University-related Factors in Technology Integration: A Quantitative Study in East Coast of China

Lin Chenhui[1], Geethanjali Narayanan[2], Harrinni Md Noor[3*]

[1 2 3]Faculty of Education, Universiti Teknologi MARA,
UiTM Puncak Alam Campus, 42300 Puncak Alam, Selangor, Malaysia
carollinhappy@hotmail.com
geetha@uitm.edu.my
harrinni@uitm.edu.my
[*]Corresponding Author

https://doi.org/10.24191/ajue.v20i2.27009

Received: 22 April 2024
Accepted: 24 May 2024
Date Published Online: 21 July 2024
Published:21 July 2024

Abstract: The Chinese government has acknowledged the importance of technology in education and has launched many policies to promote technology integration. Nevertheless, practical implementation still needs to match the expectations. Previous studies indicate that the integration of technology by English as a Foreign Language (EFL) lecturers is influenced by both initiate-order factors (e.g., facilitating conditions, university culture, policies and professional development) and subsequent-order factors (e.g., teacher beliefs, technological knowledge and skills). In China, initiate-order factors play a more significant role due to its collectivist culture. Thus, the objective of this study is to explore how university-related factors (representatives of initiate-order factors), including university culture, facilitating conditions, and professional development, affect EFL teachers' technology integration and the interrelationship among these aspects. Technology integration in this study refers to the utilization of technology to facilitate transformative learning and teaching, rather than merely technology usage. A survey was adopted to examine university-related aspects of 271 EFL lecturers in East Coast of China. The data was analyzed using Partial Least Square–Structural Equation Modelling (PLS-SEM) in Smartpls 4. The findings revealed that facilitating conditions had a positive correlation with technology integration, whereas university culture and professional development showed weak relationships. University culture indirectly predicted technology integration via facilitating conditions. It also revealed that there was a positive correlation between university culture and professional development.

Keywords: Technology Integration, university-related Factors, English as a Foreign Language

1. Introduction

The advent of technology has brought about substantial transformations in the realm of second language instruction and acquisition by creating an authentic language environment, bridging the gap between native and non-native contexts, promoting learners' learning autonomy, and developing their 21st-century skills (Huang, 2020; Kessler, 2018). Previous studies have illustrated that the use of technology has been treated as an efficient approach to speed up students' learning (Abdullah et al., 2023; Liu & Deris, 2022). The Chinese government recognizes the significance of effectively integrating technology with English as a foreign language (EFL) teaching due to its strength. In 2018, the Ministry of Education (MoE) released the Education Informatization 2.0 Action Plan which proposed the concept of "Education Informatization 2.0". The Chinese government thereby has invested heavily in building technology infrastructures and university facilities and has promoted lecturers to improve their technological competence in the past decade. Despite the potential benefits, many EFL

lecturers still need to be convinced, and some even refuse to use technology, especially Information and Communication Technology (ICT) in the setting of English instruction (Huang, 2020). In 2021, the Ministry of Education launched the Medium and Long-term Development Plan for Education Informatization (2021-2035) to emphasize integrating technology into teaching and promote technology transformation reform (The State Council, 2021). Thus, there needs to be more clarity between policy requirements and the implementation of teaching practices among EFL lecturers (Ma et al., 2019).

The existing research identifies two influencing factors in the integration of technology by lecturers: initial-order factors and subsequent-order factors (Ertmer & Ottenbreit-Leftwich, 2010). The initial-order factors include contextual factors (e.g., political influence, social culture, and university culture), facilitating conditions, and available resources such as time, equipment, and training (Lai & Jin, 2021). The subsequent-order factors contain attitudes and beliefs, motivation, and technological knowledge and skills (e.g., TPACK) (Kim et al., 2013; Lai & Jin, 2021; Miranda & Russell, 2011). Compared with subsequent-order factors, initiate-order factors play a more significant role in China due to its collectivist culture. Also, previous studies demonstrate that subsequent-order factors could be overcome more easily when initial-order factors have been handled (Kim et al., 2013; Vongkulluksn et al. (2018). Thus, the study concentrates on initiate-order factors. Although many policies have been released to promote technology integration in China, actual technology integration among EFL lecturers is far from satisfactory. Thus, the researcher focus on the university-related factors which are the bridge between government policies and EFL lecturers in order to analyze how university-related factors such as professional development, university culture, and facilitating conditions affect EFL lecturers' technology integration. It is also evidenced that university-related factors such as professional development, university culture, and facilitating conditions have a major impact on Chinese EFL lecturers and are still worth further study (Lai et al., 2022; Ma et al., 2019). Furthermore, as Dogan et al. (2020) argue, the majority of current research focuses on individual factors and fails to consider their interrelationship. Thus, this study plans to explore university-related factors affecting the integration of technology by EFL lecturers on the East Coast of China.

2. Technology Integration

Technology integration has been defined differently in literature. Reigeluth and Joseph (2002) introduced two terms: integrating technology and transforming technology. Integrating technology focuses on using technology to improve the approaches to instruction. In contrast, transforming technology refers to utilizing technology to make significant changes to how knowledge is taught that was not previously possible. Ertmer (2005) perceives technology integration to be relevant to the understanding of technology transformation as described by Reigeluth and Joseph (2002). Ertmer recognizes that technology integration can achieve more complicated and authentic teaching goals; reducing time is not the primary purpose. Although emphasizing the transformational potential of technology, these definitions neglect the interdependence between teaching and technology by excluding crucial aspects such as pedagogy and content, which are equally essential in the process of integrating (Bui, 2022; Okojie et al., 2006). According to Kimmons (2015), technology integration in education is the efficient employment of technology in educational environments to achieve learning goals. Islam et al. (2019) state that technology integration in teaching enhances teachers' proficiency in both pedagogical and content domains inside the classroom, facilitating efficient learning for students through the employment of technological instruments. However, Bui (2022) suggest, it is difficult to define technology integration as the process itself is multifaceted and develops in combined with the introodcution of new technologies (Tondeur et al., 2008). In addition, as Dockstader (1999) highlight, the mere use of computers in a classroom without specific education or purpose should not be regarded as technology integration. Technology helps to progress just when it is associated with efficient and purposeful utilization. In this context, technology integration refers to the incorporation of technological tools and resources to facilitate the transformation of the learning and teaching process. In order to enhance the investigation in the field of educational technology, the term "technology" in this research encompasses a wide range of tools and technologies that lecturers employ to facilitate efficient English instruction.

2.1 University-related factor: professional development

Teacher professional development (PD) is crucial for enhancing student learning outcomes. Prior study has evidenced the advantages of successful incorporation of technology in education. The rapid growth of technology necessitates that lecturers stay abreast of the latest advances, therefore emphasizing its significance of PD. PD can encompass formal structured training programmes or informal independent learning efforts undertaken by individuals. Formal and structured training, regarded as traditional PD, may take the forms of workshops, conferences, formal instructions, and collaborative activities. Research has demonstrated the correlation between PD and the implementation of technology by lecturers. In a study by Li et al. (2019), a part of a larger longitudinal research project examined 938 high school lecturers. The findings suggested that providing technological and pedagogical assistance through training can motivate instructors to utilize technology in the classroom with more efficacy. Similarly, the research investigating K-12 teachers explored by Hsu (2017) also evidenced a significant correlation between the adoption of and receiving training in technology. As Khodabandelou (2016) suggests, one of the main obstacles preventing lecturers from accepting technology is their insufficient professional technical training, which hinders their ability to acquire the necessary knowledge and abilities. Thus, we propose Hypothesis One (H1) as follows.

Hypothesis One (H1): Professional development positively influences technology integration.

2.2 University-related factor: facilitating conditions

Facilitating conditions (FC) relate to the infrastructures that users see as essential for supporting the adoption of technology in a particular context (Venkatesh et al., 2003; Ma et al., 2019). FC are elements of the environment that affect how easy or difficult a person perceives a task to be used (Teo, 2009). FC contributing to technology integration may include technological guidance, accessible resources, device administration and assistance, and administrative policy endorsement. As Mei et al. (2017) suggest, thoughtfully planned courses can easily be compromised by unforeseen disruptions such as Internet failures, program crashes, or hardware malfunction. Ma et al. (2019) used the UTAUT model to study the technology usage of 585 EFL lecturers in China. It is shown that FC has a direct impact on technology integration. In a study executed by Mei, Brown, and Teo (2017), a total of 295 preservice EFL teachers were surveyed to assess their usage of Web 2.0 technologies. The results also evidenced that FC (technical support and tightly controlled Internet) has a beneficial impact on the incorporation of Web 2.0 tools. We propose Hypothesis Two as follows.

Hypothesis Two (H2): Facilitating conditions positively influence technology integration.

2.3 University-related factor: university culture

University culture (UC) is recognized as the available support and expectations from universities to motivate and promote lecturers to use technology for teaching (Huang, 2022). Existing evidence demonstrated that lecturers who receive support from universities were more inclined to utilize technology for teaching (e.g., Bice & Yang, 2022; Inan & Lowther, 2009; Miranda & Russell, 2011; Xie et al., 2021). In their 2005 case study, Staples, Pugach, and Himes (2005) emphasized the importance of a shared vision and pointed out that a school with a robust shared technology is less likely to be distracted by the use of technology that lacks clarity and does not contribute to the enhancement of education and curriculum. This aligns with the findings of Tondeur et al. (2008) that a problem would arise if surrounding lecturers had different attitudes toward using ICT. Another corroborating evidence provided by Bice and Tang's (2022) study was the setting of a compact independent educational institution catering specifically to pupils with dyslexia. The result demonstrated that university culture affected the teacher's beliefs and adoption of technology. The UC of that setting encourages multisensory methods, and all participating lecturers, as the result reflected their enthusiasm to use multisensory usage for instruction (Bice & Tang, 2022). As Hew and Brush (2006) conclude, a favorable university culture could be a powerful motivator to overcome obstacles from an institution or a school. Accordingly, Hypothesis Three is proposed as follows.

Hypothesis Three (H3): University culture positively influences technology integration.

2.4 Conceptual framework

Research on EFL lecturers indicates that a positive university climate, which includes access to the necessary technology, support from university leaders, encouragement, and recognition from colleagues, might stimulate the integration of technology into teaching practices (Hong et al., 2019; Lai et al., 2022). The expectations or requirements of the institution may also affect lecturers' motivation to engage in PD. In addition, UC may also influence technology integration through FC's medication. A pleasant UC may motivate universities to provide technological facilities, resources, and tools. In a 22-month-long study, Chiu (2022) investigates the supply of school learning support for technology integration to 122 lecturers who are keen to enhance their technical skills, receive facilitation help, and gain autonomy support. This longitudinal and experimental study evidenced that the increased support for lecturers' needs will encourage lecturers to use technology for high-quality integration. According to the literature that has been discussed, we put forward the following hypothesis.

Hypothesis Four (H4): University culture predicts technology integration indirectly via the mediation of facilitating conditions.

Hypothesis Five (H5): University culture positively influences professional development.

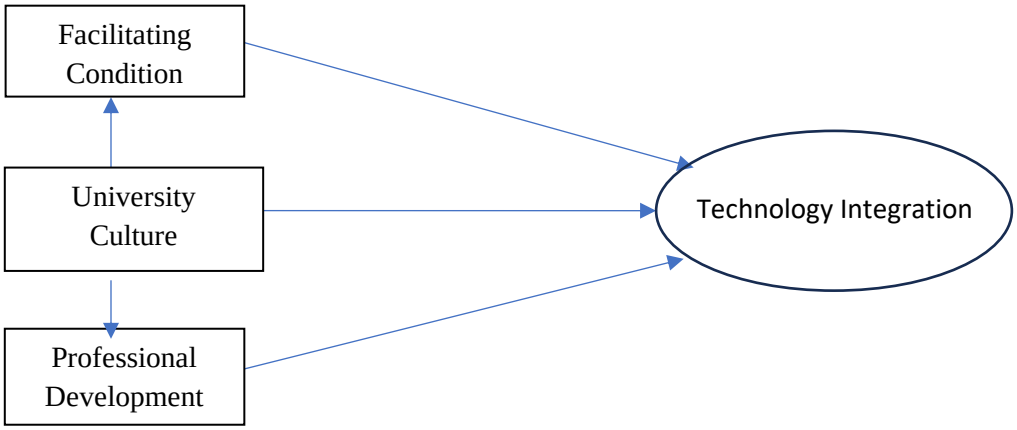

Fig.1 Conceptual Framework

3. Research methods

3.1 Context and Subjects

This study involves a group of 271 EFL lecturers. The individuals in question are EFL educators employed in Jiangsu Province, which is located on the East coast of China. There are 78 universities in Jiangsu Province, including public universities and private universities, key universities and non-key universities, comprehensive universities, and specialized institutes. The various types of universities can enrich the study as the uneven growth of educational informationalization at Chinese universities leads to variations in lecturers' perceptions and behavior regarding the integration of technologies (Huang et al., 2019).

3.2 Instrument

The questionnaires of this study comprise three sections: demographics, the scale of technology integration, and the scale of university-related predictors (facilitating conditions, professional development, and university culture). The scale of technology integration is designed based on the study of Ertmer et al. (2012). The scale of school-related predictors is adopted from Ma et al. (2019) and Lai et al. (2022). Items on facilitating conditions are from Ma et al. (2019), and items on professional development and University Culture are from Lai et al. (2022). Factor analysis was used to validate the

questionnaires before data collection. All items in the questionnaires were measured using a 5-point Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement. The language of the questionnaire was bilingual (English and Mandarin) in case participants did not fully understand the description of their second language.

3.3 Data collection and analysis

The online questionnaires were initiated using the online survey platform WENJUANXING. Participants were invited via social chatting groups (such as the WeChat or QQ platforms), discussion forums, and professional development centers.

The software SPSS 26.0 was utilized to conduct descriptive statistics. The data analysis, which involved both the measurement model and the structural model analysis, was conducted using Partial Least Square – Structural Equation Modelling (PLS-SEM) in SmartPLS 4. The conceptual model was validated using PLS-SEM. According to Hair et al. (2017), PLS-SEM is beneficial for conducting exploratory studies like this one and has the potential to yield precise outcomes. Furthermore, it does not have a rigid criterion for data distribution and sample size (Willaby et al., 2015). In relation to the measurement model, the internal consistency was assessed by testing Cronbach's coefficient and the Composite reliability coefficient (CR). The convergent validity of the items has been assessed based on the outer loadings, Composite Reliability (CR), Average Variance Extracted (AVE), and Variance Inflation Factor (VIF). The study assessed the discriminant validity by examining cross loading and the Fornell-Larcker criterion (HTMT). The study examined various aspects of the structural model, including the path coefficients, the coefficient of determination (R^2), Predictive Relevance (Q^2), and effect size (f^2).

4. Result and discussion

4.1 Descriptive statistics

A total of 271EFL Lecturers participated in this study. Most of them are aged above 45, which occupies 53.87% while 2.21% of them with aged below 30, and 43.91% are between 30 and 45 years old. In terms of types of institutions they work in, 75.65% are from non-key public universities, 21.03% are from key public universities, and the remaining 3.32% are working in private universities. In terms of academic background, 26 participants are Bachelor holders (9.59%), 178 are Maser holders (65.68%), and 67 participants have PhD degrees (24.72%). The majority of participants (82.66%) have over 15 years of experience in teaching English, while 10.33% have teaching experience ranging from 5 to 15 years. The remaining participants have fewer than five years of experience in teaching English. Considering self-assessed technology proficiency, only six individuals (2.21%) classify themselves as advanced technology users, whereas 189 (69.74%) identify as intermediate technology users, and the other 76 (28.04%) categorize themselves as novice technology users. When it comes to self-assessment of technology proficiency, more than half of the participants (69.74%) have a moderate degree of technological expertise, while 28.04% consider themselves low-level users of technology. Only six individuals demonstrate a high level of technological proficiency.

Table 1. Demographic Information

		Frequency	Percent %
Age	<30	6	2.21%
	30-45	119	43.91%
	>45	146	53.87%
Type of institution or university working	Key Public University	57	21.03%
	Non-key Public University or Institute	205	75.65%
	Private University or Institute	9	3.32%
Academic Background	Bachelor	26	9.59%

		Frequency	Percent %
	Master	178	65.68%
	PhD	67	24.72%
Year of English Teaching	<5 years	19	7.01%
	5-15 years	28	10.33%
	>15 years	224	82.66%
Self-evaluation of technology proficiency	Low	76	28.04%
	Medium	189	69.74%
	High	6	2.21%

4.2 Measurement model assessment

The measurement model was evaluated based on its internal consistency, convergent validity, and discriminant validity. Initially, the convergent validity was checked by examining the factor loadings and calculating the Average Variance Extracted (AVE). Factor loadings of all items were examined. The factor loadings of all items were above 0.7, therefore satisfying the criterion established by Hair et al (2022). In terms of AVE, Facilitating Conditions (0.831), University Culture (0.657), Professional Development (0.829), and Technology Integration (0.767) all surpassed the standard of 0.5 established by Hair et al (2022).

In order to evaluate the internal consistency, the Cronbach's α coefficient and the Composite Reliability coefficient (CR) were examined. Table 2 illustrates that Facilitating Condition (α=0.898), University Culture (α=0.781), Professional Development (α=0.897), and Technology Integration (α=0.924) all above the threshold of 0.7 set by Hair et al (2011). Four constructs of CR exceeded the recommended value of 0.7, as stated by (Hair et al, 2022). The reliability of all variables was verified.

Table 2. Reliability and Validity

Constructs	Items	Factor Loadings	VIF	Cronbach's α	AVE	CR (rho_a)	CR (rho_c)
Facilitating Condition	F1	0.892	2.748	0.898	0.831	0.936	0.937
	F2	0.951	4.420				
	F3	0.890	2.741				
University Culture	S1	0.769	2.621	0.781	0.657	0.852	0.936
	S2	0.855	3.029				
	S3	0.806	2.669				
Professional Development	P1	0.905	1.429	0.897	0.829	0.936	0.872
	P2	0.922	1.794				
	P3	0.905	1.825				
Technology Integration	T1	0.872	2.846	0.924	0.767	0.943	0.943
	T2	0.865	2.790				
	T3	0.921	4.374				
	T4	0.834	2.590				
	T5	0.884	3.311				

Discriminant validity measures the degree to which one construct is distinct from another. The Fornell-Larcker criterion and HTMT were assessed in this particular case. Based on the data shown in Table 3, the Square Root of each Construct's AVE presented more significance compared to the correlations with other constructs. As a consequence, Fornell-Larcker was reached. The HTMT values of all constructs were below the cut-off HTMT requirement of 0.9 (Hair et al., 2022). Hence, considering the information provided, discriminant validity has been proven. The measurement model is both valid and reliable.

Table 3. Fornell-Larcker Criterion

	FC	PD	UC	TI
FC	0.912			
PD	0.284	0.911		
UC	0.357	0.325	0.834	
TI	0.42	0.127	0.296	0.876

Note: Diagonals Represent the Square Root of Each Construct AVE; Off-Diagonal Represents the Constraint's Correlation. FC=Facilitating Conditions, PD=Professional Development, UC= University Culture, TI=Technology Integration.

Table 4. HTMT

	FC	PD	UC	TI
FC				
PD	0.316			
UC	0.427	0.38		
TI	0.457	0.142	0.344	

Note: FC=Facilitating Conditions, PD=Professional Development, UC= University Culture, TI=Technology Integration.

4.3 Structural model assessment

Once the components' reliability and validity were established, the structural model was tested using a bootstrapping technique of 5000 re-samples. This technique was used to assess multicollinearity, standard beta (β), coefficient of correlation (R^2), and the size of the effect (f^2). The objective was to analyze the correlation between independent and dependent variables and to assess the significance of path coefficients.

The presence of multicollinearity was assessed using the Variance Inflation Factor (VIF). As to the findings of Hair et al (2022), VIF value below 5 is considered acceptable. According to Table 2, all VIF values were less than 5.

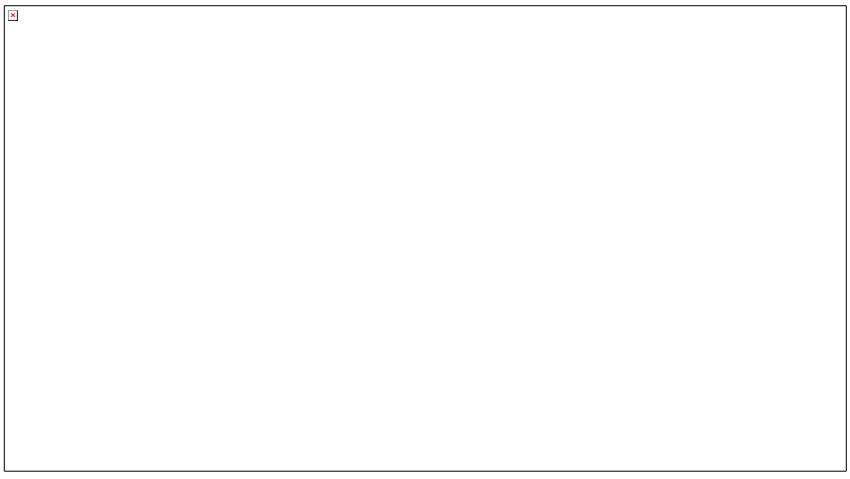

Fig. 2 Findings of the structural model

Regarding R^2 values results provided in Figure 1, the combined effects of FC, UC, and PD together contribute to 20.2% of the variance in TI (0.202). UC explains that 10.6% is attributed to PD and 12.8% is related to FC. According to Cohen (1988), R^2 values below 0.01 indicate a little influence, R^2 values around 0.09 as indicating a moderate effect, and R^2 values above 0.25 as indicating a large effect. Thus, the R2 values in this study show a moderate effect.

Effect size values were also evaluated to test the structural model. Based on Gefen and Straub's (2005) arguments, an effect size lying within the range between 0.02 and 0.15 demonstrates a small effect, while a range between 0.15 and 0.35 suggests a medium effect, and any figure above 0.35 indicates a large effect. Results as presented in Table 6, demonstrate that H2 (f^2=0.142) and H5 (f^2=0.118) have a weak effect, while H4 (f^2=0.146) have a moderate effect, which was close to the 0.15 threshold.

The independent constructs possess predictive significance for dependent constructs, as all Q^2 values are statistically significant, exceeding zero. The predictive power of SC, FC, and PD in predicting TI is moderate as the PLS-SEM model outperforms the LM model in 9 out of 11 prediction mistakes.

Table 6. Hypothesis assessment

Hypothesis	Path	Path coefficient	P values	Supported	f-square
H1	PD -> TI	-0.034	0.641	Not supported	
H2	FC -> TI	0.367	0.000	Supported	0.142
H3	UC -> TI	0.176	0.076	Not supported	
H4	UC -> FC	0.357	0.000	Supported	0.146
H5	UC -> PD	0.325	0.000	Supported	0.118

The results presented in Table 6 demonstrate that there is no statistically significant correlation between PD and technology integration (P>0.05). Consequently, Hypothesis One is not supported. Concerning Hypothesis Two, as shown in Table 6, FC was positively related to technology integration (β=0.367, P<0.05). Thus, Hypothesis Two is confirmed in a positive manner. Furthermore, there is no significant association between UC and technology integration (P>0.05). As a consequence, Hypothesis Three which claims that university culture positively predicted technology integration was not accepted. Regarding the interwoven relations among UC, FC, and PD. It is demonstrated that UC was positively related to FC (β=0.357, P<0.05) and PD (β=0.325, P<0.05). Hypothesis Four and Hypothesis Five were confirmed.

5. Discussion

The objective of this study is to explore university-related factors influencing the integration of technology of EFL lecturers to integrate technology in the Chinese educational system as well as the relationship among these aspects. The study found that FC exhibited a direct and positive relation with technology integration, and UC and PD demonstrated a weak and non-significant correlation. However, UC can predict technology integration indirectly via the mediation of FC in this study. Also, SC is positively associated with PD.

In line with previous literature, FC is a positive predictor on EFL lecturers' technology integration. The decisions of EFL lecturers regarding technological integration are significantly influenced by the support provided by the administration in terms of policy, internet connectivity, and technical assistance. The findings of a survey conducted on 295 preservice EFL teachers demonstrate that their adoption of Web 2.0 tools is greatly impacted by their perceived convenience of FC, which in turn determines their intention to integrate technology into their teaching (Mei et al., 2019). Prompt technical help is crucial for the seamless and incident-free implementation of ICT in the education setting. As Mei et al. (2018) suggest, an unexpected Internet outage or a software bug can easily ruin well-laid-out courses. Thus, the technical team in the universities should address technology concerns such as system failure, internet connectivity, and system malfunction with utmost diligence (Abdul Rahim et al., 2022).

Inconsistent with previous studies, it is evident that UC and PD have no positive relations with technology integration In this particular setting.. The reason behind this is that, firstly, technology integration refers to high-quality usage of technology in this study, rather than simple technological adoption and enrichment. Many EFL lecturers have been reported that they still have a preference for

incorporating poor-quality technologies in order to reduce expenses and save time (Cheng et al., 2020). They are still reluctant, even refusing to use technology, especially ICT for English teaching (Huang et al., 2020). Thus, it is possible that participants do not employ technology integration for transformation purposes, but rather utilize technology for alternative objectives. In addition, we solely explore some representative initiate-order factors (FC, UC, and PD) in this study, which may only account for a percentage of the reasons and overlook some subsequent-order factors such as skills, knowledge, attitudes and beliefs. Many studies illustrated that first-order factors are interwoven with subsequent-order factors which are second-order factors, should be examined in a specific setting (e.g., Huang et al., 2020; Lai et al., 2022; Sun & Mei, 2020). Although UC and PD do not positively predict technology integration in this study, they still have some indirect influence.

This study found that UC could predict EFL lecturers' technology integration indirectly via the mediation of FC. Prior studies have illustrated that educators who receive effective facilitating support from their universities are more willing to use technology in their instructional practices (e.g., Bice & Lang, 2022; Miranda & Russell, 2011; Xie et al., 2021). A good university culture of technology integration provides timely technical support, policies, and undisturbed Internet, thereby supporting technology integration. In this study, UC is positively associated with PD which is in line with previous studies. Universities with great support and pleasant technological usage environments are willing to provide formal and informal training for lecturers. The findings of Lai et al. (2022) studies suggest that lecturers prefer to integrate technology after PD because lecturers achieve a sense of belonging, encouragement, and social support through PD. An assertion has been made that a primary hindrance to the advancement of educational technology initiatives in universities is the need for additional assistance. This is because instructors who do not receive assistance are likelier to have lower self-efficacy and not have acquired the skills required to pursue the initiatives. Also, China is a collectivist cultural orientation country (Chiu, 2016; Liu & Deris, 2022). As Ma et al. (2019) suggest, the Chinese have a strong 'we' consciousness; people prefer to "walk in the same line." A pleasant UC could bring many changes in EFL lecturers' attitudes and behaviors, which could affect their technology integration.

6. Conclusion

This study investigates the impact of three university-related elements, namely, university culture (UC), facilitating condition (FC), and professional development (PD), on EFL instructors' technology usage in the educational setting of East Coast China. Additionally, the study examines the interrelation between these components. The evidence demonstrates that FC is the crucial factor in determining the integration of technology by EFL lecturers, and UC has a positive correlation with both FC and PD.

The study acknowledges its constraints. Initially, this study employed self-reported data to examine various variables. Subsequent investigations could include observation and interviews to quantitatively assess real-world utilization and delve into various facets of the study. In addition, this study only examined three variables pertaining to universities. It is necessary to conduct further research on additional variables linked to lecturers, such as knowledge and skills, attitudes, and beliefs. It is recommended that this study be replicated in various settings and enhanced with a longitudinal and comprehensive qualitative research methodology to enhance the depth and breadth of the research.

7. Co-Author Contribution

The authors affirmed that there is no conflict of interest in this article. Author1 conducted the fieldwork, completed the literature review, and composed the entire article. Author2 and Author3 provided supervision to Author1, thoroughly proofread the entire article, and offered suggestions.

8. Acknowledgements

The authors would like to thank Geethanjali Narayanan and Harrinni Md Noor for supervising and EFL lecturers who participated in this study.

9. References

Abdul Rahim, N. N., Humaidi, N., Abdul Aziz, S. R., & Mat Zain, N. H. (2022). Moderating Effect of Technology Readiness Towards Open and Distance Learning (ODL) Technology Acceptance During COVID-19 Pandemic. *Asian Journal of University Education*, *18*(2), 406–421.

Abdullah, H., Zahariah Sahudin, Nur Zahidah Bahrudin, Imbarine Bujang, & Khalid, K. (2023). Determinants of Educational Technology Acceptance: An Integration of TAM and UTAUT. *Asian Journal of University Education*, *19*(4), 638–650.

Bice, H., & Tang, H. (2022). Teachers' beliefs and practices of technology integration at a school for students with dyslexia: A mixed methods study. *Education and Information Technologies*.

Bui, T. H. (2022). English teachers' integration of digital technologies in the classroom. *International Journal of Educational Research Open*, *3*, 100204.

Cheng, S.-L., Lu, L., Xie, K., & Vongkulluksn, V. W. (2020). Understanding teacher technology integration from expectancy-value perspectives. *Teaching and Teacher Education*, *91*, 103062.

Chiu, T. K. F. (2016). Introducing electronic textbooks as daily-use technology in schools: A top-down adoption process. *British Journal of Educational Technology*, *48*(2), 524–537.

Chiu, T. K. F. (2022). School learning support for teacher technology integration from a self-determination theory perspective. *Educational Technology Research and Development*.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Routledge.

Dockstader, J. (1999). Teachers of the 21st century know the what, why, and how of technology integration. *THE Journal*, *26*(6), 73–74.

Dogan, S., Dogan, N. A., & Celik, I. (2020). Teachers' skills to integrate technology in education: Two path models explaining instructional and application software use. *Education and Information Technologies*, *26*(1).

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development*, *53*(4), 25–39.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher Technology Change. *Journal of Research on Technology in Education*, *42*(3), 255–284.

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, *59*(2), 423–435.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. *Journal of the Academy of Marketing Science*, *45*(5), 616–632

Hair, J. F., Hult, G. T., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152.

Hew, K. F., & Brush, T. (2006). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, *55*(3), 223–252.

Hong, H.-Y., Lin, P.-Y., & Lee, Y.-H. (2019). Developing effective knowledge-building environments through constructivist teaching beliefs and technology-integration knowledge: A survey of middle-school lecturers in northern Taiwan. *Learning and Individual Differences*, *76*, 101787.

Hsu, L. (2017). Examining EFL teachers' technological pedagogical content knowledge and the adoption of mobile-assisted language learning: a partial least square approach. *Computer Assisted Language Learning*, *29*(8), 1287–1297.

Huang, F., Qi, J., & Xie, A. (2022). Sustaining Teaching with Technology after the Quarantine: Evidence from Chinese EFL Teachers' Technological, Pedagogical and Content Knowledge. *Sustainability*, *14*(14), 8774.

Huang, F., Teo, T., & Zhou, M. (2020). Factors Affecting Chinese English as a Foreign Language Teachers' Technology Acceptance: A Qualitative Study. *Journal of Educational Computing Research*, *57*(1), 83–105.

Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: a path model. *Educational Technology Research and Development*, *58*(2), 137–154.

Kessler, G. (2018). Technology and the future of language teaching. *Foreign Language Annals, 51*(1), 205–218.

Khodabandelou, R. (2016). Exploring the Main Barriers of Technology Integration in the English Language Teaching Classroom: A Qualitative Study. *International Journal of Education and Literacy Studies*.

Kim, C., Kim, M. K., Lee, C., Spector, J. M., & DeMeester, K. (2013). Teacher beliefs and technology integration. *Teaching and Teacher Education, 29*(1), 76–85.

Kimmons, R., Miller, B. G., Amador, J., Desjardins, C. D., & Hall, C. (2015). Technology integration coursework and finding meaning in pre-service teachers' reflective practice. *Educational Technology Research and Development, 63*(6), 809–829.

Lai, C., & Jin, T. (2021). Teacher professional identity and the nature of technology integration. *Computers & Education, 175*, 104314.

Lai, C., Wang, Q., & Huang, X. (2022). The differential interplay of TPACK, teacher beliefs, school culture and professional development with the nature of in-service EFL teachers' technology adoption. *British Journal of Educational Technology*.

Li, Y., Garza, V., Keicher, A., & Popov, V. (2019). Predicting High School Teacher Use of Technology: Pedagogical Beliefs, Technological Beliefs and Attitudes, and Teacher Training. *Technology, Knowledge and Learning, 24*(3).

Liu, X., & Deris, F. D. (2022). CoI-based Teaching Practices to Promote EFL Learners' Online Discussion in China's Blended Learning Context. *Asian Journal of University Education, 18*(2), 477–488.

Ma, M., Chen, J., Zheng, P., & Wu, Y. (2019). Factors affecting EFL schools' affordance transfer of ICT resources in China. *Interactive Learning Environments, 30*(6), 1044–1059.

Mei, B., Brown, G. T. L., & Teo, T. (2017). Toward an Understanding of Preservice English as a Foreign Language Teachers' Acceptance of Computer-Assisted Language Learning 2.0 in the People's Republic of China. *Journal of Educational Computing Research, 56*(1), 74–104.

Miranda, H. P., & Russell, M. (2011). Understanding factors associated with teacher-directed student use of technology in elementary classrooms: A structural equation modeling approach. *British Journal of Educational Technology, 43*(4), 652–666.

Reigeluth, C., & Joseph, R. (2002). Beyond technology integration: the case for technology transformation. *Educational Technology, 42*(4), 9–16.

Staples, A., Pugach, M. C., & Himes, D. (2005). Rethinking the Technology Integration Challenge. *Journal of Research on Technology in Education, 37*(3), 285–311.

Sun, P. P., & Mei, B. (2020). Modeling preservice Chinese-as-a-second/foreign-language teachers' adoption of educational technology: a technology acceptance perspective. *Computer Assisted Language Learning*, 1–24.

Teo, T. (2009). The Impact of Subjective Norm and Facilitating Conditions on Pre-Service Teachers' Attitude toward Computer Use: A Structural Equation Modeling of an Extended Technology Acceptance Model. *Journal of Educational Computing Research, 40*(1), 89–109.

The State Council. (2021). *The Medium and Long-term Development Plan for Education Informatization (2021-2035)*. Www.moe.gov.cn. http://www.moe.gov.cn/jyb_xxgk/xxgk_jyta/jyta_kjs/202111/t20211104_577689.html

Tondeur, J., Hermans, R., van Braak, J., & Valcke, M. (2008). Exploring the link between teachers' educational belief profiles and different types of computer use in the classroom. *Computers in Human Behavior, 24*(6), 2541–2553.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information technology: toward a Unified View. *MIS Quarterly, 27*(3), 425–478.

Vongkulluksn, V. W., Xie, K., & Bowman, M. A. (2018). The role of value on teachers' internalization of external barriers and externalization of personal beliefs for classroom technology integration. *Computers & Education, 118*, 70–81.

Willaby, H. W., Costa, D. S. J., Burns, B. D., MacCann, C., & Roberts, R. D. (2015). Testing complex models with small sample sizes: A historical overview and empirical demonstration of what Partial Least Squares (PLS) can offer differential psychology. *Personality and Individual Differences, 84*, 73–78.

Xie, K., Nelson, M. J., Cheng, S.-L., & Jiang, Z. (2021). Examining changes in teachers' perceptions of external and internal barriers in their integration of educational digital resources in K-12 classrooms. *Journal of Research on Technology in Education*, 1–26.