

Utilizing Wikis and a LINE Messaging App in Flipped Classrooms

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ABSTRACT

The aim of this research is to identify students' perception of the utilization of wikis, LINE, and flipped teaching strategies in a Research Methodology course at a university in Taiwan. Q-methodology, a combination of qualitative and quantitative research, was employed for this study, and sixteen participants were asked to rank-order 30 statements related to the integration of wikis and LINE in a flipped classroom. Correlation, a centroid factor analysis, and judgmental rotation were used to identify the significant factors. The two factors that represented groups of participants with a similar perception were extracted and the results were as follows; (1) learners could be divided into those with a strong positive feeling about group-based activities and self-paced learning (Collaborative Achiever) and those who had a positive reaction to collaboration, but expressed concern about tension caused by competition (Collaborative Competitor), and (2) all the participants agreed that they were highly engaged and motivated when using Wikispaces and LINE in the flipped classroom based on the advantages of a timely and easy-to-use IT environment, self-regulated learning, virtual community companion, collaborative work, and the building and sharing of knowledge. The theoretical and practical implications of the results were discussed.

Keywords: flipped classroom, Q-methodology, Wikispaces, LINE, collaborative learning

INTRODUCTION

Many previous studies have focused on utilizing wikis for collaborative learning and student engagement in higher education (Chia & Pritchard, 2014; Lee & Bonk, 2014; Yueh et al., 2015), and there is also a growing interest in the use of m-learning in education (Kearney et al., 2015). Indeed, LINE (<http://line.naver.jp/en/>) is one of the most popular applications for messaging on smartphones and personal computers in Taiwan, with 17 million Taiwanese users in January 2017 and more than 218 million monthly active users worldwide. Ninety-one percent of Taiwanese between 12 and 65 years of age used LINE in the first half-year of 2016 (Yeh, 2017). Due to the personal and portable nature incorporated into learning, the Mobile Instant Messaging (MIM) app may have the potential to be employed as a compelling learning tool in higher education (Hsieh & Wu, 2013; Rambe & Bere, 2013; Van de Bogart & Wichadee, 2015; Wang et al., 2016).

Despite the popularity and extensive use of LINE by students, its usage as a virtual learning companion has not made significant inroads into mobile learning studies (Hsieh & Wu, 2013). Nonetheless, the pedagogical potential of MIM remains one of the least explored functionalities of smartphones in higher education institutions (Rambe & Bere, 2013; Van de Bogart & Wichadee, 2015). While a considerable volume of research has been undertaken on the utilization of wikis in teaching and learning practices (Yueh et al., 2015; Altanopoulou & Tselios, 2017), few investigations have been made of the use of both Wikis and LINE as collaborative tools to supplement a "flipped classroom." However, it seems critical to explore students' views during the initial application of a "flipped classroom" approach in order to understand how technologies can best be integrated into the learning process (Bhagat et al., 2016; L. Chen et al., 2015; S. C. Chen et al., 2015; Davies et al., 2013). Therefore, the purpose of this Q-study is to identify and categorize learners' perception of the use of wikis, LINE, and flipped teaching strategies in

Contribution of this paper to the literature

- This study identifies university students' perception of the use of wikis, LINE, and flipped teaching strategies in a Research Methodology course in Taiwan.
- Q-methodology, a combination of qualitative and quantitative research, was used for the study.
- Instructors need to be aware that there are distinctive sets of opinions (i.e. Factors I and II) in the flipped classroom; thus, there is a need to provide support on an individual level.

a Research Methodology course at a university in Taiwan. The following research questions will guide the overall study:

1. What are the learners' subjective opinions of this pedagogy?
2. What are the factors that represent groups of learners who share a similar pattern of thought?

The paper is organized as follows: (1) the theoretical and empirical background of the study is presented in the first part; (2) details of the methodological approach used to complete the research are provided in the second part; (3) the results are presented in the third part; and (4) the fourth part contains a discussion of those results, as well as some recommendations and implications for further research and practice.

LITERATURE REVIEW

Using the LINE Messaging Application in Education

Today, the proliferation of mobile technologies offers the opportunity to embed learning in higher education. Indeed, LINE has become the most favorite app of Taiwanese smartphone owners ahead of Facebook, YouTube, WeChat and Instagram, according to the survey results released from the Market Intelligence Center under the government-sponsored Institute for Information Industry (Chung & Huang, 2016). LINE enables users to exchange texts, images, videos, and audio material, as well as participate in free VoIP conversations and video conferences (see [Figure 1](#)). Van de Bogart and Wichadee (2015) suggest that smartphones with a LINE chat app may support teaching and learning in a database course. Shih et al. (2015) also found that college students demonstrated a positive attitude toward learning English vocabulary, particularly spelling, using the LINE app. The LINE chat app constantly updates choices of self-expressive sticker characters that can also be attached to a standalone message to convey a feeling or even an attitude. Teachers can interact with their students using the emoticons and stickers attached to text when using LINE as a way to bridge the generation gap. Stapa and Shaari (2012) suggest that some of the emoticons can be used to strengthen the text message, while others represent particular tones of voice such as happiness, sadness, fear, anger, disgust, and surprise. Students can also utilize the small emoticons and stickers in the LINE app as a substitute to express their feelings and respond to their friends in an everyday life situation (Van de Bogart & Wichadee, 2015).

Using Wikis in Higher Education

Leuf and Cunningham (2001), who invented the wiki concept, originally described it as "a freely expandable collection of interlinked webpages, a hypertext system for storing and modifying information – a database, where each page is easily edited by any user with a forms-capable Web browser client" (p.14). Recent rapid advances in wiki technologies have already been utilized successfully in higher education to promote students' writing skills (Wheeler & Wheeler, 2009), enhance their critical thinking and contextual application (West & West, 2009), impact knowledge management processes, fulfill students' satisfaction (Biasutti & EL-Deghaidy, 2012), and facilitate group learning (Altanopoulou et al., 2015). Most of the application of wikis in education is related to the collaborative approach to learning (Yueh et al., 2015). Wikis enhance creativity and freedom of expression, although there are some challenges for students. The openness of wikis may sometimes make it prone to vandalism and cause the posting of untrue information. In addition, learners may tend to only read the information to which they contributed, and may be defensive in taking personal credit for their particular work within groups. Furthermore, students may dislike group work and feel intimidated by online learning and collaboration (Wheeler et al., 2008). Abdekhodae et al. (2017) found that peer feedback improved learners' work; however, much of it was too brief to be constructive and was offered too late to be useful in guiding their work. One challenge of using wiki is that the non-peer reviewed content is usually posted prior to its publication and there is a risk that it may contain inaccurate or false information (Kolski et al., 2015). Snodgrass (2011) suggests that collaborative learning using a wiki is potentially more successful when combined with face-to-face activities and assessments.



Figure 1. Features of LINE

Implementing the Flipped Classroom for Teaching and Learning

A growing awareness has been directed toward implementing the flipped classroom approach in assorted educational institutions (Aşıksoy & Özdamlı, 2016; Karabulut-İlgu et al., 2017; Lee, 2017; Zainuddin & Halili, 2016). Previous researchers have reported that the flipped classroom approach fosters academic performance, enhances interaction (Hung, 2015), improves class attendance (Chen et al., 2014), and cultivates a positive attitude toward the course in which it is applied (S. C. Chen et al., 2015). Bhagat et al. (2016) note that the flipped classroom approach could help low achievers because they will receive more attention from teachers. Contrary to these positive findings, L. Chen et al. (2015) claim that some students may not have internet access to view the videos at home. Milman (2012) elaborates that poor quality of video lectures usually becomes an unexceptional problem in flipped classroom practice. Kim et al. (2014) found no evidence that flipped learning improved students' grades. Chen et al. (2014) also reported that some students resisted this approach initially because they did not have time to watch video lectures prior to classes. Consequently, some skipped the pre-class activities and came to class unprepared. Notwithstanding, potential negative effects have been found in this approach in higher educational institutions, with Liou et al. (2016) arguing that videos in flipped classroom are not inherently interactive and there is a need to integrate other technologies to advance the flipped classroom model.

METHODOLOGY

Trainer and Research Participants

The research was conducted during a sixteen-week flipped course at a continuing education center in a university in Taipei. Sixteen graduate students attended this required course. The first author, who had experience of implementing a flipped classroom, was the instructor, the curriculum designer, and the moderator in the individual and focus-group interviews. All the participants had college degrees and web-based learning experience, and many of them knew each other and the moderator.

Description of the Course

The wiki and LINE messaging application was implemented in a Research Methodology course, a required component of the master's program in the Department of Technology Management. The course contents included the following: (1) an introduction to a variety of quantitative and qualitative research methods, (2) planning,

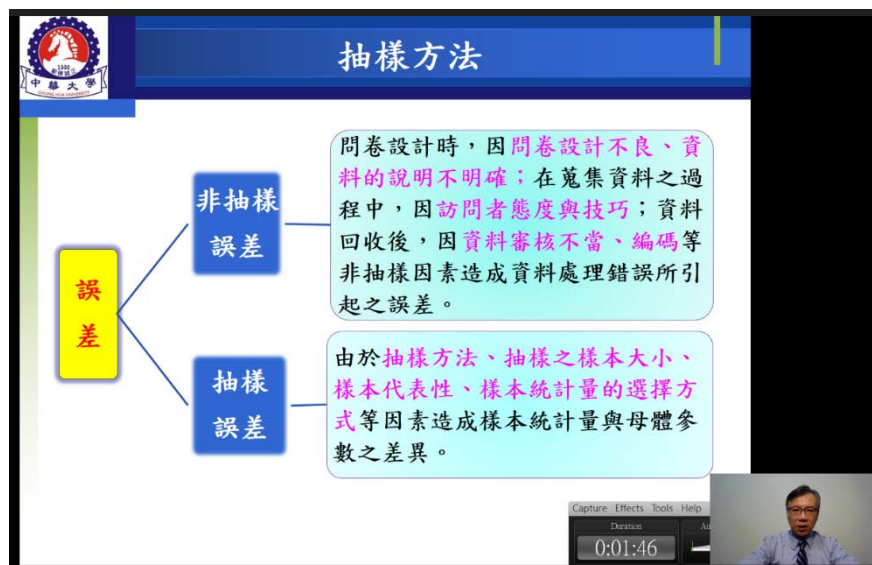


Figure 2. Sample screencast with Camtasia software

designing, and choosing appropriate research method(s), (3) collecting, analyzing, interpreting, and reporting data, and (4) utilizing the Statistical Package for Social Sciences (SPSS) to manage and analyze data. The participants were assessed based on 12 individual written assignments and five sessions of group-based case studies that incorporated the use of Wikispaces.

Instructional Strategies in the Flipped Classroom

Each team consisted of two to four trainees, who were assigned segmented missions (i.e., group problem-solving, decision-making assignments and peer reviews). Formal groups were organized in this training program. The course was designed as follows:

1. Text-based lecture notes and pre-recorded multimedia micro-lectures (i.e., two to three micro-lectures, six to seven minutes in length) were assigned to each class. The lecture was recorded with Camtasia Studio 8 screen capture software (see Figure 2). These video clips were presented in the Wikispaces Classroom.
2. The training sessions were moved from inside to outside the classroom. The students used the time outside to view pre-recorded multimedia lectures and read lecture notes prior to attending the class.
3. Individual students were required to answer some group/individual questions in order to assess their fundamental knowledge of the lesson material right before each class.
4. The amount of class time spent on lecturing was reduced, allowing the students more time for structured team-based problem-solving and feedback. They were assigned to work in teams of two to four. At the beginning of each class, the team members compared their responses to their individual/group assessments and agreed a team response. The teacher then reviewed any common misconceptions and summarized the key concepts. Finally, the small groups completed team-based short essay questions or case studies with higher-level application problems.
5. The teacher provided assistance, clarification and feedback when needed.

In summary, since it was necessary for the students to focus on more complex and long-term problems in the physical classroom, they were officially organized and monitored by their teacher. Consequently, the peer groups gathered to develop and contribute to one another's mastery of various course topics by discussing the materials and supporting their group members.

Implementation of Wikispaces Classroom and LINE

Wikispaces Classroom (i.e., a social writing platform for education) was selected for this course from the many available wiki software packages. All the students were required to create their own account and participate in the individual/group tasks during the course. The training program, which consisted of three 1-hour sessions each week, was conducted in a traditional classroom; however, the virtual collaborative activities were undertaken via the Wikispaces (www.wikispaces.com). The students attended a one-hour briefing session about the Wiki at the beginning of the semester. Wikispaces was used regularly to deliver news, upload assignments, and share learning

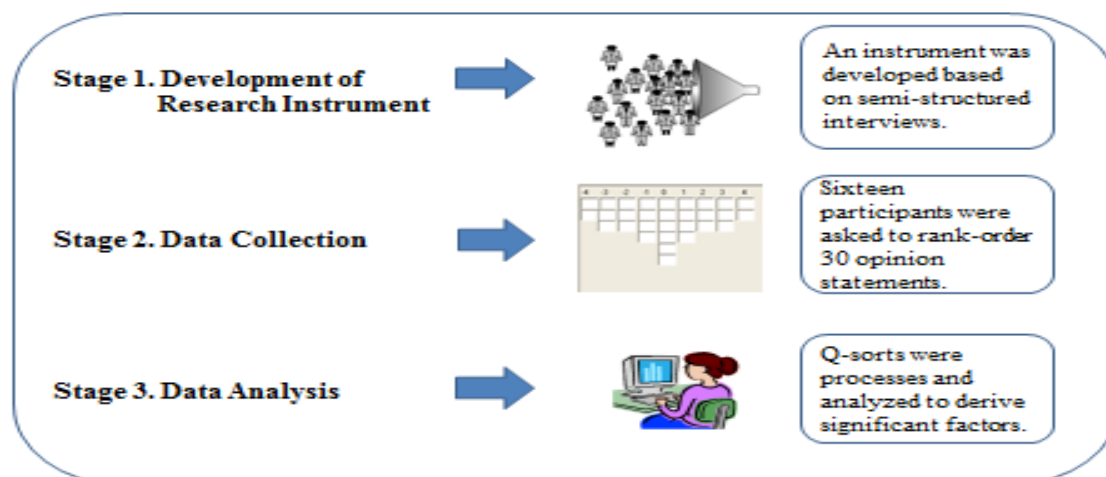


Figure 3. Steps of Q-methodology

video clips and materials. The trainer facilitated further discussions on the Wikispaces homepage, and the students were encouraged to use Wikispaces to discuss and answer queries. Overall, the basic features of a Wikispaces Classroom are as follows: (1) provides a page-editing function, (2) tracks and logs the editing processes, (3) organizes group work, (4) supports online discussion and feedback, (5) creates rich and appealing pages using widgets, and (6) provides adjustable permission to keep the content safe and secure.

Participation in Wikispaces on a weekly basis was mandatory, but LINE was used in this course on a voluntary basis. Learners could use LINE as a platform to form their own virtual learning companion in order to exchange text messages, graphics, video and audio media, make free VoIP calls, and hold free audio/video conferences. This is a technology that provides an informal learning environment, and students can use it for chronologically-structured contributions. In contrast, Wikispaces Classroom offers both formal and informal learning settings and allows users to develop content-specific websites. Participants summarize their learning using online collaboration tools, and instructors provide feedback to increase the cooperation in both virtual and physical classrooms. Wikispaces Classroom and LINE were both used in this study to enhance collaborative learning in the virtual learning community (VLC).

Measuring Subjectivity

Q-methodology was used in this study in order to ascertain the subjective viewpoints of a few people by asking them many questions, rather than exploring the reaction of a large number of people to fewer questions. The objective of Q-methodology is neither to uncover cause nor to generalize demographic prevalence of variables to a large population. Hence, a small sample size is quite common and acceptable when utilizing Q-methodology (Brown, 1993; Brown, 1996; Stollefson et al., 2012). The three steps of Q-methodology are as follows: (1) Development of the research instrument: to create a set of statements to be sorted, (2) Data collection: to sort those statements along a continuum of preferences (i.e., from agree to disagree) by each participant, and (3) Data analysis: to analyze and interpret the data (see [Figure 3](#)).

Data Collection

Having completed the training program, 16 learners participated in a Q-study led by the researcher. Semi-structured interviews were conducted with all the students one week after the end of the training program in order to ascertain their perspective of the topic. The research instrument was based on a representative sample of 30 statements containing key ideas from the interviews. Those 30 statements, which represented the final Q-set, were selected through a content analysis that characterized aspects of technology, content, and teacher/students. It is imperative to note that Q-statements (i.e., the opinion statements of the research instrument) in Q-methodology are selected as cautiously as the participant selection is conducted in any other scientific method (Brown, 1996). A pilot test was conducted with two volunteers who participated in the first interview, with only minor changes needing to be made to clarify some Q-statements. The Q-set (viz. Q-methodology questionnaire) was then distributed to all learners to study the basis of their assessment of this innovative pedagogy. Without bias, and treating both disagreement and agreement issues alike, the participants were asked to rank-order 30 statements into nine categories within the response grid, ranging from Most Disagreeable (-4) to Most Agreeable (+4). In other words,

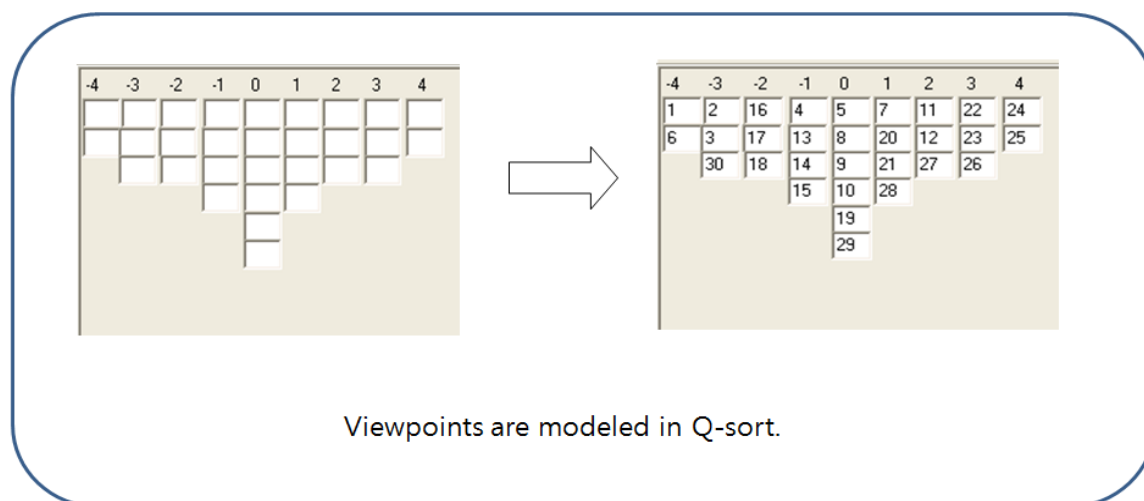


Figure 4. Q-sorting

the participants constructed their viewpoints in Q-sorts on the sorting answer sheet (see [Figure 4](#)) (L. Chen et al., 2015).

Data Analysis

PQMethod (version 2.11) statistical software was used for the data analysis. Data and Q-sorts were entered into the program as they were being collected, thus producing different piles of statement numbers. Unlike the Likert survey technique, the statements related to one another are examined in Q-methodology. Various factor rotation and statistical procedure methods can be applied to safeguard factor reliability in Q-methodology. Correlation, a centroid factor analysis, and judgmental rotation (i.e., hand rotation) were employed to derive the significant factors in this study. The relevant factors were selected and defined for a final analysis. Interested readers are referred to Brown (1993), Brown (1996), Watts and Stenner (2012) for further theoretical concerns and guidelines.

RESULTS

The participants' factor/opinion types (see [Table 2](#) and [3](#)) were revealed using the PQMethod software. Factors that represented groups of students with a similar perception were extracted in order to reveal various patterns of thoughts expressed in their subjective views. Two factor types were identified: (1) Factor I: Collaborative Achiever, and (2) Factor II: Collaborative Competitor (see [Table 1](#)). The sixteen trainees' Q-sorts were divided into these two factors. All the Q-sorts were found to be statistically significant, i.e., the loadings on these two factors were more than 0.36.

Table 1. Factor loadings by participant and opinion type (*)

ID	Factor A	Factor B
1	59	
2	56	
5	52	
6	48	
7	68	
8	82	
9	53	
10	52	
11	80	
14	86	
15	67	
3		66
4		56
12		73
13		66
16		53

(*) only significant loadings are shown ($p < .01$); decimals omitted

Factor I: Collaborative Achiever

Group I was the largest factor group extracted. It comprised 11 participants, representing 68.75% of the P-sample. This group consisted of 7 females and 4 males. Two were aged between 31 and 35, four between 36 and 40, and three between 41 and 45. One of them was aged between 46 and 50, and one between 56 and 60.

The individuals in this group preferred reduced seat time in the physical classroom (Statement 11, +1). They watched these video clips repeatedly when questions arose (Statement 30, +4). They also liked those learning materials being posted based on their own progress (Statement 18, +3) and enjoyed the customized learning processes (Statement 23, +4). These individuals suggested that the instructors should continue to use this approach (Statement 16, +3).

On the other hand, they were not under a lot of pressure when they compared their work with that of others and realized they had made mistakes in the online environment (Statement 3, -3). They did not appear to be concerned about the comprehensiveness of the online assignment (Statement 4, -3). At the same time, they did not think their classmates came to class without completely watching these pre-class materials (Statement 21, -3). Factor I participants perceived much benefit and few drawbacks in the application of LINE and Wiki technology in the flipped classroom. They were neither concerned about asking questions in the virtual space (Statement 10, -4) nor about others copying their work (Statement 9, -4); however, they found the course load to be quite heavy (see [Table 2](#)).

These distinguishing statements helped us to define and clarify the uniqueness of each factor, since the factor scores were used to further represent the characteristics of each cluster (see [Table 2](#) and [3](#)), with the first factor describing *collaborative achiever* (see [Table 2](#)) and the second factor describing *collaborative competitor* (see [Table 3](#)). These two specific factors were named based on comparing and contrasting the two sets of distinguishing statements (see [Table 2](#) and [3](#)).

Table 2. Statement scores by factors/opinion types

No.	Statements	Factors (*)	
		I	II
3	When comparing answers with classmates and realizing that I was mistaken in the online environment, I was quite anxious.	-3	1
4	I was concerned about the comprehensiveness of the assignment if I submitted my assignment too fast online.	-3	0
9	Some lazy students just copy others' work from Wikispaces.	-4	-1
10	Some students are afraid to ask questions in case they appear to be stupid in the eyes of their peers in the virtual space.	-4	3
11	The seat time in the "physical classroom" should be reduced if universities adopt this teaching method in future.	1	0
16	I hope my professor will continue to use this novel approach to teach the Research Methodology course.	3	1
18	I like the idea that the teaching materials were listed on the website and learners could preview/review them based on their progress.	3	0
21	Some students did not finish watching the video clips and just looked at handouts ahead of class.	-3	-2
23	Learning is customized based on individuals' needs and the teaching contents can be modified on a weekly basis. Lecturers can be sure of the quality of teaching from students' work posted on the virtual context.	4	0
29	The course load was very intense and hefty.	3	-4
30	I watched the video clips repeatedly when I was unsure how to complete the assignment.	4	-1

Table 3. Statement scores by factors/opinion types

No.	Statements	Factors (*)	
		I	II
2	Learners can compare observe others' online work, thereby accelerating the competition among classmates.	-2	3
5	I feel quite reluctant to post my unique ideas on the discussion board first because everyone can read and copy my answers.	-2	4
8	Team members discuss and generate ideas that enable the VLC to interact and collaborate. I can offer my support and build my self-competency.	2	3
10	Some students are afraid to ask questions in case they appear to be stupid in the eyes of their peers in the virtual space.	-4	3
15	The teacher categorized and posted weekly teaching materials online based on the curriculum, which made me quite comfortable to manage and record changes.	2	4
17	This teaching method may not be suitable for all types of learners since computer literacy and technological competence is required.	-1	-3
20	I would recommend that the department adopts this teaching method for each course.	-2	-3
25	The teaching video lasted for about 6-7 minutes. I think the length of the video clips are too long.	0	-3
28	Students may be tempted to fast forward the video if it is too longwinded.	-1	-4
29	The course load was very intense and hefty.	3	-4

Factor II: Collaborative Competitor

Group II was composed of five participants, representing 31.25% of the P-sample. This group consisted of 2 females and 3 males, four of whom were aged between 31 and 35 and one was less than 30 years old. The individuals in this group also recognized that this teaching approach had many benefits. They did not appear to be concerned about the heavy course load (Statement 29, -4); on the other hand, they were concerned about asking questions in the virtual space (Statement 10, +3) and reluctant to post their ideas on the board first (Statement 5, +4). They were very much aware of the competition among the group members (Statement 2, +3).

On the other hand, they strongly favored this method because it keeps a good record of their learning (Statement 15, +4), provides personal support, and advances collaboration and interaction (Statement 8, +3). They believed that this approach may be suitable for all types of students (Statement 17, -3). In contrast, the individuals in this group did not recommend adopting this approach for every course (Statement 20, -3). They considered that the duration of the video clips was not too long (Statement 25, -3), and students would probably not be tempted to fast forward them (Statement 28, -4) (see [Table 3](#)).

Consensus Statements between Factors I & II

The consensus statements between these two groups of trainees were statements 1, 8, 13, 14, 17, 19, 20, 21, and 22 (see [Table 4](#)). Both groups agreed that this method enhanced interaction and collaboration, fostered discussion,

Table 4. Consensus statements between Factor I and Factor II

No.	Statements	Factors (*)	
		I	II
1	This pedagogy enables individuals or groups to discuss the course content or any issues.	2	1
8	Team members discuss and generate ideas that enable the VLC to interact and collaborate. I can offer my personal support and build my self-competency.	2	3
13	This teaching method enhances my learning effectiveness.	1	2
14	This pedagogy motivates me to do better.	1	2
17	This teaching method may not be suitable for all types of learners since computer literacy and technological competence are required.	-1	-3
19	If problems were encountered during the preview of the video clips, we usually discussed them in the physical and virtual contexts.	1	2
20	I would recommend this teaching method for every course in our department.	-2	-3
21	Some students did not finish watching the video clips and just looked at the handouts ahead of the class.	-3	-2
22	The interface of the Wikispaces Classroom is all in English and is too complex, which makes it hard to begin.	-1	-1

increased motivation, and improved learning effectiveness. They discussed the pre-class materials both in and out of the class time if questions arose. These two groups thought that their classmates finished watching the whole video clips prior to the beginning of the class. They also believed that this approach is suitable for all types of learners. Both groups found the Wikispaces to be not too complex to begin with; however, these individuals did not believe that every course could adopt this method.

DISCUSSION AND CONCLUSION

Discussion

The results of this research revealed several important issues, the first of which is that the learners' opinions could be divided between those who showed strong positive feelings about group-based activities and self-paced learning (i.e. Factor 1: Collaborative Achiever) and those who had a positive reaction toward collaboration, but expressed concern about tension caused by competition (i.e. Factor 2: Collaborative Competitor). Though Factor 1 students considered that the course load was very heavy, they still maintained a positive attitude toward it. On the other hand, Factor II students did not think that the workload was hefty, but they were reluctant to post their answers and perceived their performance as a contest in a competitive learning environment. More research is needed to determine whether competition in the classroom is motivating or destructive. The findings of this research are in line with those of Chen et al. (2014) and Shih and Tsai (2017), who found that learners' workloads were heavier due to homework outside the classroom. This may pose a challenge to employing flipped classrooms. Consistent with Mayer's (2014) cognitive theory of multimedia learning, this study divided the long video into a series of short video clips and used a six-minute guideline of video production. In addition, this study is in line with previous research, which recommends that 20-25 minutes for all combined video segments would be a bearable workload for most students in a flipped classroom (Lo et al., 2017). It is recommended that learning materials may be divided into various levels (i.e. required pre-class materials for all students and optional learning materials for higher achievers) and learners can adopt them to learn based on their abilities.

Secondly, the participants of this study said that the course materials were well-organized and presented and the quality of the instructional design was high. Nevertheless, all the participants agreed that they were highly engaged and motivated in the physical classroom, the asynchronous environment (i.e. Wikispaces) and the asynchronous/ synchronous environment (viz. LINE). Consistent with Hung (2015), all the participants agreed that this teaching method had improved their learning effectiveness. The analysis of this study goes beyond the findings of Liou et al. (2016), which initially suggests that there is a need to integrate other technologies for the advancement of the flipped classroom model. This implies that the students were particularly attracted to the advantages of a timely and easy-to-use IT environment, self-regulated learning, virtual community companion, collaborative work, and the ability to build and share knowledge provided in Wikispaces and LINE that were added in the current flip learning context.

Thirdly, while Chen et al. (2014) and L. Chen et al. (2015) maintain that some Chinese students still find it difficult to adopt the flipped learning approach because of their former passive learning habits from the traditional classroom, the findings of this research present a very different picture of this pedagogy. These adult learners strongly believed that this approach could enhance students' intrinsic motivation. It motivated them to seek additional information, encouraged continuous dialogue and collaborative interactions among colleagues, and fostered a feeling of autonomy and personal affinity rather than relying on humdrum grades to spark

enthusiasm. Previous researchers claimed that learners cannot immediately ask questions for clarification during video lectures in flipped classrooms (Schultz et al., 2014). In contrast, the findings of this study revealed that the Chinese students engaged in active learning in both the in-class and out-of-class contexts that took place before, during, and after lessons.

Fourthly, Baepler et al. (2014) claimed that when instructors provide an active learning classroom, seat time can be cut by two thirds and the same outcomes can be attained. Similar to this argument, the findings of this research suggest that Factor I participants believed that in-class seat time could be reduced in a flipped learning context. Further research should investigate if students' seat time can be reduced while achieving the same outcomes.

Fifthly, a particularly interesting aspect that emerged was that the Factor II participants described tension between the collaborative and competitive nature of the VLC. The public nature of the Wikispaces and Line enables learners to be easily compared. Factor II students did not wish to initiate the posting of answers in front of their peers. Due to the different tendencies between Chinese learners and their Western counterparts in online education, Factor II participants were too timid to ask questions and publish their work online for fear of "losing face." In fact, the Confucian-heritage culture and the concept of "face" still has a huge impact on Chinese students' learning (Wang & Greenwood, 2015). "Having face" means that one has a good social standing or a good reputation and protecting one's face is another source of psychological motivation. This collaborative approach may be challenging for students who are not accustomed to open discussions and expressing insights as the feedback is displayed online publicly and it can lead to either loss or gain of face. Thus, to convey a better impression and seek positive peer feedback becomes one of the ways learners can protect their face. Teachers should be mindful to such 'restraints' on Chinese learners' behavior and provide more encouragement. Clear instructions and sufficient preparation time should be provided to allow students to think about those virtual discussion topics. Further research is needed to validate whether learners prefer a "safe" learning context and a sense of anonymity in VLC.

Conclusion

Apart from the limitations of the study, it is concluded that instructors need to be aware that there are distinctive sets of opinions (i.e. Factor I and II) in the flipped classroom, just as there are learners with diverse needs and backgrounds in traditional classroom settings. The aspects of Factor I and II participants deserve urgent attention and understanding. Evidently, social media like wikis and Line are not a fad, since they continue to play an emergent role in individuals' lives (Doss et al., 2016). With their combined strengths of formal and informal learning, unique features that optimize the benefits while constraining the limitations of each of them, it is concluded that Wikispaces and LINE are likely to form an effective approach for adult learners in the context of flipped classrooms.

Limitations of the Study

Although several pedagogical implications can be drawn from this study, some limitations must also be acknowledged. Firstly, it is important that the generalization of the preliminary findings should not be interpreted by the numerical distribution, but rather the validity and implications of the opinion clusters this Q-study conveyed. Secondly, the pre-class videos were provided in this required Research Methodology course; thus, it should be considered whether these findings are course subject-specific. Further research at broader levels (i.e. program, discipline) may assist researchers to understand the overall impact of this pedagogy. Thirdly, since this study was mainly focused on graduate students, a further investigation is needed of the way in which age and maturity influence learners' reaction to the course and academic performance. Fourthly, the vast majority of the studies included in this research examined the flipped classroom approach within one semester. Therefore, further longitudinal studies are necessary to provide a more in-depth understanding of this new teaching approach. As with any study, this study has some limitations that need to be considered when interpreting the findings.

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