

Flipping the Classroom for Exploration of the World Libraries

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ABSTRACT

Globalization has generated a trend of learning all subject domains in English. In learning with English, various innovative teaching approaches have emphasized that active learning experience is a necessary foundation for learners' knowledge acquisition. With the advancements in the integration of mobile technology into the classroom in various subject domains, learning has shifted its role from being passive to active in nature. In this study, a "flipped classroom" approach was adopted in a course entitled "Exploration in the Library World." The course was taught in English. Instructional contents were pre-recorded and uploaded to a learning management system. Students brought their own mobile devices to the class. An enriched learning environment with the use of technologies in this class aimed to offer students a more engaging learning experience. During the class period, an IRS (instant response system) was frequently used as a major tool for eliciting feedback from students. Other approaches such as role-playing, group work (with cloud resources), and reflection and sharing strategies were also used to ensure active learning among students. Mobile devices were used to support needed interactions in class activities. The implementation of the "flipped classroom" design was assessed by the 40 students who were enrolled in the course. A 5-point Likert scale was used to reflect the students' attitudes toward the implementation. According to the gathered data, the students reacted positively toward following aspects, including: (1) Quality of the digital learning materials (4.23, SD = 0.39), (2) Exploration of foreign knowledge (4.41, SD = 0.44), (3) Collaborative learning activities (4.34, SD = 0.48), (4) Use of online instant feedback (4.28, SD = 0.48), (5) Reflective journal writing (4.01, SD = 0.53), and (6) Adoption of mobile devices (4.30, SD = 0.43).

Keywords: *flipped classroom, blended learning, content and language integrated learning (CLIL), higher education, LIS education*

INTRODUCTION

The use of "Flipped classrooms" has become widely employed in recent years as a means to offer students an interactive and engaging learning environment. The adoption of enabling technologies by universities provides opportunities for student-centered learning. The rapid growth and widespread use of mobile devices and ubiquitous connectivity also makes teaching and learning different in the new "Knowledge Age" (Hutchings & Quinney, 2015). The flipped classroom is usually associated with providing course materials with pre-prepared lecture notes or pre-recorded videos for students to engage with outside of the classroom, and then engages students with technology-mediated

experiences in participatory in-class activities and collaborative works that are meaningful for knowledge acquisition (Al-Zahrani, 2015; Balan, Clark, & Restall, 2015; Chen & Summers, 2015). Much literature suggests that flipped classrooms have a great impact on students' perceptions, attitudes, engagement and performance in learning (Bergmann & Sams, 2014; Brooks, 2014; Chao, Chen, & Chuang, 2015; Clark, 2015; Egbert, Herman, & HyunGyung, 2015). To encourage class interaction and engagement in learning, various strategies should be employed in a flipped classroom, for example, the use of IRS (instant response system) to elicit feedback from students. Other approaches, such as role-playing, group work (using cloud resources), reflection and sharing are also used to encourage

students' active learning.

Framing the Inquiry Learning Model for A Flipped Classroom

A flipped classroom emphasizes the use of blended instructional approaches that entail different cognitive and affective responses from learners (Clark, 2015). The core idea of using blended learning strategies embedded in learning to flip the common instructional approach is to provide students with sufficient opportunities to learn how to think through working with problems, constructing concepts, and engaging in collaborative learning (Fulton & Gonzalez, 2015). The early works of Todd (2006) emphasized the nature and dynamics of knowledge construction and transformation of information by learners in the school setting, particularly through embedding an inquiry framework in the learning environment. Gordon (2009) addressed the importance of guidance for students to approach the ways of knowing and the processes of analysis and synthesis in reflective learning. The underlying premise in a flipped classroom is that there are realms to which academic disciplines belong. In this study, a guided process through responding, inquiry, experiencing, and reflection was used.

In a flipped instructional approach, guiding students to learn from their thinking processes draws on a rich theoretical tradition of constructivist learning theory, cognitive information science, knowledge elicitation and representation. Learning in an information rich, and technology-supported environment, students must be involved in attending and experiencing, reflecting on the knowledge, and employing various learning strategies to acquire knowledge (ChanLin, 2012; Usta, 2011). Application of collaboration, dialogue and reflection connected to the learning context is needed for effective learning (Huang & ChanLin, 2007; Lofstrom & Nevgi, 2007; Williams, Morgan, & Cameron, 2011). The development of students' learning strategies for self-regulation, problem solving and decision-making, and the evaluation of their own progress is the central focus of any educational innovations (Lightner et al., 2007).

Engaging Students' Interest through Eliciting Responses

Along with the use of various innovative tools in a flipped classroom, learning is characterized as technology-supported, student-centered, collaborative, context-based, and globalized. Learners are required to possess the capability to manage the rapid changes in world knowledge and information (Gubbiyappa et al., 2014; Frey & Osborne, 2013). The transformation of the

pedagogy paradigm from drilling factual knowledge to facilitating an innovative motivation environment is crucial for engaging students' attention and curiosity in various knowledge domains, and active learning in the digital age (Gunyou, 2015).

The use of IRS (Instant Response System) for eliciting students' instant feedback in the classroom has been considered an effective approach for promoting deliberate thinking processes (Lee & Shih, 2015; Shieh & Chang, 2013; Yu et al., 2015). It encourages peer learning and helps students to attend to the feedback mindfully and actively with advanced learning technologies. Students also benefit from both the formative and summative purposes of integrating learning content and constructing understanding of knowledge (Andergassen et al. 2013; Brady et al., 2013). IRS provides a wide variety of applications including instant quizzes and real-time audience feedback for eliciting and assessing students' responses to the given questions, either individually or collaboratively (Shieh & Chang, 2013). A pedagogical approach emphasizing active and interactive learning in the use of IRS is suggested for successful implementation (Kay & LeSage, 2009).

Inquiry Process

A flipped classroom encourages students' positive attitude and inquiry of skills and knowledge in various domains through active exploration in an open learning atmosphere (Winquist & Carlson, 2014; Yuping, Xibin & Juan, 2015). In contrast to traditional teacher-centered and teacher-prepared resources for delivering information to learners, knowledge no longer comes from one single channel (Clark, 1983; Kong & So, 2008; Winquist & Carlson, 2014). Rather, students can access a variety of knowledge from different electronic resources, and use diverse ICT (information community technology) tools for experiencing different learning approaches within or outside classroom activities. Challenging tasks assigned in the class invite learners to be engaged in cognitive processes involving reflection, analysis, and problem-solving. The approach also requires learners to search, comprehend, organize, synthesize and evaluate information from different resources. Learners actively understand problems, investigate information, and discuss solutions (Kong & So, 2008). Inquiry experiences can provide valuable opportunities for students to improve their understanding of both learning content and professional practices (Edelson, Gordon, & Pea, 1999). Learning is reinforced by effective peer interaction involved

in questioning and responding in a flipped classroom (Al-Zahrani, 2015; Wong et al., 2014). A shift from passive knowledge acquisition to actively utilizing knowledge also encourages students to experience a genuine learning community (Al-Zahrani, 2015; Morrison-Saunders & Hobson, 2013).

Active Learning through Experiencing

Active learning is often emphasized in flipped classrooms in various learning cases (Basal, 2015; Herreid & Schiller, 2013; Pierce & Fox, 2012). In such classrooms, increased pre-class preparation underlies the improvements in student outcomes. Learning occurs when students are actively involved in the class activities and cognitively process the information obtained in the learning setting (Gross et al., 2015). The emphasis of the pedagogical approach on knowledge acquisition and skills competency should incorporate various practices for enriching students' active learning experiences leading to their success in the classroom and in the real world (Carr-Chellman, 2015). It is also suggested that various skills, such as curiosity, problem solving, information inquiry, and self-regulated learning are needed for both academic achievement and the future job market (Bergmann & Sams, 2014; Callison, 2015; Frey & Osborne, 2013; Rosen et al., 2010).

Holistic learning occurs only when students are actively engaged in reflecting on what they learn, and actively participate in higher-order thinking tasks, such as analysis, synthesis, and evaluation (Weimer, 2013). The learning environment should be planned and organized to guide individuals' interests, and to motivate self-exploration of knowledge and skills (Clegg, 2004). Through guided reflection processes, learning can be enhanced. Experiential knowledge derived from a self-monitored learning approach in a flipped classroom model can be obtained (Colwell & Hutchison, 2015). Helping students to think deepens their thoughts and ideas, and leads to a reflective process of knowledge construction and skills development (Clegg, 2004; Holec, 1981) Within this context, it is proposed that strategies which promote active learning, in which students are doing things and thinking about what they are doing, should be emphasized (Bonwell & Eison, 1991).

Approach to Reflective Thinking

In a flipped classroom, reflective thinking skills that underpin active learning experience and decision-making in knowledge acquisition are important (Dalton et al., 2015; Miller, 2012). Self-regulated learning is viewed as a personally directed form of learning. However, learners

manage to self-select reading, or to seek information differently (Zimmerman, 2008). Learners with less self-motivation might need to be guided, given the choices regarding academic tasks to pursue when carrying out complex assignments and learning strategies related to self-regulative processes (Zimmerman & Schunk, 2001).

Employing reflective processes encourages students to think and respond to regulate their learning process. Such processes are initiated through the learners' experience, thinking, consideration, and evaluation to examine and explore the issues, opinions, feelings, and behaviors of concern (Boyd & Fales, 1983; Carver & Scheier, 1998). The process provides a learning experience in which students record and reflect deeply on their thoughts, which are an essential part of their learning (Dyment & O'Connell, 2010; Le & Le, 2007). It also entails learners' active, persistent and careful consideration of their self-constructed knowledge by using their experience, actions, and beliefs (Dewey, 1933; Schon, 1987). Through the metacognitive reflective process, students' interpretation of their exploration of knowledge is fostered (Boyd & Fales, 1983; Colwell & Hutchison, 2015; Dewey, 1933).

In the implementation, the teaching approach is critical in helping learners with different learning styles to express and evaluate their attitudes and feelings. Through careful planning, students' reflective levels can be enhanced, including learning cognition and holistic comprehension of knowledge (Hsieh, Jang, Huang, & Chen, 2011).

THE STUDY

Setting and Subjects

Globalization has generated a trend of learning all subject domains in English. In LIS (Library and Information Science) education, incorporating global perspectives in the curriculum to reflect changes is needed (Hirsh et al., 2015; Rudasill, 2015). To encourage the use of curricula which promote the right interpersonal skills, cultural sensitivity and communication and language skills which are demanded by the job market, content and language integrated learning (CLIL) in a specific subject domain is suggested (Dallinger et al., 2016).

The learning setting for this study is an elected course, entitled "Exploration of the Library World" (an LIS course taught in English) for the Department of Library & Information in North Taiwan. With CLIL implemented in the course, the students were invited to acquire knowledge using English and innovative technology. Forty

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freshmen enrolled in the course were the subjects of this study. The classroom provided Wi-Fi access. Students were encouraged to use their own mobile devices for interaction.

In this study, students were required to respond, inquire, experience, and reflect in the flipped classroom environment. They were encouraged to explore diverse significant features and services of world libraries. Students' responses were gathered and analyzed. The ICan learning management system was used to manage the students' learning resources and learning portfolios. Zuvio (<http://www.zuvio.com.tw/index.php>) was adapted as an instant response system (IRS) for eliciting responses during the learning activities.

Various interactive questions were designed in the IRS, including multiple choice questions, essay questions, group questions, and peer evaluation. Through the instant feedback system, all students in the classroom were required to respond to the teacher's questions within a given time limit (individually or on a group basis) using handheld devices. In addition to instant messages, reflective journals were also employed to involve students in in-depth thinking processes for specific issues raised in the class. Tasks for further exploration were also arranged to encourage students' inquiry learning in each lesson unit. Brief examples of the activities are listed in Table 1.

Table1. Example of activities designed in the class

Unit	Activities
British Library	<p>Responding: Questions about the significance and features of the library</p> <p>Inquiry process: Students' inquiry learning about the symbolism of the statue of Isaac Newton in front of the British Library</p> <p>Experiencing: Video clips and group exploration of the British Library virtual venue visit.</p> <p>Reflective thinking: Reflection on the innovative design of the library</p>
Bibliotheca of Alexandria	<p>Responding: Questions about the instructional contents in the video clips.</p> <p>Inquiry process: Inquiries (from students) about Egyptian cultural issues and their impact on service policies at the Bibliotheca of Alexandria.</p> <p>Experiencing: Exploration of the Bibliotheca of Alexandria website</p> <p>Reflective thinking: Reflections on the modern architecture structure of the Bibliotheca of Alexandria</p>
Carrel services	<p>Responding: Questions about carrel services in FJCU library.</p> <p>Inquiry process: Inquiries (from students) about library management issues related to carrel services</p> <p>Experiencing: Exploration of carrel services in different universities</p> <p>Reflective thinking: Reflections on various policies adapted in different libraries</p>
A trip with foreign students	<p>Responding: Warm-up conversations with foreign students.</p> <p>Inquiry process: Inquiry learning about library resources needed for planning a group trip.</p> <p>Experiencing: Students share the knowledge with their foreign team members: introducing KungPo Library, and guiding them to borrow collections (for a specific trip in Taiwan)</p> <p>Reflective thinking: Sharing their learning from the experience of being a curator for library services.</p>
Library of Congress	<p>Responding: Questions about the signature features of the library</p> <p>Inquiry process: Student inquiries about the issues related to traditional and modern services in the library.</p> <p>Experiencing: Exploration of information services and the library's special collections.</p> <p>Reflective thinking: Reflection on the roles and missions of the Library of Congress.</p>

In the course, all of the web-based learning materials were pre-recorded and open-access from an open-courseware website (<http://course.lins.fju.edu.tw/libraryworld/digital>). Video clips associated with specific problem scenarios in library settings were produced and used. Interactive learning activities for the class were planned and implemented to encourage students' active participation. For example, in an effort to provide the students with a collaborative learning experience of using library collections,

"A trip with foreign students" was planned and designed. Discussions with teachers from the Chinese language learning center were carried out to identify skills for both classes. Collaboration guidance among group members for the activity was provided (Table 2). Within the two-hour activity, the students were required to work in teams, to document the interactions among team members, and to share their experiences of completing the tasks.

Table 2. Example of collaborative activities in the class

Learning	Events
Objectives	From the activity, you will be able to: Tell the foreign students about services in the library. Instruct foreign students how to identify keywords for searching in our library Webpac system. Instruct foreign students how to use call numbers to locate the material (print-based materials or DVDs) from Kung-Po Library Work with the foreign students to integrate the resources gathered and plan a trip to a specific place in Taiwan.
Tasks	Help your foreign partners with the following tasks: Become familiar with library services Identify collections about attractions in Taiwan Check out relevant library resources using the self-checkout machine. Select and integrate the information needed Make your trip plan. Share with other groups in the class.
Sharing among the class members	Responding: your understanding of the foreign students' use of Kung Po Library Inquiry: things you would like to explore in the library (plan) Experiencing: things you experienced from the activity Reflection: thoughts and ideas about the learning process

During the course, group work was assigned on a bi-weekly basis to encourage students' active participation in the class activities. In the class period, all the students were required to respond to the questions elicited using the instant feedback system. These warm-up questions were aimed to focus students' attention on the issues emphasized in the lesson. Further inquiries among students followed, including initiation of augmenting knowledge, and plans for searching for and accessing specific resources and information. After these experiences, the students were requested to share their thoughts in the open-ended responses of the questionnaire.

Students' learning outcomes were assessed in different ways: grades from the tasks assigned in the class, the mid-term project, and the final project. At the end of the semester, a set of questionnaires was administered to assess the students' reactions in various aspects, including: the quality of the digital learning materials, exploration of foreign knowledge, the collaborative learning activities, the use of online instant feedback, reflective journal writing, and adoption of mobile devices. A 5-point Likert scale was used to reflect the students' agreement with each statement.

RESULT

Table 1 indicates the students' responses to the digital learning materials and various approaches used in the flipped classroom, including the collaborative learning activities, the use of online instant feedback, reflective journal writing, and adoption of mobile devices. The students considered the instructional materials very helpful for self-paced learning. They also highly

valued the future application of the knowledge provided in the content. The platform used in the class was easy for the students to use to access the learning materials at any time.

Among the items for assessment in the flipped-classroom approach, the students rated their experience highly for the item "The class gives me the opportunity to gain professional knowledge in Library and Information Science" (Mean = 4.58, SD = 0.50) and "The class inspires my motive for exploring and acquiring more about world libraries in different countries" (Mean = 4.55, SD = 0.55). The majority of students were very positive about the collaborative learning activities designed in the class. The tasks assigned in the class encouraged them to be actively involved in the activities. For example, to accomplish the tasks of sharing thoughts on the specific design issues of library services, group members shared the duty of searching for relevant resources for planning the color design of a library. "Jane and Orange searched for the color themes used by the libraries. Kate and I worked on the relevant information for putting together our plan." "We discovered the differences among libraries for providing carrel services when working on the group task assigned today."

From observation, the use of instant feedback allowed all students to work on the class activities. The students reacted positively toward most statements about using the online instant feedback system. In contrast to their participation in other courses, the students were more involved in the learning content. However, it was also

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observed that some students were reluctant to respond to the instant feedback system. These students were not used to responding under time pressure in the class. *“The use of instant feedback made me concentrate more on the instruction materials for learning in the class. In order to respond immediately, I paid much attention to what was going on.”* *“Sometimes, I felt pressured to respond in such a short period of time, especially in English.”*

The implementation of writing reflective journals allowed the students to be involved in retrospective thinking. The process required them to internalize the knowledge they obtained from the course. The majority of the students were positive about the opportunities provided in the course. However, for students who were not skilled in English writing, they felt that it was time-consuming to express their ideas. Variation among students’ English writing ability was

observed from students’ works in the reflective journal. *“Reflective journal helped me review what I learned in the class. For example, I was encouraged to share my feeling about seeing the manuscripts from the 12th century. The digitalization project (of the treasures) at the British Library made these treasures available on their website”*

Most students were positive about using hand-held mobile devices in the class activities. They considered that the integration of mobile technology into learning encouraged them to take actions and respond in the class. Although connectivity problems were experienced, they enjoyed active participation in the class activities using their mobile devices. *“I personally enjoyed using technology for assist my learning. In order to meet the need for our future work, we need to experience the innovative way of learning and communication.”*

Table3. Students’ responses to the flipped classroom

A. Responses regarding the digital learning materials		
Statement	Mean	SD
1. The content is sufficient and important for future career development.	4.35	0.48
2. The learning materials are well designed.	4.28	0.64
3. The key concepts of the instructional content are easy to comprehend.	4.15	0.62
4. The instructional materials can motivate my learning interest.	4.30	0.65
5. Quizzes embedded in the lessons are helpful for me to understand the learning materials.	4.10	0.63
6. The examples used in the learning materials are helpful for the application of concepts.	4.35	0.58
7. The materials are appropriate for my learning level.	4.13	0.65
8. The use of the instruction platform makes it easy to access the learning material.	4.40	0.59
9. The digital materials are helpful for previewing before the class and reviewing after the class.	4.20	0.69
10. Overall, I have a high regard for the learning materials.	4.15	0.77
11. I hope to have recorded learning content in other courses.	4.15	0.74
Sub Mean	4.23	0.39
B. Exploration of foreign knowledge		
Statement	Mean	SD
1. The class encourages me to explore the up-to-date knowledge of library professionals.	4.35	0.62
2. The class inspires my motive for exploring and acquiring more knowledge about world libraries in different countries.	4.55	0.55
3. The class gives me the opportunity to obtain professional knowledge in Library and Information Science.	4.58	0.50
4. I have learned to think about professional knowledge in English.	4.15	0.70
Sub Mean	4.41	0.44
C. Collaborative learning activities		
Statement	Mean	SD
1. This class creates an atmosphere that makes me comfortable to share my thoughts with others.	4.23	0.62
2. I learn to cooperate with different people. Working with others triggers my inspiration.	4.40	0.55
3. International collaboration increases my motivation to learn.	4.25	0.74
4. The assistance from the teaching assistant stimulates innovative thinking among group members.	4.48	0.64

Sub Mean	4.34	0.48
D. Online instant feedback		
Statement	Mean	SD
1. The instant feedback system helps me focus on the in-class activities.	4.38	0.59
2. Through the instant feedback system, I observe others' feedback.	4.40	0.63
3. The instant feedback system can increase my enjoyment of learning.	4.35	0.70
4. Compared with oral expression, I love to give my feedback through the instant feedback system.	3.85	0.83
5. The instant feedback system triggers my critical thinking ability.	4.40	0.63
6. Reviewing others' responses encourages my motivation to respond in the class.	4.45	0.55
7. Compared with other classes, the use of the instant feedback system encouraged my active learning.	4.15	0.80
Sub Mean	4.28	0.48
E. Reflective journal writing		
Statement	Mean	SD
1. The reflective questions help me review what I have learned during the class.	4.23	0.58
2. The reflective questions help me clarify my expectations regarding knowledge exploration.	4.05	0.68
3. The reflective questions encourage my learning reactions.	4.13	0.65
4. The reflective journal helps me clarify my thoughts.	3.98	0.77
5. The reflective questions help me develop my descriptive skills.	4.08	0.76
6. The reflective journal helps me review my learning progress.	4.15	0.74
7. The reflective journal consolidates my learning.	4.03	0.73
8. Reflective journal writing improves my English writing skills.	3.88	0.76
9. From the questions raised in the reflective journal, I gain motivation for further exploration.	3.88	0.79
10. Sharing of questions triggers new interest in specific information raised by others.	3.93	0.66
11. Reflective journal writing enhances my expression of ideas.	3.95	0.71
12. Reflective journal writing encourages me to relate learning with practices of my professional field.	3.88	0.76
Sub Mean	4.01	0.53
F. Adoption of mobile devices.		
Statement	Mean	SD
1. I enjoy class activities involving mobile devices for learning.	4.45	0.64
2. I am prepared to deal with possible barriers to integrating mobile devices into classroom activities.	4.28	0.64
3. Learning through mobile interaction allows me to learn more actively.	4.45	0.60
4. I consider that integrating mobile devices into classroom activities is a future learning trend.	4.38	0.67
6. I understand the limitation that teachers might encounter when integrating mobile devices into the classroom.	4.23	0.53
7. I enjoy exploring various apps for mobile learning.	4.38	0.70
8. Excluding the barriers in Internet connectivity, I prefer using mobile devices for learning.	4.35	0.70
9. I am willing to bring my own device (tablet, mobile phone) for class activities if needed.	4.23	0.70
10. I wish to have more courses that integrate mobile devices into class activities in the future.	4.25	0.63
Sub Mean	4.30	0.43

CONCLUSION

This study adopted mixed methods of question eliciting, and reflection and discussion, using inquiry-based learning and an instant response system in a flipped classroom setting. The researcher attempted to promote a new approach to engaging students in learning. Learning begins with the learners' curiosity, eliciting responses

using the IRS. Inquiry learning of world knowledge by the students followed. In this study, we encouraged students to explore world knowledge by giving them greater autonomy over the use of information in the learning process. Hopefully this study can develop the learners' appreciation of the value of independent learning, and enable them to become lifelong learners.

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