香港教育大學
The Education University of Hong Kong

A Project entitled

With the assessment of Unified Theory of Acceptance and Use of Technology (UTAUT), are the Hong Kong General Studies teachers ready to adopt Flipped Classroom?

Submitted by

KWAN Sin Yi

submitted to The Education University of Hong Kong

for the degree of *Bachelor of Education (Honours) (Primary) (General Studies)*

in *April 2021*

Declaration

I, *KWAN Sin Yi* declare that this research report represents my own work under the supervision of Mr. Chan Ping Man, Paladin, and that it has not been submitted previously for examination to any tertiary institution.

KWAN Sin Yi

April 2021

Abstract

The infusion of technology into education is commonplace in the 21st century. In view of the advanced technology, the latest Hong Kong General Studies (GS) curriculum has also made good use of multimedia for developing e-Learning in which Flipped Classroom (FC) is one of the teaching approaches. This research aims to assess the readiness of Hong Kong General Studies teachers in adopting FC by employing the three direct determinants in Unified Theory of Acceptance and Use of Technology (UTAUT) model. The research findings have been separated into four parts for discussions, including (1) the overall readiness of Hong Kong GS teachers in adopting FC, (2) the most influential direct determinant, (3) the relationship between direct determinants and moderating variables and (4) their degree of intention to adopt FC in future teaching. 82 valid questionnaires were eventually collected from teachers who are currently teaching GS in Hong Kong primary schools. Some recommendations were addressed to improve the readiness of teachers. The results of this research would be valuable to Hong Kong education sector for assessing teachers' acceptance towards the adaptation of FC.

Keywords:

UTAUT, Flipped Classroom, Hong Kong General Studies teachers, readiness, perceptions and expectations

Table of Contents

List of Tables

List of Figures

CHAPTER 1: INTRODUCTION

1.1 Background

Educational reform is always put forward for maintaining the competitiveness of a place. There is also no exception in Hong Kong since many advanced teaching strategies are being suggested in the latest curriculum guide. Teachers are expected to take advantages of different teaching approaches for enhancing interactive learning under the continuous updates of Hong Kong General Studies (GS) curriculum (The Curriculum Development Council of the Government of the HKSAR, 2017). According to the curriculum guide, Flipped Classroom (FC) is one of the new teaching modes of e-Learning, which is being recommended for applying in teaching GS. The FC approach is being carried out unilaterally, however, the readiness of teachers on using advanced technology is of vital importance for students' learning. Hence, a model called Unified Theory of Acceptance and Use of Technology (UTAUT) would be employed in order to investigate the readiness of GS teachers in adopting FC. Even though the acceptance of teachers or students towards FC has been studied extensively, technology acceptance theories were seldom employed to conduct study for the subject of GS. Thus, this research could contribute to the existing research gap on the readiness of Hong Kong GS teachers towards FC with a brand-new perspective through employing the assessing model of UTAUT.

1.2 Objectives

This research aims to assess the readiness of Hong Kong GS teachers in adopting FC by employing the three direct determinants in UTAUT model. In light of the UTAUT model, the most influential determinant on teachers' readiness in adopting FC would also be highlighted.

1.3 Research Questions

The following research questions (RQ) are addressed to reach the research objectives.

RQ1: What is the overall readiness of Hong Kong General Studies teachers in adopting Flipped Classroom by the assessment of Unified Theory of Acceptance and Use of Technology (UTAUT)?

RQ2: Which direct determinant in Unified Theory of Acceptance and Use of Technology (UTAUT) is the most influential to Hong Kong General Studies teachers' readiness towards Flipped Classroom?

RQ3: To what extent do Hong Kong General Studies teachers want to apply Flipped Classroom in future teaching?

CHAPTER 2: LITERATURE REVIEW

2.1 Flipped Classroom

Flipped Classroom (FC) is a new instructional approach by switching between the time of in-class instruction and at-home practice, which is currently used from primary schools to universities (Arfstrom, & Network, 2013; Bergmann, & Sams, 2012; Hwang, Lai, & Wang, 2015; Ozdamli, & Asiksoy, 2016; Schmidt, & Ralph, 2016). Under conventional circumstances, most of the lesson time would be conducted with direct instructional approach. Homework would be distributed at the end of lessons for consolidating students' attained knowledge and skills so as to develop higher order thinking skills. However, the direct instruction that used to happen in class would be accessed at home under the FC model. At home, students would need to complete the preparation work such as watching lecture videos and PowerPoint slides, which are prepared and uploaded to the corresponding online learning platforms by teachers beforehand (Bergmann, & Sams, 2012; Schmidt, & Ralph, 2016). Many teachers agreed that the instructional materials for students to prepare at home make the difference between traditional teaching (Ansori, & Nafi, 2019; Tucker, 2012). It is because FC is an overall teaching approach that integrated with in-class and at-home learning, which teachers could make good use of the instructional materials for designing advanced syllabus for students' learning.

FC has become an increasingly prevalent teaching strategy in this era, which indicates that there are potential incentives so that it has also been introduced in the latest educational reform of GS curriculum guide. Many scholars have addressed the usefulness of FC teaching approach (Fulton, 2012; G. Akçayır, & M. Akçayır, 2018; Gilboy, Heinerichs, & Pazzaglia, 2015; Herreid, & Schiller, 2013; Shi-Chun, Ze-Tian, & Yi, 2014). A large number of advantages were emphasized to flip the classroom, which could be summarized into four dimensions including the benefits brought to teachers, students, parents and others (Fulton, 2012; Herreid, & Schiller, 2013). For example, students could learn and develop at their own pace during the preparation at home. They could watch the instructional materials over and over until the concepts are cleared. Also, the ability to think outside the classroom could be achieved. Furthermore, teachers could build better insight into the learning styles and difficulties of students since more class time would be given to work on solving high-end problems. It was illustrated that students' achievements would be increased if teachers could assist students promptly, which differs from the conventional method of teaching that students might need to work on their own at home. Moreover, it is appropriate in applying FC for 21st century learning as education should also keep up move with the time by exploiting the benefits of technology. However, it was suggested that relevant training and facilities should be provided to face difficulties and challenges occurred about FC (G. Akçayır, & M. Akçayır, 2018; Ansori, & Nafi, 2019; Ash, 2012; Jeganathan, n.d.). Thus, it

is not difficult to understand the reasons of implementing FC as one of the new teaching strategies in Hong Kong GS curriculum.

More importantly, Bloom's Revised Taxonomy has been utilized as the framework for the sake of developing better understanding towards the teaching strategies of FC. Based on Bloom's Revised Taxonomy (Anderson, Krathwohl, & Bloom, 2001), there are six major categories including remembering, understanding, applying, analyzing, evaluating and creating. The above categorization is a framework with classifying statements for teachers to design different levels of instruction appropriately (Krathwohl, 2002). Under conventional situations, the tasks with lower order thinking skills would be conducted in class including remembering, understanding and applying while the others would be conducted in the form of homework. Nevertheless, Bloom's Revised Taxonomy would be reversed in FC (see Figure 1). Teachers would work with students in class when they are engaging in high-end thinking skills including analyzing, evaluating and creating. It was stated that the conversion brought by FC would encourage students' active engagement, which could enhance their learning performance (Krathwohl, 2002).

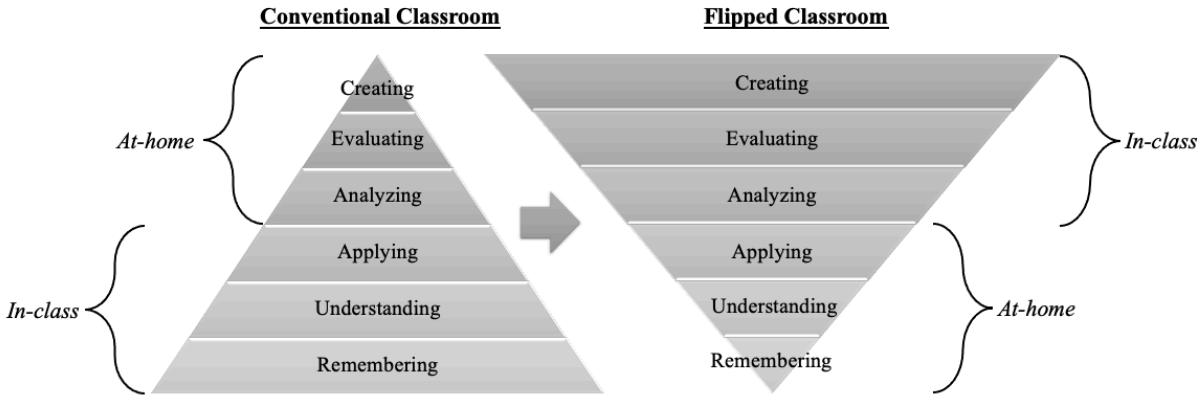


Figure 1. The reversed Bloom's Revised Taxonomy (2012) in FC.

In sum, the FC model is minimizing the direct instruction while maximizing the teacher-student interactions on higher-order thinking skills in classroom contexts. Although numerous of previous works have demonstrated the background, advantages and challenges of FC, this research might fill the gap on the application of FC in GS curriculum.

2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

Unified Theory of Acceptance and Use of Technology (UTAUT) is a model with four direct determinants including "performance expectancy, effort expectancy, social influence and facilitating conditions" (p.447), which were raised by Venkatesh, Morris, B. Davis, & D. Davis (2003). The above direct determinants are unified from eight theories to elucidate the degree of people's technology acceptance, in which the higher degree represents higher level of readiness towards a technological system.

According to Venkatesh et al. (2003), performance expectancy (PE) assesses the degree of an individual in believing the job performance would be enhanced by the assistance of technological system. It focuses on task accomplishment and would be influenced by the differences of age and gender. For example, the newbies usually incline to attach importance on extrinsic rewards as they are striving for promotion. Second, effort expectancy (EE) evaluates the degree of ease in using technological systems. The differences in age, gender and experience would carry out dissimilar behavior. For instance, the degree of an individual with prior knowledge to the technological system would be higher, which indicates that the individual is geared up to accept the technology system. Third, social influence (SI) assesses the degree of an individual's perceptions affected by the people around. The behavior of an individual would be affected by age, gender, experience and voluntariness of use. For example, the degree of social influence would be higher if an individual uses the technological system because of the encouragement by the surrounding people. Facilitating conditions is the last determinant in evaluating the degree of an individual's belief on the technological support provided by technical infrastructures. Its degree would be influenced by age and experience. For instance, the senior workers with fewer experience might need more technological support. An individual would be more willing to use the technological system with more assistance and thus the degree of this determinant would be higher (see Figure 2).

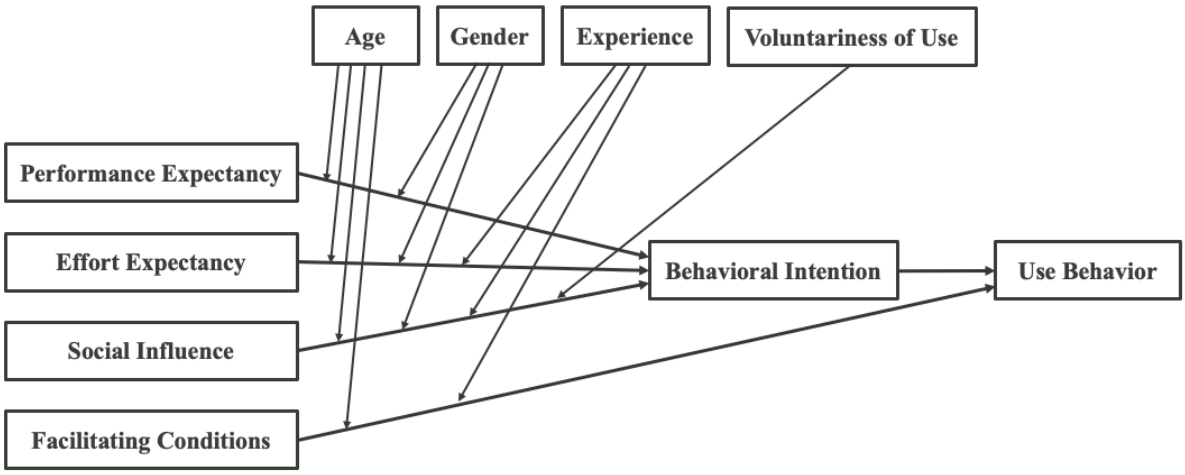


Figure 2. UTAUT model proposed by Venkatesh et al. (2003).

The original UTAUT model is comprehensive in assessing the technology acceptance level of people, yet it would be modified to match up the objectives of this research (see Figure 3). The readiness of respondents towards applying FC would be analyzed in this study, which the behavioral intention is relevant while use behavior is irrelevant. The behavioral intention of teachers implies their readiness towards applying FC in future teaching, which the higher degree represents higher behavioral intention. However, there is no relationship between use behavior and their readiness in this study. For example, a teacher who have to apply FC in teaching does not imply that he or she is ready to adopt. Hence, the use behavior and its relevant direct determinant, facilitating conditions would be excluded in the modified UTUAT model.

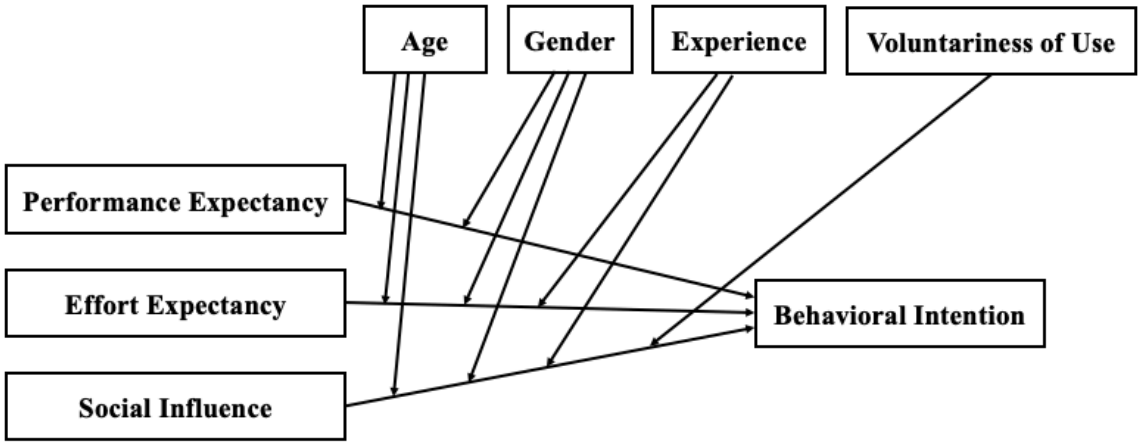


Figure 3. Modified UTAUT model for this research.

Meanwhile, it is noteworthy that plenty of scholars only conducted their studies by a single technology acceptance theory such as Technology Acceptance Model or Theory of Reasoned Action to assess the technology acceptance of people towards FC (Chen Hsieh, Wu, & Marek, 2017; Joo, Park, & Lim, 2018; Vogelsang, & Hoppe, 2018). However, the UTAUT model is considered to be outweighed other technology acceptance theories. On one hand, the UTAUT model is an integration of the eight technology acceptance theories, which is more comprehensive than merely applying a single acceptance model. On the other hand, the assessment by UTAUT model could fill the research gap in assessing the technology acceptance of Hong Kong GS teachers in adopting FC.

Since many technological elements are involved in FC, the familiarization of teachers towards the operation of technological systems is obviously crucial. For instance, videos

and PowerPoint slides have to be produced and uploaded to online learning platforms under the teaching mode of FC. The procedures would be more complicated than that of the traditional method of teaching, in which FC would require diversified technological techniques. Hence, the UTAUT model is comprehensive for this research in accessing the readiness of Hong Kong GS teachers towards the technological affairs brought by FC.

2.3 Hong Kong Teachers' Concerns on Flipped Classroom

Many academic papers studied about teachers or students' concerns on FC, however, few studies discussed about the considerations of Hong Kong teachers towards the application of FC. Some challenges and barriers were put forward by the following studies. According to Cheung and Jong (2016), they addressed the importance of performancism and perceived ease of use of FC, which is similar to performance expectancy and effort expectancy in UTAUT. It was discovered that the influence of performancism would be one of the difficulties for teachers to implement FC in teaching. Hong Kong teachers are being pressurized by the examination-oriented culture, which causing them with no confidence to apply a new teaching approach. If there is no salient outcome in applying FC, teachers would not take the risk to bring negative effects to their job performance.

Besides, teachers lack time and peer support in understanding and using the systems related to FC (Cheung, & Jong, 2016). Teachers would have no further action to adopt FC but only

step back because the perceived ease of use is of vital importance to them. Wang (2017) also indicated both internal and external barriers of FC. For example, in terms of internal barriers, teachers might have low confidence to adopt FC in teaching because they are unfamiliar with the technological systems. In terms of external barriers, there would be time constraints to redesign lesson plans and activities for FC. Teachers were also worried about the actual circumstances of FC (Lee, & Lai, 2017). On one hand, the familiarization of students towards using software tools might be a potential problem. On the other hand, the quality of video lectures would be another concern. It is thus evident that the obstacles might hinder Hong Kong teachers' in applying FC despite the fact that many advantages are put forward.

CHAPTER 3: RESEARCH METHOD

This research assessed the readiness of Hong Kong GS teachers towards adopting FC into teaching by employing the UTAUT model. Quantitative research approach was applied in the research, which the collected statistics were analyzed under numerical form (Babbie, 2020; Norušis, 2006; Punch, 2014).

The sample population of this research was selected by convenience sampling under the category of non-probability sampling. Convenience sampling is used when the target population meet some of the criteria such as geographical proximity, participation willingness and easy accessibility (Etikan, Musa, & Alkassim, 2016; Vehovar, Toepoel, & Steinmetz, 2016). Although the sample population of this research was confined within a small scope of population, it would also be a limitation of this research as convenience sampling is potentially biased. The chosen sample might not fully represent the whole population. When taking the limitations of time and resources into considerations, convenience sampling would be the most suitable for this research. Teachers who are currently teaching GS in Hong Kong primary schools are the only population regarded as eligible.

The questionnaire was sent out via two methods. It was sent to all Hong Kong primary schools through email, including 543 local schools and 44 private international schools (The Education Bureau of the Government of the HKSAR (EDB), 2020). In addition, it was disseminated

through the social network of principal investigator. 82 valid questionnaires were received eventually (n = 82).

In this research, Statistical Package for the Social Sciences (SPSS) (IBM Corp., 2020) was utilized for analyzing the collected data from questionnaire. Descriptive statistics were presented in the findings for illustrating and summarizing the fundamental features, samples and variables (DeCoster, & Claypool, 2004; Pallant, 2020; Wagner, 2015). The demographic information of Hong Kong GS teachers such as age and gender were analyzed. Through the utilization of descriptive statistics, measures of variability comprising standard deviation, minimum, maximum and measures of central tendency including mean, average mean and 95% confidence interval for mean were attained (DeCoster, & Claypool, 2004; Pallant, 2020). Moreover, tables and path diagrams were used to clearly describe the results of the study. Pearson correlation coefficients analysis was used to find out the relationship between direct determinants and behavioral intention (DeCoster, & Claypool, 2004; Pallant, 2020). Lastly, independent sample t-test and one-way ANOVA was employed to compare the means of different groups and see if there are any significant differences (DeCoster, & Claypool, 2004; Pallant, 2020).

To assess respondents' acceptance level in different dimensions, items have been employed from the original study to estimate the perceptions and expectations of respondents (see Table

1). Apart from the three direct determinants, behavioral intention (BI) would also be assessed to evaluate the relationship between different direct determinants. It is hypothesized to have positive influence on the technological usage of people (Venkatesh et al., 2003). The items in table 1 would be measured by 7-point Likert scale, which have been widely used in survey (Joshi, Kale, Chandel, & Pal, 2015; Preston, & Colman, 2000). It ranges from "1" as "strongly disagree" to "7" as "strongly agree", which an individual is allowed to express the degree of agreement towards the statements.

Direct Determinants	Abbr.	Employed Items
Performance Expectancy	PE1	I *find / would* find the FC model useful in teaching.
	PE2	Applying the FC model *enables / might enable* me to accomplish teaching tasks more quickly.
	PE3	My teaching productivity *has increased / might increase* with the use of the FC model.
	PE4	After applying FC model, I believed that my chances of getting a raise *have been / might be* increased.
Effort Expectancy	EE1	The related online platforms (e.g., Google Classroom, platforms established by textbook publishers) of FC *gives / would give* clear and understandable instructions.
	EE2	Before using the related online platforms of FC, I think I would find them easy to use.
	EE3	Learning to operate the related online platforms of FC *is / would be* easy for me.
	EE4	It *is / would be* easy for me to become skillful at using the related online platforms of FC.
Social Influence	SI1	I *apply / would apply* FC because people who can influence my behavior (e.g., principals, colleagues) told to do so.
	SI2	I *apply / would apply* FC because people who are important to me (e.g., family, friends) told to do so.
	SI3	The senior management (i.e., managers, panels) of schools *has been / would be* helpful in applying FC.
	SI4	In general, the schools h*ave supported / would support* the use of FC.
Behavioral Intention	BI	I intend to apply FC in my future teaching.

Table 1. Items employed for measuring UTAUT (Venkatesh et al., 2003).

CHAPTER 4: FINDINGS

4.1 Socio-demographic Characteristics of Respondents

The socio-demographic characteristics of respondents were encapsulated by descriptive analysis. All respondents were Hong Kong primary school teachers, who have taught the subject of GS. 31.7% were male while 68.3% were female among the 82 respondents (see Table 2). Most of them were between 30-39 years old (40.2%) and 40-49 years old (36.6%), followed by 50 to 59 years old (13.4%) and 20 to 29 years old (9.8%). The data was utilized to evaluate the relationship between direct determinants and moderating variables, comprising age and gender (see Figure 3).

Variables	Frequency (n)	Percentage (%)
Gender		
Male	26	31.7
Female	56	68.3
Age (years old)		
20-29	8	9.8
30-39	33	40.2
40-49	30	36.6
50-59	11	13.4

Table 2. Socio-demographic profile of respondents (n = 82).

Descriptive analysis was also run to summarize the respondents' experience to apply FC in teaching (see Table 3). 68.3% of the respondents have applied FC in teaching while 31.7% have not applied before. Besides, most respondents were new to FC. 43.9% of them have only applied FC for 1 to 3 years, followed by 15.9% of those who have applied FC

for 4 to 6 years. Among those who have applied FC in teaching, only 6.1% were volunteers in their first application of FC in teaching while 62.2% of them applied mandatorily. These data were used to evaluate the relationship between direct determinants and two of the moderating variables, including experience and voluntariness of use (see Figure 3).

Variables	Frequency (n)	Percentage (%)
Applied FC in teaching		
Yes	56	68.3
No	26	31.7
Years of Applying FC		
0	26	31.7
1-3	36	43.9
4-6	13	15.9
7-9	7	8.5
Voluntariness of Use		
Yes	51	62.2
No	5	6.1
N/A (have not applied FC in teaching)	26	31.7

Table 3. Experience of respondents in adopting FC (n = 82).

4.2 Descriptive Statistics of Direct Determinants and Behavioral Intention

The respondents' perceptions and expectations on each item employed from Venkatesh et al. (2003) were collected. Their means, standard deviations and average means were listed in Table 4. In terms of perceptions, the mean values ranged from 4.14 to 5.12. Effort expectancy was the direct determinant with the highest mean score, which indicated that the perceived ease of use of FC was the greatest concern of the respondents. In addition,

social influence was the one with the lowest mean score, which implied that the opinions given by their surrounding people were not that crucial.

Besides, expectations were collected from the respondents who have not applied FC before. The mean value ranged from 4.80 to 5.50, which social influence was the highest while performance expectancy was the lowest. The data indicated that the opinions given by the important someone would be vital for them to adopt FC in teaching, while the influence of gaining in job performance will be less influential.

Apart from the three key determinants, the means, standard deviations and average means of behavioral intention were also listed in Table 4. It was summarized that the respondents who have applied FC before would be more likely to apply FC in future teaching (5.59) than that of the respondents who have not applied FC before (4.85). It is noteworthy that the findings of correlations between three key determinants and behavioral intention were concluded in the next part.

Determinants	Perceptions (n=56)		Expectations (n=26)		Average
	Mean	Std. Deviation	Mean	Std. Deviation	mean
PE Overall	***4.60***	***0.84***	***4.80***	***0.23***	***4.70***
PE1	5.48	0.95	5.15	0.88	5.38
PE2	4.68	1.30	4.77	1.34	4.71
PE3	5.00	0.85	4.77	1.07	4.93
PE4	3.23	1.57	4.50	1.45	3.63
EE overall	***5.12***	***0.15***	***5.31***	***0.35***	***5.22***
EE1	5.11	1.19	5.85	0.68	5.34
EE2	4.91	1.24	5.00	1.39	4.94
EE3	5.13	1.11	5.00	1.33	5.09
EE4	5.34	1.05	5.38	0.94	5.35
SI overall	***4.14***	***0.70***	***5.50***	***0.17***	***4.82***
SI1	4.48	1.58	5.31	1.35	4.74
SI2	2.93	1.62	5.46	0.51	3.73
SI3	4.48	1.35	5.77	0.91	4.89
SI4	4.66	1.24	5.46	0.95	4.91
BI	5.59	0.91	4.85	1.05	5.35

Note: Based on 7-point Likert scale, "7" = strongly agree; "1" = strongly disagree.

Table 4. Perceptions and expectations of respondents towards FC.

4.3 Correlations Between Direct Determinants and Behavioral Intention

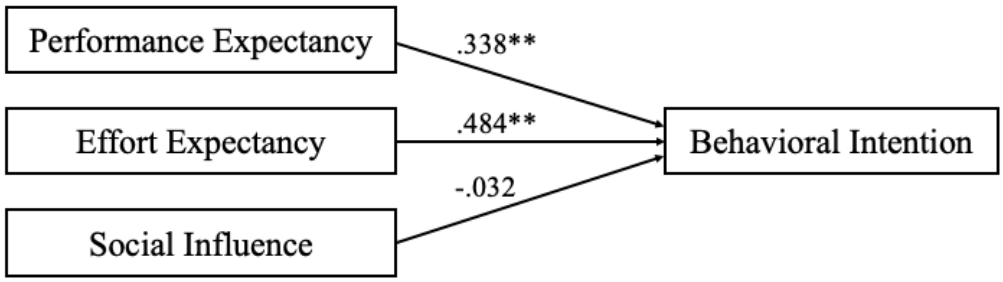
Pearson correlations analysis was employed to find out the relationships between three direct determinants and behavioral intention. According to Table 5 and Figure 4, it was analyzed that performance expectancy (coefficient = .338, $p < 0.01$) and effort expectancy (coefficient = .484, $p < 0.01$) were significant determinants on the behavioral intention of all respondents.

Perceptions and Expectations

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social Influence
Pearson Correlation Coefficients	1	.338**	.484**	-.032
Sig.		.002	.000	.776

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Table 5. Pearson correlations between direct determinants and behavioral intention (perceptions and expectations).



Note: **. Correlation is significant at the 0.01 level (2-tailed).

Figure 4. Path diagram with Pearson correlation coefficients (perceptions and expectations).

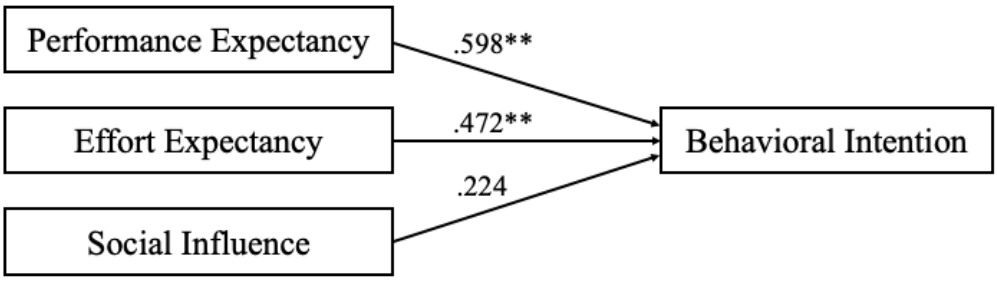
Apart from analyzing the overall Pearson correlations coefficients, the results were analyzed separately. The respondents who have applied FC in teaching deemed that performance expectancy (coefficient = .598, $p < 0.01$) and effort expectancy (coefficient = .472, $p < 0.01$) would be correlated with behavioral intention. However, the correlation between social influence and behavioral intention was not significant (coefficient = .224, $p > 0.01$) (see Table 6 and Figure 5).

Perceptions

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social Influence
Pearson Correlation Coefficients	1	.598**	.472**	.224
Sig.		.000	.000	.097

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Table 6. Pearson correlations between direct determinants and behavioral intention (perceptions).



Note: **. Correlation is significant at the 0.01 level (2-tailed).

Figure 5. Path diagram with Pearson correlation coefficients (perceptions).

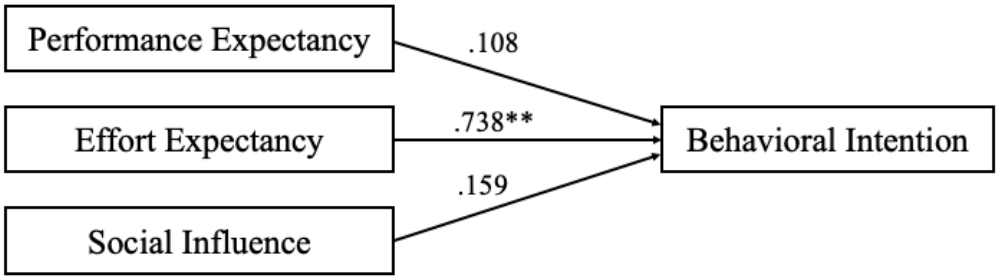
In addition, the respondents who have not applied FC in teaching expected that only performance expectancy (coefficient = .738, $p < 0.01$) would be correlated with behavioral intention. However, performance expectancy (coefficient = .108, $p > 0.01$) and social influence (coefficient = .159, $p > 0.01$) were deemed as insignificant with their behavioral intention (see Table 7 and Figure 6). Overall speaking, effort expectancy would be the most influential direct determinant to the behavioral intention.

Expectations

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social Influence
Pearson Correlation Coefficients	1	.108	.738**	.159
Sig.		.600	.000	.437

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Table 7. Pearson correlations between direct determinants and behavioral intention (expectations).



Note: **. Correlation is significant at the 0.01 level (2-tailed).

Figure 6. Path diagram with Pearson correlation coefficients (expectations).

4.4 The Influence of Moderating Variables

Descriptive, independent sample t-test and one-way ANOVA analysis were run to point out the significance of moderating variables for each direct determinant. The moderating variables comprise age, gender, experience and voluntariness of use.

4.4.1 Age

Descriptive analysis was operated for the means, standard deviations and 95% confidence interval for means between four age groups (see Table 8). The mean values showed the degree of importance of three direct determinants, which are dissimilar

among different age groups. Performance expectancy was the most significant direct determinant for the respondents between 20 to 29 years old (5.53), while effort expectancy was the most important to the respondents between 40 to 49 years old (5.48). Moreover, social influence was the most important to respondents between 50 to 59 years old (5.20). Same results were also shown by the upper bound of 95% confidence interval for mean in Table 8.

Direct Determinants	Age (years old)	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Performance Expectancy	**20-29**	5.53	0.26	4.91	6.15
	30-39	4.39	0.16	4.07	4.72
	40-49	4.83	0.13	4.56	5.09
	50-59	4.39	0.28	3.75	5.02
Effort Expectancy	**20-29**	4.72	1.31	3.63	5.81
	30-39	4.92	0.92	4.59	5.24
	40-49	5.48	0.91	5.14	5.82
	50-59	5.47	0.36	5.23	5.72
Social Influence	**20-29**	5.06	0.83	4.37	5.76
	30-39	4.47	1.04	4.10	4.84
	40-49	4.32	1.36	3.81	4.82
	50-59	5.20	0.90	4.60	5.80

Table 8. Descriptive statistics of age and direct determinants.

Then, means were compared by one-way ANOVA analysis on three direct determinants and age. It was evaluated that there was statically significant difference on performance expectancy ($F = 4.850$, $p < 0.05$) and effort expectancy ($F = 3.141$, $p < 0.05$) (see Table

9). It indicated that age would be an influential moderating variable to performance expectancy and effort expectancy.

Moderating Variable	Direct Determinants	F	Sig.
Age	**Performance Expectancy**	4.850	.004*
	Effort Expectancy	3.141	.030*
	Social Influence	2.226	.092

Note: *. The mean difference is significant at the 0.05 level.

Table 9. Results of one-way ANOVA on direct determinants and age.

The multiple comparison results of Least Significant Difference (LSD) post hoc test of each direct determinant are shown in Table 10, 11 and 12 separately. The respondents between 20 to 29 years old deemed that performance expectancy was more significant than the respondents from other age groups ($p < 0.05$) (see Table 10). Nevertheless, the respondents between 40 to 49 years old considered that performance expectancy was more important that those between 30 to 39 years old ($p < 0.05$).

Dependent Variable: Average mean of performance expectancy

Age (I)	Age (J)	Mean Difference (I-J)	Std. Error	Sig.
20-29	**30-39**	1.137	.328	.001*
	40-49	.706	.331	.036*
	50-59	1.145	.386	.004*
30-39	**40-49**	-.431	.210	.043*
	50-59	.008	.289	.979
40-49	**50-59**	.439	.203	.138

Note: *. The mean difference is significant at the 0.05 level.

Table 10. Results of LSD post hoc test on age and performance expectancy.

Referring to the results of LSD post hoc test on age and effort expectancy, the mean differences were significant between three age groups (see Table 11). The respondents ages 40 to 49 considered that effort expectancy was more important than those ages 20 to 29 ($p < 0.05$) and ages 30 to 39 ($p < 0.05$).

Dependent Variable: Average mean of effort expectancy

Age (I)	Age (J)	Mean Difference (I-J)	Std. Error	Sig.
20-29	**30-39**	-1.979	.357	.581
	40-49	-.765	.360	.037*
	50-59	-.759	.421	.075
30-39	**40-49**	-.567	.228	.015*
	50-59	-.561	.315	.079
40-49	**50-59**	.006	.319	.985

Note: *. The mean difference is significant at the 0.05 level.

Table 11. Results of LSD post hoc test on age and effort expectancy.

In the aspect of social influence, the results of LSD post hoc test revealed that the mean difference was significant between two age groups only (see Table 12). The respondents ages 50 to 59 considered that social influence was more important than those ages 40 to 49 ($p < 0.05$).

Dependent Variable: Average mean of social influence

Age (I)	Age (J)	Mean Difference (I-J)	Std. Error	Sig.
20-29	**30-39**	.593	.448	.190
	40-49	.746	.452	.103
	50-59	-.142	.528	.789
30-39	**40-49**	.153	.287	.595
	50-59	-.735	.396	.067
40-49	**50-59**	-.888	.401	.030*

Note: *. The mean difference is significant at the 0.05 level.

Table 12. Results of LSD post hoc test on age and social influence.

4.4.2 Gender

Descriptive analysis was run for the means, standard deviations and 95% confidence interval for means between male and female (see Table 13). The mean values showed the perceived importance of different genders towards three direct determinants. Performance expectancy (5.12) and social influence (4.81) were more significant to the male respondents, while effort expectancy (5.29) was more important to the female respondents. Same results were also listed by the upper bound of 95% confidence interval for mean in Table 13.

Direct Determinants	Gender	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Performance Expectancy	**Male**	5.12	1.04	4.69	5.54
	Female	4.45	0.73	4.26	4.65
Effort Expectancy	**Male**	4.95	1.01	4.55	5.36
	Female	5.29	0.90	5.05	5.53
Social Influence	**Male**	4.81	1.30	4.28	5.33
	Female	4.46	1.09	4.17	4.75

Table 13. Descriptive statistics of gender and direct determinants.

Independent sample t-test was applied to analyze the means between two groups, which were the male and female respondents. It was analyzed that the mean difference was only significant for performance expectancy ($p < 0.05$), while there was no significant difference for effort expectancy ($p > 0.05$) and social influence ($p > 0.05$) (see Table 14). The results indicated that the male respondents believed that performance expectancy was more crucial than that of the female respondents.

Direct Determinants	Gender (I)	Gender (J)	Mean Difference (I-J)	Std. Error	Sig.
Performance Expectancy			.664	.199	.001*
Effort Expectancy	**Male**	**Female**	-.334	.221	.136
Social Influence			.348	.275	.209

Note: *. The mean difference is significant at the 0.05 level.

Table 14. Results of independent sample t-test on gender.

4.4.3 Experience

Descriptive analysis was carried out for the means, standard deviations and 95% confidence interval for means on the respondents' experience, which have divided into four groups (see Table 15). The mean values showed their viewpoints towards two direct determinants. Both effort expectancy (5.31) and social influence (5.50) were more significant to the respondents with no experience on applying FC in teaching. According to the 95% confidence interval for mean, the mean values of effort expectancy lied between 4.96 to 5.66 while social influence lied between 5.26 to 5.74. Although the highest upper bound of means were 6.24 and 6.45 from effort expectancy and social influence respectively (see Table 15), it was caused by the small sample size of the respondents with 7 to 9 years' experience (n = 5). The inaccuracy would be further discussed in the limitation part (see Chapter 6.2). In sum, the respondents with no experience would be regarded as the group who deemed effort expectancy and social influence to be the most important.

Direct Determinants	Experience (years)	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Effort Expectancy	0	5.31	0.87	4.96	5.66
	1-3	5.13	1.06	4.79	5.48
	4-6	5.10	0.71	4.65	5.56
	7-9	5.05	0.96	3.86	6.24
Social Influence	0	5.50	0.60	5.26	5.74
	1-3	4.12	1.17	3.74	4.50
	4-6	3.92	0.71	3.47	4.37
	7-9	4.80	1.33	3.15	6.45

Table 15. Descriptive statistics of experience and direct determinants.

After that, one-way ANOVA analysis was executed to compare the means of two direct determinants and experience (see Table 16). It was analyzed that there were no statically significant difference on both effort expectancy ($F = .127$, $p > 0.05$) and social influence ($F = 2.580$, $p > 0.05$).

Moderating Variable	Direct Determinants	F	Sig.
Experience	Effort Expectancy	.127	.881
	Social Influence	2.580	.082

Table 16. Results of one-way ANOVA on direct determinants and experience.

The results of LSD post hoc test of the related direct determinants are shown in Table 17 and 18 separately. In terms of effort expectancy, there were no significant mean difference among different years of experience in applying FC (see Table 17).

Dependent Variable: Average mean of effort expectancy

Experience (I)	Experience (J)	Mean Difference (I-J)	Std. Error	Sig.
0-3	**4-6**	.133	.290	.648
	7-9	.103	.379	.788
4-6	**7-9**	-.030	.446	.946

Table 17. Results of LSD post hoc test on experience and effort expectancy.

In terms of social influence, the mean difference was significant between 4 to 6 and 7 to 9 years' experience (see Table 18). The respondents who have applied FC in teaching for 7 to 9 years believed that social influence was more important than those with 4 to 6 years' experience ($p < 0.05$).

Dependent Variable: Average mean of social influence

Experience (I)	Experience (J)	Mean Difference (I-J)	Std. Error	Sig.
0-3	**4-6**	.625	.348	.076
	7-9	-.518	.455	.258
4-6	**7-9**	-1.142	.535	.036*

Note: *. The mean difference is significant at the 0.05 level.

Table 18. Results of LSD post hoc test on experience and social influence.

4.4.4 Voluntariness of Use

Descriptive analysis was carried out for the means, standard deviations and 95% confidence interval for means of respondents' voluntariness in their first application of FC. They are branched into three groups including mandatory, voluntary and N/A, in which N/A represents those who have not applied FC in teaching before (see Table 19). The mean values showed their standpoints towards social influence. It was found out

that social influence was the most influential to the respondents who have not adopted FC in teaching before. Its 95% confidence interval for mean was also greater than the others, which fell between 5.26 to 5.74.

Direct Determinant	Voluntariness of Use	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Social Influence	Mandatory	4.65	0.38	4.18	5.12
	Voluntary	4.09	1.14	3.77	4.41
	N/A	5.50	0.60	5.26	5.74

Table 19. Descriptive statistics of voluntariness of use and social influence.

With the analysis of one-way ANOVA analysis, it was analyzed that there was statically significant difference between voluntariness of use and social influence ($F = 18.082$, $p < 0.05$) (see Table 20).

Moderating Variable	Direct Determinant	F	Sig.
Voluntariness of Use	Social Influence	18.082	.000*
Note: *. The mean difference is significant at the 0.05 level.			

Table 20. Results of one-way ANOVA on social influence and voluntariness of use.

The results of LSD post hoc test is shown in Table 21. There were significant mean difference between two groups, which were voluntary and N/A (see Table 21). It indicated that the respondents who have not applied FC in teaching presumed social

influence was more important than those who applied FC voluntarily for their first time ($p < 0.05$).

Dependent Variable: Average mean of social influence

Voluntary (I)	Mandatory (J)	Mean Difference (I-J)	Std. Error	Sig.
N/A	**Voluntary**	1.412	.235	.000*
	Mandatory	.850	.476	.078
Mandatory	**Voluntary**	.562	.457	.222

Note: *. The mean difference is significant at the 0.05 level.

Table 21. Results of LSD post hoc test on voluntariness of use and social influence.

CHAPTER 5: DISCUSSIONS AND RECOMMENDATIONS

The above findings could be separated into four parts in responding to the research questions, including (1) the overall readiness of Hong Kong GS teachers in adopting FC, (2) the most influential direct determinant, (3) the relationship between direct determinants and moderating variables and (4) their degree of intention to adopt FC in future teaching.

First, the average means of the three direct determinants lied between 4.70 to 5.22. According to 7-point Likert scale (Joshi, Kale, Chandel, & Pal, 2015), the overall readiness of the respondents would be categorized as between neither agree nor disagree and somewhat agree. The 95% confidence interval for mean also showed identical results except some particular items. For example, teachers with 7 to 9 years' experience strongly agreed that there would be positive influence of the important others on their application of technological systems. However, that was inaccurate because of the small sample size of teachers with 7 to 9 years' experience. This accordingly revealed that the GS teachers are in fact not fully ready for the application of FC in teaching as there are still rooms for improvement.

Besides, the findings showed that the most influential direct determinant was effort expectancy, which represents the ease associated with the use of FC related technological systems. The respondents who have applied FC in teaching before deemed performance expectancy and effort expectancy as significant, while those who have not adopted FC in teaching only

considered effort expectancy as important. Overall speaking, the most influential direct determinant goes to effort expectancy. Hence, some recommendations are put forward as follows in order to increase Hong Kong GS teachers' readiness towards FC.

To begin with, professional development of teachers should be strengthened. According to EDB (2021), there are some on-going resources to support teachers in using different e-Learning approaches. However, there should be some particular trainings and workshops for FC as it has been emphasized as one of the e-Learning approaches in the GS curriculum guide (The Curriculum Development Council of the Government of the HKSAR, 2017). The objectives of workshops or trainings should be clear so that teachers would be easy to follow and understand. Besides, the peer support between teachers would be crucial as well (Mead, 2003; Solomon, 2004). They could share knowledge, skills and resources of FC with other colleagues. While the irregular trainings or workshops could assist teachers in using FC, peers could also play an important role with prompt help. The Hong Kong FlippEducators (2019) has been holding courses and talks for teachers, which should also be promoted in the education sector for the benefits of teachers. Thus, it is believed that these above suggestions might improve Hong Kong GS teachers' perceived ease of use towards different technological systems of FC.

Hong Kong is well-known as a city with examination-oriented culture (Berry, 2011). Hong Kong students are pressurized by plenty of quizzes and examinations in every semester, as well

as the teachers because they are responsible for heavy workload every day. They might not be able to investigate the use of FC because of time constraints. It is accordingly suggested that the examination-oriented teaching approach should be altered. For instance, the spare time could be utilized to participate in trainings and workshops, which have been discussed in the previous paragraph. Hence, teacher professionalism on applying FC could be enhanced progressively by the reduction of working pressure.

Based on the original paper written by Venkatesh et al. (2003), it was assumed that the moderating variables would be in relation to the direct determinants. However, most results from this research were different from the previous assumptions (see Table 22). It is observed that gender and voluntariness of use were the influential moderating variables while age and experience in applying FC were not. Performance expectancy was moderated by gender such that men believe that the application of FC should be help in gaining job performance than that of women. It is ingrained that most Hong Kong women are responsible for rearing children while their husbands would be breadwinners (Cheung, 1997; Ebrahimi, 1999). The viewpoints of female teachers on performance expectancy might still be affected by the inherent gender stereotyping in Hong Kong nowadays. In addition, effort expectancy was moderated by gender as well because women thought the perceived ease of use of technological systems is more important than that of men, which is driven by the cognitions of gender roles (as cited in Venkatesh et al., 2003). Furthermore, social influence was moderated by the voluntariness of

use such that teachers who applied FC in mandatory settings would consider it as more vital. It might be caused by an individual's compliance with the social pressure (Venkatesh et al., 2003; Warshaw, 1980). For example, they might intend listening to the opinions of their important someone and thereby causing their first application of FC, whereas people might have lower motivation in voluntary settings. Hence, the results found are utterly reasonable.

Direct Determinants	Moderating Variables	Assumptions	Results of Research*
Performance Expectancy	**Age**	Younger > Elder	Different
	Gender	Male > Female	Same
Effort Expectancy	**Age**	Younger > Elder	Different
	Gender	Female > Male	Same
	Experience	Less > More	Different
Social Influence	**Age**	Elder > Younger	Different
	Gender	Female > Male	Different
	Experience	Less > More	Different
	Voluntariness of Use	Mandatory > Voluntary	Same
Note: *. Categorized into (1) same or (2) different.			

Table 22. Comparisons between Venkatesh et al.'s hypothesis (2003) and this research.

The results, however, were not completely consistent with the previous hypothesis. Age is the moderating variable that would not work upon all three direct determinants. This could be interpreted by the teacher trainings in Hong Kong. The trainings or workshops provided to Hong Kong GS teachers would be the same regardless of ages (EDB, 2021). It is believed that the age differences might not be an edge or obstacle to the teachers who have received similar education and trainings. Although it was considered that the younger users would be more competent on using technological systems (Venkatesh et al., 2003), the divergence has been

lessened due to the rapid development of technology in recent years. The majority of people of all ages, including teachers, are more capable in using electronic devices. It is consequently that age might not be a moderating variable towards the direct determinants.

In terms of experience, Venkatesh et al. (2003) hypothesized that effort expectancy and social influence would be more influential to the people with less experience on using technological systems. The different in results could also be attributed by the aforementioned, which are teacher trainings and speedy development of technology. It was also newfound that there is no relationship between social influence and experience though it was originally considered that experience would affect the degree of social influence (Venkatesh et al., 2003). When someone they regarded as important told them to teach with the application of FC systems, they would merely affect by the voluntariness of use instead of the other moderating variables. Therefore, the behavioral intention of teachers might be affected by the moderating variables but it might vary due to different circumstances.

To conclude, it is discovered that Hong Kong GS teachers were somewhat agreed to apply FC in future teaching. The direct determinants might affect their readiness, in which effort expectancy would be the most influential direct determinant.

CHAPTER 6: IMPLICATIONS AND CONCLUSION

6.1 Practical and Theoretical Implications

The above findings would be valuable to Hong Kong education sector, especially for the subject of GS. In view of the latest GS curriculum guide (2017), FC is regarded as one of the effective e-Learning approaches so that teachers are encouraged to apply FC in teaching. Nevertheless, the policy was new and its relevant interpretation was inadequate for teachers to put FC into practice. Hence, this study might help EDB and related insitutions to recognize the perceptions and expectations of Hong Kong GS teachers. They might focus on providing more assistance for teachers on the use of technological systems since it was presented as the most influential direct determinant.

Apart from the practical implications, this study also has theoretical implications. Since there were few researches studied about the readiness of Hong Kong GS teachers in applying FC, this study might be able to fill the existing research gap. The results of this research might accordingly lead to a significant contribution to the application of FC by exploring the perceptions and expectations of teachers.

6.2 Limitations and Future Research

There were two limitations when conducting the research, which were about small sample size and convenience sampling method. The small sample size was the utmost limitation of

this research, such that the comprehensiveness and reliability of study would be reduced. It was caused by the limitation of researcher's social network. Besides, the questionnaire was chosen to be transmitted online by convenience sampling method. The infection of COVID-19 was the biggest obstacle as it was difficult to distribute the questionnaire to teachers practically. Although it is efficient and easy to implement, there would be potential bias of the sampling technique.

In conclusion, Hong Kong GS teachers might not be fully ready to adopt FC with the assessment of UTAUT. Since the implementation of e-Learning in Hong Kong education sector is getting more prevalent in recent years, it is considered that more effort could be put on the research of related stakeholders' readiness towards different e-Learning approaches in the future study. In terms of FC, the future study might enlarge the target population. More recommendations should also be put forward in order to ameliorate the current curriculum guide, and thereby improving the quality of teaching and learning in Hong Kong.

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Appendix: Questionnaire

With the assessment of Unified Theory of Acceptance and Use of Technology (UTAUT), are the Hong Kong General Studies (GS) teachers ready to adopt Flipped Classroom (FC)?

I am conducting a research on the perceptions and expectations of Hong Kong GS teachers towards the application of the FC model in GS. This questionnaire consists of 4 sections, which would take about 8-10 minutes. It is assured that all provided information would be kept properly and protected confidentially.

* For the questions, please tick (✓) the appropriate box.

Section 1: Background Information

1. Have you taught GS in Hong Kong primary schools?

☐ Yes (answer question 2) ☐ No (You are not the anticipated participants for this research. Thank you!)

2. Have you applied the FC model in teaching GS?

☐ Yes (answer 2i, Section 2 and 4) ☐ No (answer Section 3 and 4)

i. If your answer is "yes", please tick (✓) in the appropriate box.

It is ☐ mandatory / ☐ voluntary when I first applied the FC model in teaching GS.

Section 2: Perceptions Towards the Flipped Classroom Model

In this section, 5 dimensions would be measuring your readiness in adopting the FC model. Please show your **perceptions** towards **teaching GS by the FC model** based on your **previous experience**. Please tick in "7" box if you strongly agree the statement, and so on (details in the following box).

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Performance Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. I find the FC model useful in teaching.	☐	☐	☐	☐	☐	☐	☐
2. Applying the FC model enables me to accomplish teaching tasks more quickly.	☐	☐	☐	☐	☐	☐	☐
3. My teaching productivity has increased with the use of the FC model.	☐	☐	☐	☐	☐	☐	☐
4. After using the FC model, I believed	☐	☐	☐	☐	☐	☐	☐

that my chances of getting a raise have been increased.							

Effort Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5. The related online platforms (e.g., Google Classroom, platforms established by textbook publishers) of FC gives clear and understandable instructions.	☐	☑	☐	☐	☐	☐	☐
6. Before using the related online platforms of FC, I think I would find them easy to use.	☐	☐	☐	☐	☐	☐	☐
7. Learning to operate the related online platforms of FC is easy for me.	☐	☐	☐	☐	☐	☐	☐
8. It is easy for me to become skillful at using the related online platforms of FC.	☐	☐	☐	☐	☐	☐	☐

Social Influence	**1**	**2**	**3**	**4**	**5**	**6**	**7**

9. I apply FC because people who can influence my behavior (e.g., principals, colleagues) told to do so.	☑	☐	☐	☐	☐	☐	☐
10. I apply FC because people who are important to me (e.g., family, friends) told to do so.	☐	☐	☐	☐	☐	☐	☐
11. The senior management (i.e., managers, panels) of schools has been helpful in applying FC.	☐	☐	☐	☐	☐	☐	☐
12. In general, the schools have supported the use of FC.	☐	☐	☐	☐	☐	☐	☐

Behavioral Intention	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13. I intend to apply FC in my future teaching.	☐	☐	☐	☐	☐	☐	☐

Section 3: Expectations Towards the Flipped Classroom Model

In this section, there are 5 dimensions in measuring your readiness in adopting the FC model. Since you have not applied the FC model before, please show your **expectations** towards **applying the FC model in teaching GS**. Please tick in "7" box if you strongly agree the statement, and so on (details in the following box).

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Performance Expectancy	1	2	3	4	5	6	7
1. I would find FC useful in teaching.	☐	☐	☐	☐	☐	☐	☐
2. Applying the FC model might enable me to accomplish teaching tasks more quickly.	☐	☐	☐	☐	☐	☐	☐
3. My teaching productivity might increase with the use of FC.	☐	☐	☐	☐	☐	☐	☐
4. After applying the FC model, I believe	☐	☐	☐	☐	☐	☐	☐

that my chances of getting a raise might be increased.							

Effort Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5. I expect the related online platforms (e.g. Google Classroom, platforms established by textbook publishers) of FC would give clear and understandable instructions.	☐	☐	☐	☐	☐	☐	☐
6. I think I would find the related online platforms of FC easy to use.	☐	☐	☐	☐	☐	☐	☐
7. I think learning to operate the related online platforms of FC would be easy for me.	☐	☐	☐	☐	☐	☐	☐
8. I think it would be easy for me to become skillful at using the related online platforms of FC.	☐	☐	☐	☐	☐	☐	☐

Social Influence	**1**	**2**	**3**	**4**	**5**	**6**	**7**

9. If people who can influence my behavior (e.g., principals, colleagues) think that I should apply FC in teaching, I would do so.	☐	☐	☐	☐	☐	☐	☐
10. If people who are important to me (e.g., family, friends) think that I should apply FC in teaching, I would do so.	☐	☐	☐	☐	☐	☐	☐
11. I think the senior management (i.e., managers, panels) of schools would help me in applying FC.	☐	☐	☐	☐	☐	☐	☐
12. In general, I believe the schools would support my use of FC in teaching.	☐	☐	☐	☐	☐	☐	☐

Behavioral Intention	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13. I intend to apply FC in my future teaching.	☐	☐	☐	☐	☐	☐	☐

Section 4: Demographic Information

1.	**Gender**	☐ Male	☐ Female
2.	**Age**	☐ 20 - 29	☐ 30 - 39
		☐ 40 - 49	☐ 50 - 59
		☐ 60 or above	
3.	**Years of teaching**	☐ 1 - 5	☐ 6 - 10
		☐ 11 - 15	☐ 16 - 20
		☐ 21 - 25	☐ 26 - 30
		☐ 30 or above	
4.	**Years of applying FC in teaching (not confined in teaching GS)**	☐ 0 - 3	☐ 4 - 6
		☐ 7 - 9	☐ 10 +

- End of Questionnaire. Thank you! -