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Relations between Instructional Factors and Student Acceptance of Flipped Learning in Chinese Language Learning

Kit Ling LAU[a] & Quan QIAN[b]
[a]*The Chinese University of Hong Kong, Hong Kong*
*dinkylau@cuhk.edu.hk
[b]*Beijing Normal University, Zhuhai*

Abstract: This study investigated the relations between instructional factors and students' acceptance and use of flipped learning (FL) in the context of L1 Chinese language learning. A total of 2160 students from ten secondary schools in Hong Kong filled out two questionnaires measuring their perception of the instructional design and implementation of FL in their Chinese language classes and their acceptance of and actual participation in FL activities. Findings of the descriptive analysis indicated that from the perception of students, the design and implementation of FL in Chinese language classes generally adhered to the instructional principles of FL. Students also showed a moderately high level of acceptance of FL and a moderate level of participation in FL activities. The results of structural equation modeling indicated that both the quality of in-class and out-of-class eLearning activities had significant and positive effects on students' perceived usefulness, ease of use, and enjoyment of FL and, in turn, indirectly affected their actual participation of FL activities. The connection between in-class and out-of-class eLearning activities also had a significant direct effect on student participation. These findings highlight the important role of instructional factors in promoting students' willingness to accept FL as a new learning approach in a traditional teacher-centered school subject.

Keywords: Chinese language learning, flipped learning, instructional factors, student acceptance

1. Introduction

Flipped learning (FL) is a type of blended learning that emphasizes the active role of learners by switching the traditional classroom instruction to pre-class home activities using educational technologies (Blau & Shamir-Inbal, 2017; Bond, 2020). A typical flipped classroom comprises two core components: out-of-class eLearning activities and face-to-face classroom learning (Bergmann & Sams, 2012; Rasheed et al., 2020; Strelan et al., 2020). When compared to the traditional classroom learning, FL has many benefits to student learning. The out-of-class eLearning component of FL allows students to decide the time, place, and frequency of learning based on their learning needs (Akçayır & Akçayır, 2018; Murillo-Zamorano et al., 2019; Rasheed et al., 2020). The in-class component of FL focuses on in-depth discussions and interactive activities, which helps students deepen their understanding of the learning content and enhance their higher-order thinking (Cheng et al. al., 2018; Lo et al., 2018; Sletten, 2017). Many studies have supported the effectiveness of FL in promoting students' learning performance (Akçayır & Akçayır, 2018; Bond, 2020; Strelan et al., 2020), motivation (Kirmizi & Kömeç, 2019, Zou et al., 2022) and self-regulated learning (Blau & Shamir-Inbal, 2017; Çakiroglu & Öztürk, 2021).

As the learning approach of eLearning is largely different from the traditional teacher-centered instruction, one major concern in technology enhanced learning research is students' acceptance and intention to use the technologies (Estriegana et al., 2019; Teo, 2019). As proposed by the technology acceptance model (TAM) (Davis, 1989; Venkatesh &

Davis, 2000), users' perception of the usefulness and ease of use of a new technology significantly affects their intentional and actual use of the technology. In addition to perceived usefulness and ease of use, some researchers have proposed to add perceived enjoyment as another important indicator of student acceptance to represent students' internal motivation to use the technology (Padilla-MeléNdez et al., 2013; Zacharis, 2012). Although TAM has been widely adopted to investigate user acceptance in many eLearning studies, only a few studies applied this model in understanding students' acceptance of FL (Chen Hsieh et al., 2017; Haghighi et al., 2019; Padilla-MeléNdez et al., 2013). Most FL studies only explored students' general attitudes towards FL, and inconsistent findings were found across different studies. While some studies indicated that students held positive attitudes toward FL (Akçayır & Akçayır, 2018; Kirmizi & Kömeç, 2019; Wang, 2016), some found students preferred traditional instruction to FL because of the extra workload and lacking teacher guidance in out-of-class eLearning (Akçayır & Akçayır, 2018; Bond, 2020; Lo & Hew, 2017).

Instructional design and implementation pf FL have been posited as significant determinants that affect students' perception and acceptance of technologies and consequently affect their participation of FL activities (Dianati et al., 2022; Jiang et al., 2021). Regarding the out-of-class eLearning component of FL, many studies revealed that the quality of online teaching videos and other eLearning materials and activities would affect students' willingness to participant in out-of-class eLearning (Akçayır & Akçayır, 2018; Bond, 2020; Haghighi et al., 2019; Lau & Keung, 2021; Rasheed et al., 2020). In addition, explicit instruction and constant feedbacks from teachers are important to support students' independent learning in out-of-class eLearning activities, which can increase their acceptance and use of FL (Dianati et al., 2022; Zou et al., 2020). Researchers have also proposed some useful guidelines for the design and implementation of in-class learning activities of FL. First, there should be a close connection between out-of-class eLearning and in-class learning activities (Bond, 2020; Ng, 2018; Rasheed et al., 2020). Second, student-centered and cooperative learning activities should be designed to facilitate student interactions and cultivate students' high-order cognitive abilities (Çakiroglu & Öztürk, 2021; Haghighi et al., 2019; Lo & Hew, 2017; Strelan et al., 2020). Finally, teacher should also provide support to facilitate student involvement during the higher-order and interactive learning activities (Chen Hsieh et al., 2017; Sletten, 2017; Zou et al., 2020).

Compared with other subject areas, only a few FL studies were conducted in the area of language learning and were predominated by studies in the field of learning English as a second/foreign language (Turan & Akdag-Cimen, 2020; Zou, 2022). While findings of previous EFL/ESL studies supported the usefulness of FL in enhancing students' language learning, certain difficulties and challenges were found when implementing FL in language classes. After reviewing 43 studies on using FL to promote English learning, Turan and Akdag-Cimen (2020) concluded that although FL could facilitate students' interactions and overall language performance, it increased the workload and technical problems for both teachers and students. Studies on using FL to enhance language learning usually only measured students' general perceptions or attitudes of FL (e.g., Dianati et al, 2022; Kirmizi & Kömeç, 2019). Only a few studies adopted TAM as a comprehensive framework to examine students' acceptance of FL. For example, the results of TAM questionnaire in the study of Chen Hsieh et al (2017) indicated that students' perceived usefulness, ease of use, and system characteristics were significant predictors of their intention of using FL to learn English. Chen Hsieh et al's (2017) study was also the only study that included instructional factors in understanding students' acceptance of FL in language learning. However, system characteristics only represented one component of FL design. Up to the present, no exiting studies have comprehensively examined the effects of different instructional factors on students' acceptance in the subject area of language learning.

2. The Present Study

The study aimed to investigate the relations between instructional factors and students' acceptance and use of FL in the context of L1 Chinese language learning. As shown in the above literature review, while FL has numerous positive effects on students' learning, there are significant challenges in students' acceptance and use of this new learning approach. To increase students' acceptance and use of FL, the quality of the instructional design and implementation of FL is critically important. Moreover, most FL studies on language learning were conducted in the context of ESL/EFL. Influenced by Chinese Confucian culture, Chinese language teachers are used to adopt the traditional teacher-centered approach (Lau, 2013) and not familiar with eLearning (Turan & Akdag-Cimen, 2019). Thus, whether the design and implementation of FL in Chinese language classes adheres to the instructional principles of FL and how these instructional factors may affect students' acceptance and use of FL in this subject area need to be further explored.

Specifically, the study sought answers for the following three research questions:
RQ1: How did students perceive the instructional design and implementation of FL in their Chinese language classes?
RQ2: What were the level of students' acceptance and use of FL in Chinese language learning?
RQ3: Were students' acceptance and use of FL significantly related to the instructional design and implementation of FL in their Chinese language classes?

3. Methodology

3.1 Participants

Data of this study was drawn from a large-scale survey study entitled "Hong Kong students' acceptance of using FL in Chinese language subject and influencing factors" led by the first author. To ensure the representiveness of the sample, a similar number of students with different achievement levels were invited to participate in the study on a voluntary basis. The sample of this study consisted of 2160 students (1085 boys, 1017 girls, and 58 of unreported gender) between the ages of 12 and 17 years (mean = 14.55 years, SD = 1.62) from ten secondary schools in Hong Kong. Among these students, 724 were come from schools with high-achieving students, 742 from schools with moderate-achieving students, and 694 from schools with low-achieving students.

3.2 Measures

The study adopted two questionnaires to measure students' perception of the instructional design and implementation of FL in their Chinese language classes and their acceptance and use of FL. Reliability estimates of the two questionnaires are shown in Table 1.

3.2.1 Instructional Design and Implementation of Flipped Learning Questionnaire (IFLQ)
This questionnaire was designed based on the instructional principles of FL and studies on the effects of instructional factors on the effectiveness of FL (Akçayır & Akçayır, 2018; Bergmann & Sams, 2012; Bond, 2020; Çakiroglu & Öztürk, 2021; Lo & Hew, 2017; Lo et al., 2018; Ng, 2018; Rasheed et al., 2020; Zou et al., 2020). It consisted of 36 items with five subscales. Two of the subscales focused on the out-of-class eLearning component of FL measuring students' perception of the quality of the eLearning materials and activities (OL_Q) and teacher support (OL_T) they received for out-of-class eLearning. Three of the subscales focused on the in-class learning component of FL measuring students' perception of the connection between out-of-class eLearning and in-class learning (CL_C), the quality of the in-class learning materials and activities (CL_Q) and teacher support (CL_T). Students were asked to rate how similar was the description of each item with the instructional design and implementation of FL in their Chinese language classes on a 5-point Likert scale.

3.2.2 Technology Acceptance Model Questionnaire (TAMQ)

This questionnaire was adapted from the validated TAM questionnaires used in previous studies (Davis, 1989; Estriegana et al., 2019; Padilla-MeléNdez et al., 2013; Scherer et al., 2019; Teo, 2019; Venkatesh & Davis, 2000). The wordings of some items were revised to fit the context of Chinese language learning. The questionnaire consisted of 14 items with four subscales. Besides the two core components of TAM, perceived usefulness (PE) and perceived ease of use (PEU), perceived enjoyment (PEN) was added because of its importance in determining students' acceptance of new technologies in the school setting (Lau & Keung, 2021; Padilla-MeléNdez et al., 2013). Students' frequency of participating in the FL activities in their Chinese language classes was used to replace the "intention of use" variable in TAM to reflect their actual use (AU) (Estriegana et al., 2019; Zacharis, 2012). Students were asked to rate the level of their agreement with each item on a 5-point Likert scale.

Table 1. *Descriptive statistics and reliability estimates for the two questionnaires*

Questionnaire/Subscale	No. of Items	Cronbach's α	Mean	SD
Instructional Design and Implementation of Flipped Learning Questionnaire				
Out-of-class eLearning: Quality of Learning Materials & Activities (OL_Q)	12	.95	3.63	.75
Out-of-class eLearning: Teacher Support (OL_T)	6	.92	3.65	.82
In-class Learning: Quality of Learning Materials & Activities (CL_Q)	8	.95	3.72	.79
In-class Learning: Teacher Support (CL_T)	5	.93	3.82	.82
Connection between Out-of-class eLearning & In-class Learning (CL_C)	5	.92	3.68	.81
Technology Acceptance Model Questionnaire				
Perceived Effectiveness (PE)	5	.94	3.58	.84
Perceived Ease of Use (PEU)	3	.87	3.65	.85
Perceived Enjoyment (PEN)	3	.92	3.47	.97
Actual Use (AU)	3	.86	3.25	.84

3.3 Procedures and Data Analysis Plan

The initial version of the two questionnaires was reviewed by two researchers and four experienced Chinese language teachers with good experiences on using FL. After making revisions based on their comments, the questionnaires were piloted in a secondary school with moderate-achieving students. Further refinements were made based on the results of reliability estimates and confirmatory factor analysis (CFA) of the pilot study.

The questionnaires were distributed to the participating schools in June to August 2022. Schools could choose to administer either the paper-based or online version of questionnaires to their students. All students were required to complete the questionnaires anonymously under the supervision of their class teachers in about 10 minutes. Standardized instructions for administration were prepared for teachers to ensure all schools followed the same procedures to administer the questionnaires.

Reliability estimates and CFA were conducted again in the main study to check the psychometric properties of the questionnaires. The findings indicated the reliability and factor structure of both questionnaires were good (see Table 1 and 2). Descriptive analysis was done to examine students' perceptions of the instructional design and implementation of FL in their Chinese language classes (RQ1) and their acceptance and use of FL (RQ2). SEM was conducted to examine the relations between all latent variables of the study (RQ3).

Table 2. *Goodness of fit for the measurement models and SEM model of the Study*

Measurement model	Goodness-of-fit index					
	χ^2	*df*	CFI	TLI	RMSEA	SRMR
IFLQ (5-factor model)	3134.234***	584	.933	.928	.045	.029
TAMQ (4-factor model)	323.771***	71	.982	.977	.041	.033
SEM model	5232.987***	1142	.929	.924	.041	.042

4. Results

4.1 Instructional Design and Implementation of FL in Chinese Language Classes

As shown in Table 1, the mean scores of all subscales of IFLQ were higher than the mid-point of the 5-point Likert scale. Among the five subscales, the mean score of CL_T was the highest, followed by CL_Q, CL_C, OL_T, and OL_Q. The findings indicated that from the perception of students, the design and implementation of FL in their Chinese language classes generally adhered to the instructional principles of FL. Students showed a slightly more positive perception on the in-class learning component of FL than the out-of-class eLearning component.

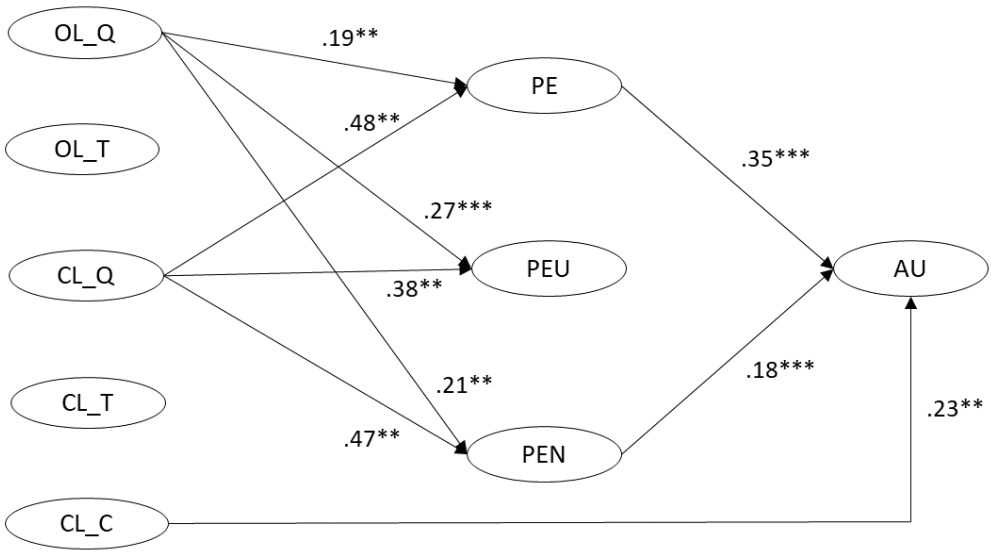
4.2 Student Acceptance and Use of FL in Chinese Language Learning

As shown in Table 1, the mean scores of all subscales of TAMQ were higher than the mid-point of the 5-point Likert scale. Among the three acceptance variables, the mean score of PEU was the highest, followed by PE and PEN. The findings indicated that students generally showed a positive attitude towards using FL in Chinese language learning. The mean score of AU was slightly higher than the mid-point of the 5-point Likert scale, indicating a moderate level of student participation in Chinese language FL activities.

4.3 Relations between Instructional Factors and Student Acceptance of FL in Chinese Language Learning

SEM was adopted to explore the complex relationships between different instructional factors and students' acceptance and use of FL in Chinese language learning. Based on the literature reviewed above, the model hypothesized students' AU of FL as the dependent latent variable, the five subscales of IFLQ as independent latent variables, and the three subscales of TAMQ as mediators. Item scores were used as observed indicators for all latent variables in the model. The SEM findings indicated a good fit for the hypothesized model (see Table 2).

The results of SEM are shown in Figure 1. Regarding the relations between instructional factors and students' acceptance of FL, CL_Q had the largest significant effects on PE, PEU, and PEN and OL_Q also had significant effects on these three acceptance variables. No significant relation was found between the other three instructional variables and student acceptance. Regarding the relation between students' acceptance and use of FL, PU had the largest significant effect on AU and PEN also had a significant effect on AU. Among the five subscales of IFLQ, only CL_C had a significant direct effect on AU. CL_Q and OL_Q mainly exerted effects on AU indirectly through the three acceptance variables. The indirect effects of CL_Q and OL_Q on AU were .12 ($p < .01$) and .15 ($p <. 01$), respectively.



Note. *To simplify the figure, only significant paths among the latent variables are shown in the model. ** p < .01; *** p < .001*

Figure 1. Results of SEM on the relations between instructional factors, student acceptance and use of FL in Chinese language learning.

5. Discussion and Conclusion

This study investigated Hong Kong secondary school students' acceptance and use of FL in the context of L1 Chinese language learning. Since FL is largely different from the traditional teacher-centered instruction, previous studies found that not all students adapted to this new learning approach (Akçayır & Akçayır, 2018; Blau & Shamir-Inbal, 2017; Bond, 2020). In contrast to the prediction of the study that this problem may be more obvious when FL is introduced to Chinese language classes which has long been dominated by the traditional teacher-centered and knowledge-based instruction (Lau, 2013), the findings indicated a moderate level of student participation in Chinese language FL activities and students generally showed a moderately high level of acceptance to this new learning approach. Among the three acceptance variables, students had the most positive perception on ease of use. Since online learning has been adopted frequently in Hong Kong during the COVID-19 outbreak in the past three years, most Hong Kong secondary school teachers and students are familiar with various types of eLearning tools and platforms, which may help reduce students' technical problems in FL. Students' positive perceptions on the usefulness and enjoyment of FL are consistent with the positive effects of FL on students' learning outcomes (Akçayır & Akçayır, 2018; Bond, 2020; Strelan et al., 2020) and motivation (Kirmizi & Kömeç, 2019; Zou et al., 2022) revealed in many previous studies. As posited by some language educators, FL move the teaching of a large amount of basic knowledge and lower-level language skills to better organized and self-paced pre-class self-learning and free class time for students to interact actively with their classmates to practice and apply their higher-order language skills, which consequently promote higher motivation and proficiency in language development (Li et al., 2022; Jiang et al., 2022; Turan & Akdag-Cimen, 2019). The study's findings support that these proposed benefits of FL in language learning are also endorsed by Hong Kong students when FL is incorporated in their Chinese language classes.

Students' positive perception on the design and implementation of FL in Chinese language classes refute the traditional view that Chinese language teachers tend to adopt teacher-centered instruction (Lau, 2013) and FL approach is seldom applied in Chinese

language teaching (Zou et al., 2022). This may be due to a greater emphasis of student-centered instruction in current Chinese language curriculum (HKCDC, 2017) and teachers' more frequent use of eLearning tools and platform during the COVID-19 outbreak. Nevertheless, the study revealed that students held more positive perception on the in-class learning component of FL than the out-of-class eLearning component. It suggests that Hong Kong Chinese language teachers are still more capable in designing high quality learning materials and activities and supporting students' learning during face-to-face classroom teaching than in the out-of-class eLearning context. Thus, more trainings should be provided for Chinese language teachers to enhance their professional skills in incorporating eLearning in Chinese language teaching.

In line with the previous TAM studies (Chen Hsieh et al., 2017; Estriegana et al., 2019; Haghighi et al., 2019; Padilla-MeléNdez et al., 2013; Zacharis, 2012), PE and PEN were found to have significant effects on AU. While the largest effect of PU on AU confirms again that perceived usefulness is the most critical variable in TAM (Scherer et al., 2019), the significant relation between PEN and AU and the non-significant relation between PEU and AU suggest that young school students consider the feeling of enjoyment more than the difficulty level of the tasks when they determine whether they would like to participate in FL activities (Padilla-MeléNdez et al., 2013; Zacharis, 2012). The significant direct effects of the instructional factors on student acceptance of FL support the important role of instructional factors in enhancing students' acceptance of using FL (Cheng, 2019; Dianati et al., 2022; Hsieh et al., 2017; Jiang et al., 2021). Among various instructional factors, CL_Q and OL_Q were found to have significant effects on all the three student acceptance variables and indirectly affected AU. These findings are consistent with the view that student-centered, higher-order, and interactive in-class activities, and interesting, diverse, and well-designed eLearning materials and activities can enhance students' positive attitude towards FL and, in turn, increase their willingness to participate actively in FL activities (Akçayır & Akçayır, 2018; Blau & Shamir-Inbal, 2017; Bond, 2020; Haghighi et al., 2019; Lau & Keung, 2021; Rasheed et al., 2020). It is noteworthy that CL_C did not have any significant effect on student acceptance but it had a direct effect on AU. Since many students view out-of-class eLearning activities as extra work for them and are not willing to make pre-class preparation (Akçayır & Akçayır, 2018; Rashead et al., 2020), teachers' effective use of follow-up activities is essential for encouraging students to complete pre-class learning tasks (Blau & Shamir-Inbal, 2017; Lau & Keung, 2021; Lo et al. 2018).

In conclusion, while previous FL studies have predominately focused on the effectiveness of FL on student learning, the study made a unique contribution to the FL research by verifying the relations between instructional factors, students' acceptance, and their use of FL using more comprehensive measures of instructional factors and student acceptance. The study's findings highlight the importance of designing high quality in-class and out-of-class eLearning materials and activates to increase students' willingness to participate in FL activities. The study's findings also confirm the mediating role of student acceptance between instructional factors and students' actual participation in FC activities. Students' positive perceptions on the design and implementation of FC in their Chinese language classes and their high level of acceptance of this new learning approach support the potential benefits of adopting FL to enhance student learning in this traditional teacher-dominated school subject. Lastly, it should be noted that the measure of instructional factors in the study were based only on students' perception. The significant relations between instructional factors and student acceptance of FL should be replicated in future studies using direct measures of instructional design and implementation.

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