

Empowering Students in the Process of Social Inquiry Learning through Flipping the Classroom

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ABSTRACT

The *flipped classroom* is an educational strategy about inverting the traditional use of in-class time for conducting lower-level learning activities and out-of-class time for conducting higher-level learning activities. *Guided social inquiry learning* (GSIL), which is a scaffolded constructivist pedagogic approach, has been conventionally adopted in learning and teaching of *Liberal Studies* (a “young” core senior secondary subject of social and humanities education in Hong Kong). In this research, we aimed to integrate the idea of the flipped classroom into the process of GSIL for promoting students’ learning achievement and self-efficacy in studying Liberal Studies. Apart from delineating the pedagogic design of the proposed “*flipped*” *social inquiry learning* (FSIL) approach, this paper also reports our quasi-experimental study on investigating the pedagogic effectiveness of FSIL in comparison with GSIL. There was a total of 215 Grade-11 students from top, middle, and bottom academic-banding schools participating in this study. Results indicated that, compared to the conventional approach, FSIL had different degrees of positive effects on the high, moderate, and low academic-achieving participants. The findings provide grounds for further studying a wider adoption of the flipped classroom in social and humanities education, as well as in constructivist learning and teaching activities.

Keywords

Flipped classroom, Flipped social inquiry learning, Guided social inquiry learning, Social and humanities education

Introduction

The Marzano Learning Sciences Research Lab (Marzano & Toth, 2014) has recently published a research report (namely “Teaching for Rigor: A Call for a Critical Instructional Shift”), revealing that nearly 60% of the classroom time in schools in the United States is still dedicated to direct instruction. The concluding part of the report reminds us again of the importance of learner-centredness in the twenty-first century education.

With the advancement in computing and information technologies, people nowadays tend to automate the things that can be computerised and automatized, and spend more time and effort on those that cannot (Xu, Feng, Zou & Huang, 2012). Regarding conveying information and factual knowledge, there has been evidence that video lectures can be as effective as in-person live lectures (e.g., Cohen, Ebeling & Kulik, 1991; Howland, Jonassen & Marra, 2012; Mayer, 2009; Zhang, Zhou, Briggs & Nunamaker, 2006). Therefore, it has become questionable about the traditional use of face-to-face time inside classrooms for merely “transmitting” and “receiving” subject contents (Bishop & Verleger, 2013). Employing today’s handy video-recording tools and low-cost Internet access, teachers can create online video lectures by themselves and then assign the videos to students as out-of-class “homework.” Hence, the in-class time can be used for conducting higher-order learning and teaching activities that cannot be “automated.” This is the central idea of the *flipped classroom* — a pedagogic strategy that has recently attracted a lot of educational researchers’ attention.

According to the recent K-12 edition of the New Media Consortium Horizon Report 2015 (Johnson, Adams Becker, Estrada & Freeman, 2015), the flipped classroom is foreseen as one of the most prominent educational strategies in this triennium to transform students from “spoon-fed,” passive learners into self-directed, active learners. In Hong Kong, “exploring the feasibility of introducing the flipped classroom into learning and teaching” is one of the key objectives of the government’s current three-year master plan on information technology in school education (September 2015 – August 2018) (Education Bureau, 2015).

Liberal Studies is a “young” compulsory subject of social and humanities education in the new senior secondary education system under the recent education reform in Hong Kong (Curriculum Development Council, 2014; Education Bureau, 2014). A core objective of Liberal Studies is to develop students’ knowledge of perennial and contemporary issues upon various social and humanities contexts. *Guided social inquiry learning* (GSIL), which is a scaffolded constructivist learning approach, is conventionally adopted in learning and teaching of the formal curriculum of this subject. The present research aimed to integrate the pedagogic idea of the flipped classroom into the process of GSIL to promote students’ learning achievement and self-efficacy in studying Liberal Studies. A quasi-experimental study was conducted to evaluate the pedagogic effectiveness of this “*flipped*” *social*

inquiry learning (hereinafter referred as *FSIL*) approach in comparison with the conventional *GSIL* approach. It involved a total of 215 Grade-11 students from three schools respectively at the top, middle, and bottom academic banding in Hong Kong.

We organise the rest of this paper as follows. The next section is a literature review of the related work. Then, the pedagogic design of FSIL will be elaborated. After that, we will delineate the method, findings, implications, and limitations of the experimental study. At the end of the paper, we will give the concluding observations on this research.

Related work

Guided social inquiry learning (GSIL)

The twenty-first century education encourages students to acquire knowledge constructively on their own rather than receiving it didactically from teachers (Gee, 2013; Prensky, 2012). *Inquiry learning* is one of the constructivist pedagogic approaches being advocated in the recent decade. It regards learning as the process of seeking knowledge, raising questions, searching for answers, evaluating information, and asking new questions based on new understandings (Elder & Paul, 2005; Wallace & Husid, 2011). *Scientific inquiry* and *social inquiry* are two common paradigms of this learning approach. The former has been considerably adopted in science education (de Jong, 2006; Maeots, Pedaste & Sarapuu, 2008). Often, it requires a learner to hypothesise and probe into the “natural” world, look for precise and repeatable evidence for proving his/ her hypothesis, and finally try to draw a unique conclusion that is physically true in the world.

Social inquiry learning, on the other hand, has been notably harnessed in social and humanities education (e.g., Hill, 1994; Jansen, 2011). The inquiry process usually pivots on an open-ended, argumentative *societal issue*. Instead of looking for the physical truths in the world, it emphasises on a learner’s understanding and reflection on humans and their interactions with the “societal” world from multiple perspectives, values and interests. However, without the provision of necessitated learning support, merely asking school-age students (especially for those who lack prior related experiences) to conduct such inquiry on their own is unrealistic (Jong, 2014; Small, Arone, Stripling & Berger, 2012).

Guided social inquiry learning (GSIL) suggests that there should be appropriate scaffolds to assist students in pursuing the related learning tasks in the course of inquiry (Jong, Lee & Shang, 2013; Milson, 2002). Newell (2009) has proposed a seven-task GSIL model; the tasks include *Task Identification*, *Search Strategy Initiation*, *Information Location*, *Information Evaluation*, *Information Use*, *Information Communication*, and *Problem-solving Product Evaluation*. Similar task-based elements are also found in other GSIL models such as *Big6* (Eisenberg & Berkowitz, 2011), *Organized Investigator* (Loertscher & Woolls, 2002), etc. However, some researchers (e.g., Chadwick, 2008; Jansen, 2011; Small et al., 2012; Stripling, 2003) have argued that those models are more suitable for supporting the course of *information problem solving* that engages students in finding the best information about a problem and then re-organizing that information into a product.

Stripling (2008) has suggested that a good GSIL approach should scaffold students in the course of inquiry to explore significant questions upon the societal issue, comprehend the related content and context, develop corresponding arguments on the issue, as well as monitor and reflect on their own learning. Inspired by the notions of Dewey’s (1958) *learning through experience*, Vygotsky’s (1978) *zone of proximal development*, as well as Bruner’s (1986) *interpretation in learning*, she has developed a GSIL model, namely, *Stripling Model of Inquiry*. This model consists of six guided inquiry phases: *Connect*, *Wonder*, *Investigate*, *Construct*, *Express*, and *Reflect*. Each of these phases is featured with specific actions to support students in carrying out social inquiry learning. Stripling’s GSIL model is one of the popular strategies being adapted and adopted in learning and teaching of Liberal Studies in Hong Kong. The details of this model will be elaborated further in the next subsection.

Liberal studies

Liberal Studies is a “young” core subject of social and humanities education in the new three-year senior secondary education system under the recent education reform in Hong Kong (Education Bureau, 2014). The implementation of Liberal Studies began in 2009, and the high-stakes public examination (i.e., the Hong Kong Diploma of Secondary Education Examination) started to include Liberal Studies as one of the four core

examination subjects in 2012. Other core subjects include English, Chinese, as well as Mathematics. The statutory curriculum of Liberal Studies underscores the importance of harnessing constructivist strategies to facilitate students in studying this subject, and GSIL is recommended as one of the major pedagogic approaches (Curriculum Development Council, 2014).

The core objective of Liberal Studies is to develop students' knowledge on perennial and contemporary issues in cultural, social, economic, political and technological contexts (Curriculum Development Council, 2014). The curriculum is composed of three areas: "Self and Personal Development," "Society and Culture," and "Science, Technology and the Environment." Every area consists of a number of thematic modules; each module is organised around a central theme relevant to its area. For example, there are three thematic modules under the Society and Culture area: "Hong Kong Today," "Modern China," and "Globalization." Every thematic module will involve several societal issues. For example, "Disney: Does the dream finally come true in Hong Kong?," is a societal issue involved in the Globalization module. Normally, Liberal Studies teachers use one teaching cycle to cover one societal issue; the duration of a cycle is nine days (see Figure 1). Usually, there are three 70-minute Liberal Studies lessons evenly distributed in each cycle (e.g., on Days 1, 4, and 7). They will assign related homework to students to do during the days that have no Liberal Studies lessons (e.g., on Days 2, 3, 5, 6, 8, and 9).

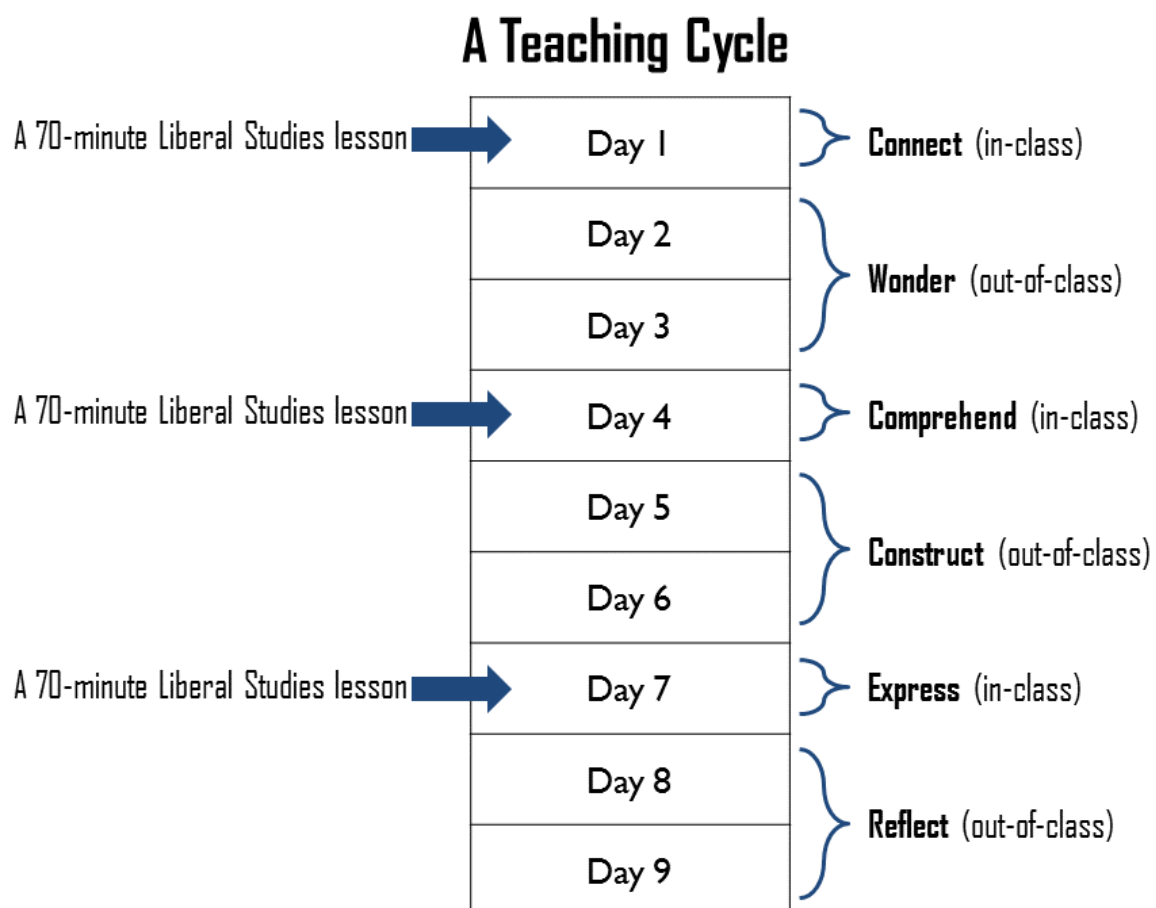


Figure 1. Implementation of GSIL in learning and teaching a societal issue in a teaching cycle

As aforementioned, Stripling's (2008) GSIL model is one of the popular pedagogic approaches being adapted and adopted in learning and teaching of Liberal Studies. The implementation of this model in a nine-day teaching cycle is illustrated on the right-hand side in Figure 1. The Connect, Comprehend, and Express phases are implemented during the face-to-face in-class time (i.e., the three Liberal Studies lessons). The pedagogic activities involved in these phases fall into the lower regions of the Bloom's taxonomy (Anderson et al., 2001), i.e., remembering and/ or understanding. The Wonder, Construct, and Reflect phases are implemented during the out-of-class time (i.e., the six days with no Liberal Studies lessons). The pedagogic activities involved in these phases fall into the upper regions of the Bloom's taxonomy, i.e., applying, analysing, evaluating, and/ or creating. The following further elaborate on how a Liberal Studies teacher implements this GSIL approach in a teaching cycle:

Day 1: Connect (the 1st lesson)

The teacher introduces the students to the general background of the societal issue, and equips them with the related key concepts via direct instruction. Usually, the content of the visual aid (the PowerPoint) that the teacher has prepared for the instruction is extracted from the related part of the textbook and/ or the Internet (e.g., images, animations, YouTube videos).

Days 2 and 3: Wonder (out-of-class time)

The students are required to access additional resources related to the issue pre-posted on the school's LMS (learning management system, e.g., Moodle, Blackboard) by the teacher. Unlike the factual and impartial content encountered in the previous phase, the content of these additional resources, which is extracted from newspapers, anonymous web articles, and Facebook/ Twitter feeds, is more controversial or even irrational in nature. The students are asked to preliminarily analyse and evaluate these "biased" resources, and by the end of this phase, identify some stakeholders of the issue based on the best of their knowledge.

Day 4: Comprehend (the 2nd lesson)

The teacher first asks the students to talk about what stakeholders they have identified in the previous phase. After that, the teacher will debrief the students on why some are regarded as the key stakeholders of the issue (normally 4 to 5) while some are not. Then, the teacher will further elaborate on the basic characteristics and interests of these key stakeholders via direct instruction. And again, the content of the visual aid that the teacher has prepared for the instruction is usually extracted from the textbook and the Internet. By the end of this lesson, each student will be assigned with one key stakeholder role.

Days 5 and 6: Construct (out-of-class time)

Each student is asked to construct his/ her own argument on the issue from the view of the assigned stakeholder role. In order to do this, he/ she should conduct a more in-depth analysis on the issue and apply the knowledge they have gained so far to frame the argument. Also, each of them has to search for information/ grounds (from the textbook and/ or the Internet) to evaluate/ support the rationality and authenticity of the argument, and if necessary, to reshape the argument. Before the end of this phase, everyone needs to create a PowerPoint to document his/ her own constructed argument with grounds.

Day 7: Express (the 3rd lesson)

The teacher invites some students who are playing different stakeholder roles to present their arguments developed in the previous phase in front of the class. Usually, the teacher will give a debriefing after each presentation. Hence, through the peer sharing, apart from merely standing in the view of his/ her assigned stakeholder role, each student can understand more about different views of the stakeholder roles played by others.

Days 8 and 9: Reflect (out-of-class time)

Each student needs to "blog" a piece of summative reflection (a reflective journal) on the LMS. In the journals, they will reshape their prior arguments developed in the Construct phase (on Days 5 and 6) from a more holistic perspective with a balance of different stakeholders' views. Also, with the guiding reflective questions pre-posted by the teacher, they will write down what they have learned in the teaching cycle, as well as what, why and how the knowledge gained can be transferred to study other societal issues within the same thematic module and across different thematic modules in Liberal Studies.

Flipped classroom

When discussing the "history" of the flipped classroom, the "definition" given by Lage, Platt and Treglia (2000) is perhaps the most frequently quoted one — "the events that have traditionally taken place inside the classroom now take place outside the classroom and vice-versa" (p. 32). In fact, the early form of the flipped classroom did not necessarily involve videos and the Internet. It was just about a re-ordering of students' in-class work (listening to the teacher) and out-of-class work (doing homework that assigned by the teacher) in traditional schooling (Baker, 2000). However, there is no denying that using online videos in the flipped classroom is a desirable way to reach today's video-saturated culture in youngsters' familiar medium (Bergmann & Sams, 2015).

Bishop and Verleger (2013) have given a more contemporary definition to the flipped classroom — a learning and teaching strategy combining both (i) *direct individual instruction outside the classroom via online video lectures*, and (ii) *student-centred learning activities inside the classroom*. This definition generally aligns with

the core pedagogic idea recognised by most educators and researchers who are currently promoting and researching the flipped classroom (e.g., Baepler, Walker & Driessen, 2014; Bretzmann, 2013; Chen, Wang, Kinshuk & Chen, 2014; Hung, 2015; Lai & Hwang, 2016; Sahin, Cavlazoglu & Zeytuncu, 2015; Wallace, 2014). In fact, both *behaviourist* (Skinner, 1968) and *constructivist* (Piaget, 1970; Vygotsky, 1978) learning paradigms are both found in the flipped classroom. At home, students are required to preliminarily gain foundation knowledge by themselves via accessing online direct instruction videos created by the teacher. These videos engage students in cognitive learning that falls into the lower regions of the Bloom's taxonomy (Anderson et al., 2001), i.e., *remembering* and/ or *understanding*. This is the behaviourist part of the flipped classroom. Back to the classroom, students will deepen their knowledge gained at home via pursuing various teacher-facilitated learner-centred tasks. The tasks engage students in cognitive learning that falls into the upper regions of the Bloom's taxonomy, i.e., *applying*, *analysing*, *evaluating*, and/ or *creating*. This is the constructivist part of the flipped classroom.

In the recent half-decade, on various educational blogs/ social media platforms as well as in many media interviews related to education over the world, a considerable number of educators and teachers have shared their observations on students' learning improvement after the adoption of the flipped classroom (Bretzmann, 2013; Kelly, 2014; Kirch, 2014; Creative Classroom Lab, 2013; Flipped Learning Network, 2014). Nevertheless, there have been critiques that those positive claims are just "experience sharing" rather than vigorous research evidence (Bishop & Verleger, 2013; Hamdan, McKnight, McKnight & Arfstrom, 2013). In this couple of years, however, empirical studies on the flipped classroom are noticeably on the increase. For example, Baelper et al. (2014), Sahin et al. (2015), and Zummo and Brown (2016) have examined the adoption of the flipped classroom respectively in learning and teaching of Chemistry, Mathematics and Biology. In those studies, the experimental group students (under the flipped classroom setting) significantly outperformed the control group students (under the traditional teaching setting) in terms of academic achievement and learning motivation. Hung's (2015) work has been another successful flipped classroom instance in language learning. With a similar experimental-control setting, she conducted a study on harnessing the flipped classroom in learning and teaching of English in which she also obtained similar significant and positive results.

While reviewing the recent flipped classroom research, it is not difficult to notice that most of the studies have pivoted on a very similar focus, i.e., to evaluate whether the pedagogic effectiveness of the proposed flipped approaches is better than the traditional classroom teaching approaches'. There has been very little attention on harnessing the idea of the flipped classroom to improve or enhance existing constructivist approaches to learning and teaching (Jong & Shang, 2016). Also, there is an apparent lack of instances of adopting the flipped classroom in social and humanities education. Teachers in the related subjects often argue that they have used constructivist pedagogic approaches (e.g., GSIL, project-based learning) in practice for years. They do not observe any critical needs to harness the flipped classroom in order to make their teaching more student-centred (Cheung & Jong, 2016).

Some teachers have even suggested that the pedagogic idea of the flipped classroom is incompatible with constructivist education. They deem that "front-loading" the learning process with direct instruction videos will "rob students of the opportunity to explore knowledge on their own" (Bergmann & Sams, 2015, p. 84). Nevertheless, notwithstanding the course that students undergo to reach their learning conclusions by themselves can be beneficial, along the learning process they may encounter fake information, gain inaccurate knowledge, and in turn come to invalid conclusions (Howland et al., 2012; Jong & Tsai, 2016). In fact, flipped videos will not "pollute" the course of constructivist learning; on the contrary, the videos can serve as solid learning scaffolds to support students in their knowledge assimilation and construction process (Cheung & Jong, 2016; Jong & Shang, 2016).

Flipped social inquiry learning (FSIL)

The most vital pedagogic benefit of the flipped classroom is reinventing the in-class time in schools (Hwang, Lai & Wang, 2015). We have proposed to integrate the pedagogic idea of the flipped classroom into the process of conventional GSIL, namely *flipped social inquiry learning (FSIL)*, for promoting students' learning achievement and self-efficacy in studying Liberal Studies. Specifically, the present study aimed to answer the following two research questions:

- Can FSIL promote students' knowledge acquisition in comparison with GSIL?
- Can FSIL promote students' self-efficacy in comparison with GSIL?

Our proposed FSIL approach still employs Stripling Model of Inquiry (Stripling, 2008) as the foundation. Figure 2 shows the contrast between the design and implementation of FSIL (on the right-hand side) and GSIL (on the left-hand side) in learning and teaching of a societal issue in a nine-day teaching cycle (consisting of three 70-min Liberal Studies lessons). FSIL moves the inquiry phases conventionally taking place inside the classroom in GSIL to outside the classroom, and vice-versa.

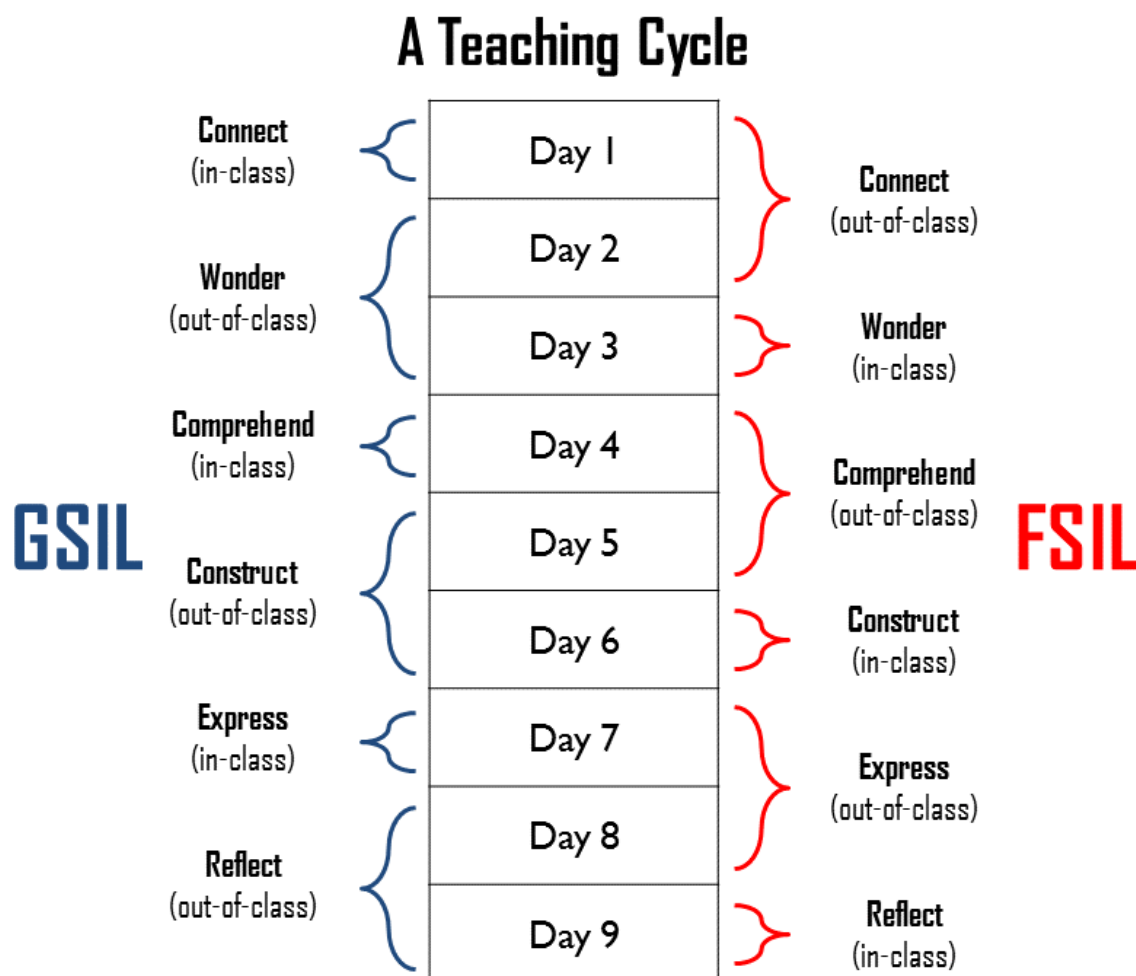


Figure 2. Contrast between the implementation of FSIL and GSIL in learning and teaching of a societal issue

As illustrated in Figure 2, different from GSIL, FSIL implements (a) the *Connect*, *Comprehend*, and *Express* phases that involve lower-level pedagogic activities (i.e., *remembering* and/ or *understanding*) outside the classroom (i.e., on the six days with no Liberal Studies lessons), and (b) the *Wonder*, *Construct*, and *Reflect* phases that involve higher-level pedagogic activities (i.e., *applying*, *analysing*, *evaluating*, and/or *creating*) inside the classroom (i.e., during the three Liberal Studies lessons). The following will further elaborate on how a Liberal Studies teacher implements the FSIL approach in a teaching cycle:

Days 1 and 2: Connect (out-of-class time)

The students are required to conduct individual learning through watching the teacher-created instructional videos pre-posted on the school’s LMS by the teacher. Usually, the content of the videos is presented in a direct instruction manner, aiming to introduce the students to the general background of the societal issue and equip them with the related key concepts.

Day 3: Wonder (the 1st lesson)

The students are divided into groups. The typical class size in Hong Kong schools is from 32 to 38; usually, the teacher will divide the class into 7 to 8 groups (4 to 5 persons per group). Every group is provided with additional resources related to the issue. Unlike the factual and impartial content encountered in the previous phase, the content of these additional resources, which is extracted from newspapers, anonymous web articles, and Facebook/ Twitter feeds, is more controversial or even irrational in nature. Each group is asked to primarily analyse and evaluate these “biased” resources with the members, and to identify some stakeholders of the issue based on the best of their knowledge. During the lesson, the teacher walks around the classroom, and if

necessary, will enact just-in-time interventions to assist the groups in conducting the discussion. The interventions can be, for example, providing additional information, clearing up misconceptions, playing the mediator role to resolve the conflict between the members, and ensuring that each member has a chance to elaborate his/ her view on the issue. In the second-half of the lesson, the teacher will ask each group to talk about what stakeholders they have identified during the discussion. After that, the teacher will debrief the students on why some are regarded as the key stakeholders of the issue (normally 4 to 5) while some are not. By the end of the lesson, each group will be assigned with one key stakeholder role.

Days 4 and 5: Comprehend (out-of-class time)

There are 4 to 5 different sets of additional resources pre-posted on the LMS by the teacher. Each resource set contains different content which describes the characteristics and interests of a particular key stakeholder. Every student is required to conduct individual learning through accessing the resource set corresponding to the stakeholder role assigned to his/ her group. Usually, the resources are presented in a direct instruction manner, in the form of texts (extracted from the content of the textbook), webpage links, and videos (teacher-created and/ or YouTube videos).

Day 6: Construct (the 2nd lesson)

Each group is asked to construct an argument on the issue by standing in the view of their assigned stakeholder role. In this phase, the members in each group work together to conduct a more in-depth analysis on the issue and apply the knowledge they have gained so far from the previous phases to frame their group-based argument. Also, each of them has to search for information/ grounds (from the textbook and/ or the Internet) to evaluate/ support the rationality and authenticity of the argument, and if necessary, to reshape the argument. During the lesson, every group is provided with an Internet-connected tablet, and the teacher will intervene the groups whenever necessary (as in the Wonder phase).

Days 7 and 8: Express (out-of-class time)

On Day 7, each group has to (a) record a short video to express the argument with grounds on the issue which has been developed in the previous phase, and (b) post it on the LMS. On Day 8, all students are required to watch the videos which have been posted by other groups. Hence, through this inter-group sharing, apart from merely standing in the view of the assigned stakeholder role, each group can understand more about different views of the stakeholder roles played by others.

Day 9: Reflect (the 3rd lesson)

The students work in groups again to reflect on the limitations of their prior arguments developed in the Construct phase (on Day 6) from a more holistic perspective with a balance of different stakeholders' views, and reshape the argument. During the discussion, the groups can seek further help from the teacher. In the second-half of the lesson, the teacher will ask each group to present the finally constructed argument and invite other groups to comment on it. Before the end of the lesson, the teacher will give a summative debriefing for the class on what knowledge has been covered in the teaching cycle, as well as what, why and how the knowledge gained can be transferred to study other societal issues within the same thematic module and across different thematic modules in Liberal Studies.

Method

We employed a quantitative approach to answering the research questions. The collection of qualitative data was to serve the purpose of supplementing the quantitative findings.

Participating schools and students

Secondary schools in Hong Kong are categorised into three academic bands based on the overall academic achievement of their students; *Band A*, *Band B*, and *Band C* are respectively the top, middle, and bottom bands. We aimed to select one school at each academic banding from our research partner schools to participate in this study (i.e., three schools in total). The following were the selection criteria:

- The schools have not adopted the flipped classroom strategy in learning and teaching of any subjects.
- The schools are using the same Liberal Studies textbook and the same type of LMS.
- The targeted students (at Grade-11) of the schools have yet to be taught the Globalization module in Liberal Studies.

Finally, three schools respectively at different academic banding were chosen. At each school, we randomly selected two Grade-11 classes. We mixed the two classes, ranked them according to their Liberal Studies examination scores in the previous school-term, and then assigned them to the experimental group and control group alternately. The total number of students involved was 215 (73 from the Band-A school, 72 from the Band-B school, and 70 from the Band-C school). Their average age was 16.74. Table 1 shows the number of students in the experimental and control groups respectively at each school.

Table 1. Number of student participants in the experimental and control groups at each school

Band-A school		Band-B school		Band-C school	
Experimental group	Control group	Experimental group	Control group	Experimental group	Control group
37	36	36	36	35	35

Experimental procedure and data collection

We conducted the same quasi-experiment at each participating school separately. It involved learning and teaching of a part of the Globalization module (under the Society and Culture area in the Liberal Studies curriculum) via inquiring into a societal issue, “Disney: Does the dream finally come true in Hong Kong?” in a nine-day teaching cycle. The experimental manipulation was FSIL, while the control manipulation was GSIL, as illustrated in Figure 2. Four months before the study, we had started preparing the learning and teaching materials for both the experiment and control manipulations. These materials included the flipped videos and other resources to be pre-posted on the LMS for implementing FSIL (as aforementioned in the section of “Flipped social inquiry learning (FSIL),” as well as the PowerPoints and other resources to be pre-posted on the LMS for implementing GSIL (as aforementioned in the sub-section of “Liberal Studies” under the section of “Related work”). In addition, we set up a review committee to scrutinise all materials developed for both the experimental and control manipulations so as to ensure that the materials were of comparable quality and aligned with the curricular aim of the Globalization module. The committee was composed of two education professors respectively from two other institutions, six Liberal Studies teachers respectively from six non-participating schools (2 at Band A, 2 at Band B, and at 2 at Band C), and one government curriculum officer.

To eliminate the “teacher effect,” we did not request the Liberal Studies teachers from the three participating schools to play the teacher role in this study. Instead, we invited a female Liberal Studies educator, *Iris* (pseudonym), who was working at another institution to be “the teacher” in the experiment carried out at each school. *Iris* was well familiar with the Liberal Studies curriculum, the conventional GSIL approach, and the type of LMS (*Moodle*) that the three participating schools were using. Two months before the study, we had started explaining to *Iris* the operational details of the research, familiarising her with the pedagogic design and implementation of FSIL, as well as discussing with her the usage of the FSIL and GSIL materials developed for this research.

At each school, we used twelve days in total to complete the experiment and data collection work with the following procedure:

- *Iris* took nine consecutive days (i.e., a normal teaching cycle for covering a societal issue) to implement the pedagogic part of the experiment, as illustrated in Figure 2. For the experimental manipulation (FSIL), the out-of-class learning and teaching activities were conducted on Days 1, 2, 4, 5, 7, and 8, and the in-class learning and teaching activities were conducted on Days 3, 6, and 9. On the other hand, for the control manipulation (GSIL), the out-of-class learning and teaching activities were conducted on Days 2, 3, 5, 6, 8, and 9, and the in-class learning and teaching activities were conducted on Days 1, 4, and 7.
- Three days after the pedagogic part of the experiment, we administered the knowledge test (1 hour) and self-efficacy survey (10 minutes) to both the experimental and control groups (see the next sub-section for the details of the test paper and questionnaire). Both the test and survey were “unseen” ones, i.e., the students had not been told beforehand that they needed to do so.
- Right after the test and survey, we randomly selected three students from the experimental group for a 30-minute group interview. We aimed to gain more understanding of how they perceived FSIL. The interview was conducted in Chinese (the mother tongue of the students).

Knowledge test and self-efficacy questionnaire

Both the knowledge test paper and self-efficacy questionnaire were in Chinese. The knowledge test was in the typical format of the Liberal Studies public examination. It consisted of three short questions (10 marks each) and one long question (20 marks), i.e., the perfect score was 50. The test questions were customised from the questions related to the Globalization module in past public examination papers from 2012 to 2015. The validity of the test and marking scheme were scrutinised by the review committee (as aforementioned in the previous sub-section). All completed test papers were individually marked by three trained markers who were postgraduate education students majoring in Liberal Studies at our university. The marking was done in an anonymous manner, i.e., the school and group information on the test papers were removed before being passed to the markers. The author of this paper was responsible for discerning any discrepancies in the markers' work.

The self-efficacy questionnaire (Cronbach's alpha: 0.92) that we adopted and customized in this study was originally developed by Wang and Lin (2007) and further revised and validated by Wang and Hwang (2012) to measure learners' belief in their own ability to pursue the required learning tasks for attaining the assigned learning goals. The customised questionnaire contained eight items (e.g., "I realise that I understand the most complex part of this societal issue"). Each item was accompanied by the five-point Likert-scale, ranging from "1" (strongly disagree) to "5" (strongly agree).

Results

For writing convenience, we use *School A*, *School B*, and *School C* to denote the Band-A, Band-B, and Band-C schools respectively. After the three experiments, we received totally 213 sets of completed knowledge test papers and self-efficacy questionnaires; 72 from School A, 72 from School B, and 69 from School C. The return rates were respectively 98.63% (at School A), 100% (at School B), and 98.57% (at School C). (*Remark: One student in School A and one student in School C were absent on the dates that we conducted the test and survey*). The research findings obtained from each school are presented in the following sub-sections.

Findings at School A

The participants in School A were high academic-achieving students. Table 2 shows the descriptive statistics of the results of the knowledge test and self-efficacy survey obtained respectively from the experimental and control groups. An independent samples *t*-test on the knowledge test results indicated that the experimental group's average score (39.45) had no significant difference from the control group's (38.53), $t(70) = 1.17$, $p > .05$. In other words, in terms of knowledge acquisition, the FSIL students did not significantly outperform the GSIL students.

Table 2. Results of the knowledge test and self-efficacy survey in School A

		Experimental group ($N = 36$)	Control group ($N = 36$)
Knowledge test	Average	39.45	38.53
	Standard deviation	9.19	8.98
Self-efficacy survey	Average	4.38	4.35
	Standard deviation	1.11	1.02

Table 3. Males' / females' knowledge test and self-efficacy survey results in School A's experimental group

		Male ($N = 17$)	Female ($N = 19$)
Knowledge test	Average score	38.89	40.01
	Standard deviation	9.38	9.00
Self-efficacy survey	Average score	4.36	4.40
	Standard deviation	1.09	1.13

The Cronbach's alpha value of the self-efficacy survey data was 0.89, indicating the self-efficacy questionnaire maintained its high reliability in the experiment. An independent samples *t*-test on the survey results showed that the experimental group's average self-efficacy score (4.38) had no significant difference from the control group's (4.35), $t(70) = 1.15$, $p > .05$. In other words, no significant evidence supported that FSIL could better promote these high academic-achieving students' self-efficacy in the course of inquiry. Table 3 shows the descriptive statistics of the test and survey results with respect to the males and females in the experimental group in School A. We further conducted two independent samples *t*-tests to assess whether the gender factor had an influence on

the test and survey results obtained from the experimental group. The analyses indicated that there were no significant differences ($p > .05$).

In summary, according to the quantitative results, the pedagogic effectiveness of FSIL in School A (a top academic-banding school) was not better (or worse) than GSIL's. However, in the group interview with the experimental-group students, they shared some advantageous learning experience in the course of FSIL in comparison with the conventional approach to studying Liberal Studies. The following are some translated interview excerpts:

- **Student A1:** *At the beginning, the teacher required us to watch a number of videos which covered the general background and basic knowledge of the societal issue (i.e., in the Connect phase, on Days 1 and 2, out-of-class time), and later, to watch a number of videos which covered some specific information about the assigned stakeholder role (i.e., in the Comprehend phase, on Days 4 and 5, out-of-class time) ... It was a good way to help us quickly grasp and remember the key contents. It became our prior knowledge to go further when doing the group work in the classroom ... when watching the videos, I could stop and rewind them whenever needed and I could watch as many times as I needed ... until I fully understood all the things ... Absolutely, I much more prefer watching videos than reading text-based teacher notes.*
- **Student A2:** *The time for us to construct our initial argument (i.e., in the Construct phase, on Day 6, in-class time) was obviously shorter than the corresponding time used in the conventional inquiry approach (c.f., the control group's Days 5 and 6, out-of-class time). But less was more, because in this teaching cycle more and more student-student and student-teacher interactions took place inside the classroom. The interactions made the whole inquiry process more engaging. I hope my own Liberal Studies teacher can also adopt this approach in his teaching practice.*
- **Student A3:** *Expressing our group's argument via video-recording (i.e., in the Express phase, on Day 7, out-of-class time) was innovative. It was much more interesting than creating a boring PowerPoint file for giving a traditional group presentation ... Also, watching other groups' video-presentations (i.e., in the Express phase, on Day 8, out-of-class time) was an effective way to let us understand more about other stakeholders' views ... before attending the last lesson, every member already got some substantial ideas about how to revise and finalise the group's argument (i.e., in the Reflect phase, on Day 9, in-class time), and thus, we could start the discussion immediately when we caught up in the classroom.*

Findings at School B

The participants in School B were moderate academic-achieving students. Table 4 shows the descriptive statistics of the results of the knowledge test and self-efficacy survey obtained respectively from the experimental and control groups. An independent samples t -test on the knowledge test results indicated that the experimental group's average score (33.78) was significantly different from the control group's (24.81), $t(70) = 7.12$, $p < 0.001$. The Cohen's d was 1.03. In other words, in terms of knowledge acquisition, the FSIL students significantly outperformed the GSIL students. The effect size was large (Cohen, 1998).

Table 4. Results of the knowledge test and self-efficacy survey in School B

		Experimental group ($N = 36$)	Control group ($N = 36$)
Knowledge test	Average	33.78	24.81
	Standard deviation	10.05	9.21
Self-efficacy survey	Average	4.08	3.29
	Standard deviation	1.05	0.93

The Cronbach's alpha value of the self-efficacy survey data was 0.95, indicating the self-efficacy questionnaire maintained its high reliability in the experiment. An independent samples t -test on the survey results showed that the experimental group's average self-efficacy score (4.08) was significantly different from the control group's (3.29), $t(70) = 3.34$, $p < 0.001$. The Cohen's d was 0.82. In other words, there was significant evidence supporting that FSIL could better promote these moderate academic-achieving students' self-efficacy in the course of inquiry. The effect size was large (Cohen, 1998). Table 5 shows the descriptive statistics of the test and survey results with respect to the males and females in the experimental group in School B. We further conducted two independent samples t -tests to assess whether the gender factor had an influence on the test and survey results obtained from the experimental group. The analyses indicated that there were no significant differences ($p > .05$).

Table 5. Male's / female's knowledge test and self-efficacy survey results in School B's experimental group

		Male (N = 18)	Female (N = 18)
Knowledge test	Average score	33.36	34.20
	Standard deviation	10.19	9.91
Self-efficacy survey	Average score	4.10	4.06
	Standard deviation	1.10	1.00

In summary, according to the quantitative results, the pedagogic effectiveness of FSIL in School B (a middle academic-banding school) was better than GSIL's, with a large effect size. In the group interview with the experimental-group students, they manifested their favourable attitude towards FSIL. They deemed that this pedagogic approach made the whole inquiry process more supportive and engaging in comparison with the conventional approach to studying Liberal Studies. The following are some translated interview excerpts:

- **Student B1:** *The videos taught us before attending the lessons (i.e., in the Connect and Comprehend phases, on Days 1, 2, 4, and 5, out-of-class time). I found myself was more equipped before attending the class. I had more confidence, and thus I was more willing to engage myself in the group activities inside the classroom In normal Liberal Studies lessons, sometime the teacher talks too fast, sometime the content is too much to be digested, sometime the content is too difficult ... usually, I don't dare to ask questions in front of the class ... I am afraid that I will look stupid ... Honestly, I am a slow learner. But this time I could control the teacher's teaching pace by moving forwards and backwards the play-back head (on the video player), Haha. That's cool. I like this learning and teaching mode as I can have more individualised learning in accordance with my learning ability.*
- **Student B2:** *The group discussion conducted during the first and second lessons was very useful (i.e., in the Wonder and Construct phases, on Days 3 and 6, in-class time). It was quite engaging. For example, in the first lesson, we were asked to work in groups to identify the key stakeholders of the issue. With our collective intelligence, my group could quickly identify the key stakeholders ... 4 brains are always better than 1 brain, Haha. The discussion process was quite beneficial Conventionally, we do this part individually at home (c.f., the control group's Days 2 and 3, out-of-class time), and I regard this as the most difficult and frustrating part of the whole inquiry process.*
- **Student B3:** *We are used to conducting the final reflection individually at home (c.f., the control group's Days 8 and 9, out-of-class time). However, this time we conducted the reflection together with the teacher and classmates during the final lesson (i.e., the Reflect phase, on Day 9, in-class time). I like this arrangement because the interactive and supportive atmosphere and rapport stimulated me to reflect deeper on what I learned in the course of inquiry. This also helped me better retain the knowledge in my mind. I think the knowledge gained will be useful for inquiring into other societal issues in the future.*

Findings at School C

The participants in School C were low academic-achieving students. Table 6 shows the descriptive statistics of the results of the knowledge test and self-efficacy survey obtained respectively from the experimental and control groups. An independent samples *t*-test on the knowledge test results indicated that the experimental group's average score (20.35) was significantly different from the control group's (15.31), $t(67) = 4.68$, $p < 0.001$). The Cohen's *d* was 0.59. In other words, regarding knowledge acquisition, the FSIL students significantly outperformed the GSIL students. The effect size was medium (Cohen, 1998).

Table 6. Results of the knowledge test and self-efficacy survey in School C

		Experimental group (N = 35)	Control group (N = 34)
Knowledge test	Average	20.35	15.31
	Standard deviation	7.89	8.04
Self-efficacy survey	Average	3.08	2.54
	Standard deviation	1.08	0.98

Table 7. Males' / females' knowledge test and self-efficacy survey results in School C's experimental group

		Male (N = 18)	Female (N = 16)
Knowledge test	Average score	19.62	21.08
	Standard deviation	7.75	8.03
Self-efficacy survey	Average score	3.05	3.11
	Standard deviation	1.12	1.04

The Cronbach's alpha value of the self-efficacy survey data was 0.90, indicating the self-efficacy questionnaire maintained its high reliability in the experiment. An independent samples *t*-test on the survey results showed that the experimental group's average self-efficacy score (3.08) was significantly different from the control group's (2.54), $t(67) = 5.36, p < 0.001$. The Cohen's *d* was 0.52. In other words, there was significant evidence supporting that FSIL could better promote these low academic-achieving students' self-efficacy in the course of inquiry. The effect size was medium (Cohen, 1998). Table 7 shows the descriptive statistics of the test and survey results with respect to the males and females in the experimental group in School C. We further conducted two independent samples *t*-tests to assess whether the gender factor had an influence on the test and survey results obtained from the experimental group. The analyses indicated that there were no significant differences ($p > .05$).

In summary, according to the quantitative results, the pedagogic effectiveness of FSIL in School C (a bottom academic-banding school) was better than GSIL's, with a medium effect size. In the group interview with the experimental-group students, they expressed that they were more motivated to learn in the course of FSIL in comparison with the conventional approach to studying Liberal Studies. The following are some translated interview excerpts:

- **Student C1:** *Whenever I look at the Liberal Studies textbook at home, I will fall asleep easily ... When I am in the class, I always look forwards to the recess or lunch time ... however, I can sit in front of my computer or hold my phone for hours for learning new things from YouTube. You know? This is the YouTube generation ... all teaching materials should be presented in video format and put them online so that I can watch them when I have a good study mood. Like this time, I watched all the videos posted by the teacher (i.e., the Connect and Comprehend phases, on Day 1, 2, 4, and 5, out-of-class time). Guess where and when I watched them? Haha, I did it when I was taking the bus to the school in the early morning, or I was lying on my bed at 11 pm before I slept.*
- **Student C2:** *Although every member of my group did view all the videos pre-posted on the LMS, not everyone can fully understand the content. The teacher joined our discussion during the first and second lessons (i.e., the Wonder and Construct phases, on Days 3 and 6, in-class time), corrected some misconceptions in our minds, and further motivated us via providing us with an alternative way to explore the issue. The interventions were very beneficial ... this kind of quality teacher-student interactions is very rare in normal Liberal Studies lessons ... The student-student interactions in my group were beneficial too ... Conventionally, when I read the more controversial content on the LMS at home (c.f., the control group's Days 2 and 3), I usually have no clue about how to do the interpretation. Fortunately, this time I worked with my group members (i.e., the Wonder phase, on Day 3, in-class time). We seriously discussed the news and information together before determining the stakeholders of the societal issue ... I did learn a lot from my classmates in this teaching cycle.*
- **Student C3:** *It was a very interesting learning experience. We created and posted our own videos on the LMS ... and watched other groups' videos (the Express phase, on Days 7 and 8, out-of-class time). In fact, the time for recording our group video should be more than the time for preparing a PowerPoint file. But we quite enjoyed doing it ... When we were doing the video, we did rehearse for three or four times. The rehearsal made us remember and understanding deeper the content. Now, I can still recall all the content that we recorded in the video ... Interesting! I could remember all the things spontaneously, not by rote ... I will be very happy if my Liberal Studies teacher from now on can use this approach to teaching all other modules in the syllabus.*

Discussion and implications

The quantitative data collected via the knowledge tests and self-efficacy surveys in this study showed that, in comparison with GSIL, FSIL had desirable pedagogic effects on the participants from the middle and bottom academic-banding schools (i.e., Schools B and C), but not the participants from the top academic-banding school (i.e., School A). However, the qualitative data gathered via the interviews revealed that FSIL provided the flipped students with more advantageous learning experience both inside and outside the classroom than GSIL did.

Students from top academic-banding schools are used to having stronger cognitive ability and higher self-efficacy in learning (Biggs & Moore, 1993). The *ceiling effect* refers to the level at which an independent variable (the variable being manipulated) is no longer affecting the dependent variable (the variable being gauged) (Cramer & Howitt, 2004). The participants in School A were high academic-achieving students, and thus the ceiling effect might affect the statistical results of the knowledge test and self-efficacy survey.

Nevertheless, at this stage, we will not simply draw a quick conclusion that FSIL is not suitable for or not worthy of being adopted in top academic-banding schools. Instead, upheld by the positive feedback on FSIL gathered from School A, we will further study whether this approach can better empower “top” students when they are inquiring into some intrinsically complex societal issues identified in the meta-studies on the Liberal Studies curriculum (Fung, Tang & Chan, 2011; Ip, 2010; Ip & Fok, 2010), i.e., to decrease the ceiling effect on the research setting via increasing the *cognitive load* (Sweller, Ayres & Kalyuga, 2011) in the inquiry process. In Hong Kong, there are only eight government-funded universities. Every year, only around 18% of Secondary-6 (K-12) students can enter these universities. Not surprisingly, the “winners” are usually the students from Band-A schools, because they are used to largely outperforming the students from Band-B and Band-C schools in the high-stakes public examination, i.e., the Hong Kong Diploma of Secondary Education Examination (Jong, 2015). Indeed, the experimental results obtained from the control groups respectively at Schools A, B, and C echo this phenomenon again (see the right-most columns of Tables 2, 4, and 6). Often, Band-C students and even Band-B students cannot enter the universities to receive tertiary education. In consequence, it hinders their future career development and affects their whole lives. Nevertheless, this research proved that FSIL could significantly empower both the low and moderate academic-achieving participants to attain better learning achievement and gain higher self-efficacy in studying Liberal Studies (a core subject in the public examination), respectively with a medium effect size and a large effect size. Therefore, it is worth additional effort on studying a wider adoption of FSIL in this subject as an “equaliser” for improving the “bottom” and “middle” students’ academic performance.

In general, the positive results of the present research align with the ones obtained in most other recent flipped classroom studies (e.g., Baelper et al., 2014; Hung, 2015; Sahin et al., 2015; Zummo & Brown, 2016). However, it is important to underscore that the insights obtained from this study are different from those studies’. As aforementioned in the literature review, most of those researchers aimed to compare their proposed flipped approaches with the traditional, didactic teaching approaches, while the focus of our work was to integrate the flipped classroom idea into a constructivist pedagogic approach (GSIL) and hence to evaluate whether this flipped approach could yield better pedagogic effectiveness than the original’s. Thus, the findings presented in this paper can provide preliminary grounds for researchers and educators who are interested in further investigating the design, implementation, and evaluation of applying the flipped classroom strategy to enhance other constructivist approaches to learning and teaching (e.g., project-based learning, problem-based learning, game-based learning, experiential learning). Moreover, as discussed in the literature review, many of current successful flipped classroom instances are related to STEM (Science, Technology, Engineering, and Mathematics) subjects. There is an apparent lack of instances of adopting the flipped classroom in social and humanities education (Jong & Shang, 2016). We hope our work can shed light on opening up more research opportunities for harnessing this pedagogic idea in learning and teaching of social and humanities subjects.

Limitations

The sample size of this research (involving only 3 schools and 215 students) had yet to be sufficiently large enough to draw a definite conclusion about the pedagogic effectiveness of the proposed FSIL approach. A piece of further research is to scale up the present study with a larger sample size, involving more students from more schools at different academic banding. In addition, the “teacher” in the three experiments, Iris, was a Liberal Studies educator working in the education department in a tertiary institution. Compared to ordinary Liberal Studies teachers in schools, she was more willing to “take risk” and more eager to try innovative approaches to learning and teaching of this subject. This might also be the reason why she was willing to accept our invitation to participate in the research. If we redo this study but replacing Iris by a randomly selected Liberal Studies teacher, the results discussed in this paper may not be simply replicated.

Another limitation, which is regarded as an unavoidable one, is the *Hawthorne effect* (McBride, 2013). This effect refers to a phenomenon whereby people improve an aspect of their behaviour in response to the fact of change in their environment, rather than in response to the nature of the change itself. In this study, the novelty of adopting a new learning approach, FSIL, in studying Liberal Studies might lead to the experimental group students’ temporarily increased learning achievement and self-efficacy. Can the positive outcomes sustain? We are interested in further studying the sustainability/ change of the pedagogic effects of FSIL on these flipped students when they learn with the same approach for the second time and third time.

Conclusion

The flipped classroom has been widely regarded as a niche for facilitating a new educational paradigm shift to take place in the current decade (Bretzmann, 2013; Chen et al., 2014; Johnson et al., 2015; Lai & Hwang, 2016; Sahin et al., 2015; Wallace, 2014; Zummo & Brown, 2016). This pedagogic strategy is not simply about “eLearning,” or “learning with online videos at home.” It is about revitalising the classroom time with teacher-supported higher-order constructivist learning activities, and moving the traditional lower-order behaviourist learning activities outside the classroom (Jong & Shang, 2016). Teachers are not replaced by computers, mobile devices or videos in the course of flipped learning; rather, they usher students into a blended learning environment where students take ownership of their learning.

In this study, we integrated the flipped classroom into the process of the conventional GSIL approach to promoting students’ learning achievement and self-efficacy in studying Liberal Studies. The statistical results of the quasi-experimental study indicated that, in comparison with GSIL, FSIL had significantly positive pedagogic effects on the moderate and low academic-achieving participants, but not the high academic-achieving participants. However, the interviews with the flipped participants at different academic banding unfolded that FSIL did provide them with more advantageous learning experience both inside and outside the classroom. The findings provide grounds for a wider adoption of FSIL in social and humanities education, and shed light on applying the idea of the flipped classroom to enhance other constructivist approaches to learning and teaching.

In light of the present research limitations, as aforementioned, we plan to scale up this study with a larger sample size, involving more students from more schools at different academic banding. Also, another piece of further research is to investigate the substantiality/ change of the pedagogic effects of FSIL on the present flipped participants (i.e., the three experimental groups) when they learn with FSIL again in studying other thematic modules in the Liberal Studies curriculum.

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