 82-91. https://doi.org/10.1016/j.tate.2016.12.010

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly,* 319-340. https://doi.org/10.2307/249008

Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: three experiments. *International journal of human-computer studies, 45*(1), 19-45. https://doi.org/10.1006/ijhc.1996.0040

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A Comparison of two theoretical models. *Management science, 35*(8), 982-1003. https://doi.org/10.1287/mnsc.35.8.982

Gilakjani, A. P., & Sabouri, N. B. (2017). Teachers' Beliefs in English Language Teaching and Learning: A Review of the Literature. *English Language Teaching, 10*(4), 78-86. https://doi.org/10.5539/elt.v10n4p78

Golombek, P., & Doran, M. (2014). Unifying cognition, emotion, and activity in language teacher professional development. *Teaching and Teacher Education, 39,* 102-111. https://doi.org/10.1016/j.tate.2014.01.002

Greenhow, C., Galvin, S. M., Brandon, D. L., & Askari, E. (2020). A decade of research on K–12 teaching and teacher learning with social media: Insights on the state of the field. *Teachers College Record, 122*(6), 1-72. https://doi.org/10.1177/016146812012200602

Guan, N., Song, J., & Li, D. (2018). On the advantages of computer multimedia-aided English teaching. *Procedia computer science, 131,* 727-732. https://doi.org/10.1016/j.procs.2018.04.317

Hamzah, M. I. M., Juraime, F., & Mansor, A. N. (2016). Malaysian principals' technology leadership practices and curriculum management. *Creative Education, 7*(07), 922. https://doi.org/10.4236/ce.2016.77096

Holton, E. F., & Burnett, M. F. (2005). The basics of quantitative research. *Research in organizations: Foundations and methods of inquiry,* 29-44. Retrieved from https://www.bkconnection.com/static/Research_in_Organizations_EXCERPT.pdf

Hung, M. L., & Chou, C. (2015). Students' perceptions of instructors' roles in blended and online learning environments: A comparative study. *Computers & Education, 81,* 315-325. https://doi.org/10.1016/j.compedu.2014.10.022

Jeung, H. H. (2014). Understanding teachers' continuance intentions towards distance training program: An Extension of technology acceptance model. *Journal of Lifelong Learning Society, 10*(2), 229-262. https://doi.org/10.26857/JLLS.2014.05.10.2.229

Joo, Y. J., Lee, H. W., & Ham, Y. (2014). Integrating user interface and personal innovativeness into the TAM for mobile learning in Cyber University. *Journal of Computing in Higher Education, 26*(2), 143-158. https://doi.org/10.1007/s12528-014-9081-2

Joo, Y. J., Park, S., & Lim, E. (2018). Factors influencing preservice teachers' intention to use technology: TPACK, teacher self-efficacy, and technology acceptance model. *Journal of Educational Technology & Society, 21*(3), 48-59. Retrieved from https://dspace.ewha.ac.kr/bitstream/2015.oak/245215/1/Factors%20Influencing%20Preservice%20Teachers%27%20Intention%20to%20Use%20Technology.pdf

Karimi, M. N., & Norouzi, M. (2017). Scaffolding teacher cognition: Changes in novice L2 teachers' pedagogical knowledge base through expert mentoring initiatives. *System, 65,* 38-48. https://doi.org/10.1016/j.system.2016.12.015

Kartchava, E., & Chung, S. (2015). Pre-service and in-service English as a second language teachers' beliefs about the use of digital technology in the classroom. *Studies in English Language Teaching, 3*(4), 355-383. https://doi.org/10.22158/selt.v3n4p355

Lakhana, A. (2014). What is Educational Technology? An Inquiry into the Meaning, Use, and Reciprocity of Technology. *Canadian journal of learning and technology, 40*(3). https://doi.org/10.21432/T2H59S

Lin, W. C., & Yang, S. C. (2011). Exploring students' perceptions of integrating Wiki technology and peer feedback into English writing courses. *English Teaching: Practice and Critique, 10*(2), 88-103. Retrieved from https://eric.ed.gov/?id=EJ944900

Mohd, K. N., & Karacan, C. G. (2018). *Augmented Reality Game (ARG), 21st century skills and ESL classroom.* Retrieved from http://download.garuda.kemdikbud.go.id/article.php?article=1733239&val=18635&title=AUGMENTED%20REALITY%20GAME%20ARG%2021ST%20CENTURY%20SKILLS%20AND%20ESL%20CLASSROOM

Morschheuser, B., Riar, M., Hamari, J., & Maedche, A. (2017). How games induce cooperation? A study on the relationship between game features and we-intentions in an augmented reality game. *Computers in human behavior, 77,* 169-183. https://doi.org/10.1016/j.chb.2017.08.026

Obar, J. A., & Wildman, S. (2015). *Social media definition and the governance.* Retrieved from https://www.researchgate.net/profile/Steven-Wildman/publication/315455917_Social_Media_Definition_and_the_Governance_Challenge_An_Introduction_to_the_Special_Issue/links/5b5776aa458515c4b2435330/Social-Media-Definition-and-the-Governance-Challenge-An-Introduction-to-the-Special-Issue.pdf

Richardson, P. W., Karabenick, S. A., & Watt, H. M. (2014). *Teacher motivation* (pp. 3-19). Routledge. https://doi.org/10.4324/9780203119273-1

Saiful, J. (2019). EFL teachers' cognition in the use of Youtube Vlog in English language teaching. *Journal of Foreign Language Education and Technology, 4*(1). Retrieved from https://www.learntechlib.org/p/208877/

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard educational review, 57*(1), 1-23. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Sousa, V. D., Driessnack, M., & Mendes, I. A. C. (2007). An overview of research designs relevant to nursing: Part 1: quantitative research designs. *Revista latino-americana de enfermagem, 15,* 502-507. https://doi.org/10.1590/S0104-11692007000300022

Suki, N. M., & Suki, N. M. (2011). Exploring the relationship between perceived usefulness, perceived ease of use, perceived enjoyment, attitude and subscribers' intention towards using 3G mobile services. *Journal of Information Technology Management, 22*(1), 1-7. Retrieved from http://jitm.ubalt.edu/XXII-1/article1.pdf

Technology. (2003). *In Collins English Dictionary – Complete and Unabridged.* Retrieved from http://thefreedictionary.com/technology

Technology. (2009). *In the American Heritage Dictionary of the English Language.* Retrieved from http://thefreedictionary.com/technology

Technology. (2010). *In Random House Kernerman Webster's College Dictionary.* Retrieved from http://thefreedictionary.com/technology

Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education, 57*(4), 2432-2440. https://doi.org/10.1016/j.compedu.2011.06.008

Teo, T., Chai, C. S., Hung, D., & Lee, C. B. (2008). Beliefs about teaching and uses of technology among pre-service teachers. *Asia-Pacific Journal of Teacher Education, 36*(2), 163-174. https://doi.org/10.1080/13598660801971641

Walker, W. (2005). The strengths and weaknesses of research designs involving quantitative measures. *Journal of research in nursing, 10*(5), 571-582. https://doi.org/10.1177/136140960501000505

Wangpipatwong, S., Chutimaskul, W., & Papasratorn, B. (2008). Understanding Citizen's Continuance Intention to Use e-Government Website: a Composite View of Technology Acceptance Model and Computer Self-Efficacy. *Electronic journal of e-government, 6*(1), 55-64. Retrieved from https://academic-publishing.org/index.php/ejeg/article/view/484

Williams, M., & Burden, R. (1997). Motivation in language learning: A social constructivist approach. *Cahiers de l'APLIUT, 16*(3), 19-27. https://doi.org/10.3406/apliu.1997.1201

Zainal, A. (2012). ESL teachers' use of ICT in teaching English literature: An analysis of teachers' TPCK. *Procedia-Social and Behavioral Sciences, 34,* 234-237. https://doi.org/10.1016/j.sbspro.2012.02.047

Zhou, Z., Wu, Q. J., & Sun, X. (2018). Encoding multiple contextual clues for partial-duplicate image retrieval. *Pattern Recognition Letters, 109,* 18-26. https://doi.org/10.1016/j.patrec.2017.08.013

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