Chang, M. et al. (Eds.) (2019). Proceedings of the 27th International Conference on Computers in Education. Taiwan: Asia-Pacific Society for Computers in Education

Unforeseen Impediments Emerging in the Process of Flipped Learning: A Lesson Learned in FIBER

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Abstract: Flipped Issue-Based Enquiry Ride (FIBER) is a pedagogical framework to integrate flipped learning into the approach of issue-based enquiry in social humanities education. This working paper presents the work that we conducted in the first research cycle (the first year) of a piece of two-cycle design-based research (DBR) on implementing FIBER in the context of formal curriculum learning and teaching in Hong Kong. The entire DBR involved 9 teachers (from 9 different secondary schools at different academic bands) and their Secondary-5 classes in two consecutive school years. In this paper, we focus on discussing the unforeseen impediments emerging in the course of FIBER that hindered students' learning in the first research cycle. The findings not only shed light on how to improve and optimize the current teacher facilitation acts in FIBER to be enacted in the second research cycle of the DBR, but also alert "flipped" educators and researchers to the potential problems occurring in the course of flipped learning.

Keywords: Flipped learning, design-based research, issue-enquiry learning, social humanities education

1. Introduction

Flipped learning (or inverted learning or flipped classroom) is an instructional strategy that merges online direct-instruction learning outside the school and student-centric learning inside the school (Bergmann et al., 2015; Bishop et al., 2013). According to the K-12 edition of the New Media Consortium Horizon Report 2015 (Johnson et al., 2015), flipped learning is regarded as one of the most important pedagogical approaches in the current decade for possibly transforming students from passive learners into constructivist ones. In Hong Kong, promoting the incorporation of flipped learning in formal curriculum teaching is one of the government's core initiatives for information technology in school education (Education Bureau, 2018).

Empirical studies on harnessing flipped learning in K-12 contexts are on the increase. For example, Lo et al. (2018), Sun et al. (2017), and Zummo et al. (2016) have investigated the adoption of flipped strategies in learning and teaching of Biology, Chemistry, Mathematics, Physics, etc. While most of the current flipped learning instances (with desirable pedagogical results) in the field are related to mathematics or science subjects, flipped learning in social humanities education is rarely discussed.

Based on the theoretical foundations of (i) Hwang's (2016) conceptual framework of flipped learning and (ii) Stripling's (2008) enquiry learning model, we have proposed *Flipped Issue-Based Enquiry Ride (FIBER)* — a pedagogical framework to integrate flipped learning into learning and teaching of Liberal Studies (LS) (a subject of social humanities education in senior secondary schools in Hong Kong). Regardless of the initial positive results in terms of students' knowledge acquisition in our early study (Jong, 2017), we have further aimed to, through design-based research (DBR), improve and optimize the teacher facilitation acts in FIBER for enhancing its pedagogical effectiveness in the context of formal curriculum learning and teaching. The entire DBR is composed of two research cycles (1 cycle per year), involving 9 teachers (from 9 different secondary schools at different academic bands) and their Secondary-5 classes in two consecutive school years. This working paper presents the work

that we conducted in the first research cycle, particularly focusing on discussing the unforeseen impediments emerging in the course of FIBER that hindered students' learning.

2. Related Works

2.1 Flipped Learning and Bloom's Taxonomy

Flipped learning is commonly regarded as a combination of (i) individual learning outside the classroom through direct instructional videos, and (ii) teacher-facilitated student-centric learning inside the classroom (Bishop et al., 2013). Hwang (2016) has further conceptualized flipped learning in terms of Bloom's Taxonomy (Anderson et al., 2001). Outside the school, pupils preliminarily gain basic knowledge via direct-instruction videos in the forms of remembering- and/ or understanding-based activities (i.e., the lower tier of the taxonomy). Back to the school, pupils deepen their knowledge gained outside the school via participating in teacher-facilitated higher-order tasks in the forms of applying-, analysing-, evaluating-, and/ or creating-based activities (i.e., the upper tier of the taxonomy).

2.2 Liberal Studies (LS) and Issue-based Enquiry

LS, which is a core subject in Hong Kong senior secondary schools, aims to equip students with knowledge and interdisciplinary perspectives for enquiring into various real-life societal issues. The LS curriculum is composed of a number of thematic areas and each area consists of a number of enquiry modules. For example, "Society and the Environment" is one of the areas, in which "Globalisation," "Environment & Sustainable Development," and "Influences of Energy Technology" are the modules therein. In the normal practice, a nine-day teaching cycle is used to cover an enquiry module; there are three 70-minute face-to-face lessons evenly distributed in the cycle. The statutory curriculum document (Curriculum Development Council, 2014) spells out that issue-based enquiry should be the primary pedagogy to be used in LS. Stripling's (2008) enquiry learning model is a common issue-based enquiry approach adopted by LS teachers (Fok et al., 2014; Jong et al., 2018). The model is composed of a number of enquiry phases, including *Connection*, *Exploration*, *Comprehension*, *Construction*, *Expression*, and *Reflection*.

2.3 Flipped Issue-Based Enquiry Ride (FIBER)

FIBER is a teacher-facilitated pedagogical framework to harness flipped learning in LS (Jong, 2017). Specifically, it aims to, in the setting of authentic formal LS learning and teaching, integrate the "flipped" strategy into the course of issue-based enquiry learning. Despite leveraging Hwang's (2016) conceptual framework of flipped learning, FIBER still adopts Stripling's (2008) enquiry learning model as the primary theoretical basis. Figure 1 illustrates the design and implementation of FIBER with respect to learning and teaching of an enquiry module in a nine-day teaching cycle (Jong et al., 2019, in-press).

2.4 Design-Based Research (DBR)

DBR is usually harnessed to develop "usable" interventions for addressing problems or issues related to education, such as curricula, classroom teaching, educational and school-based policies, etc. (Anderson et al., 2012; Design-based Research Collective, 2003). In general, two or more research cycles are needed for gathering sufficient research data in order to improve and/ or optimize the original design of the interventions. Different from other research approaches, DBR is a collective effort between both researchers and practitioners (Wang et al., 2005), targeting to co-develop pragmatic knowledge for building and/ or revamping educational practices (McKenney et al., 2012).

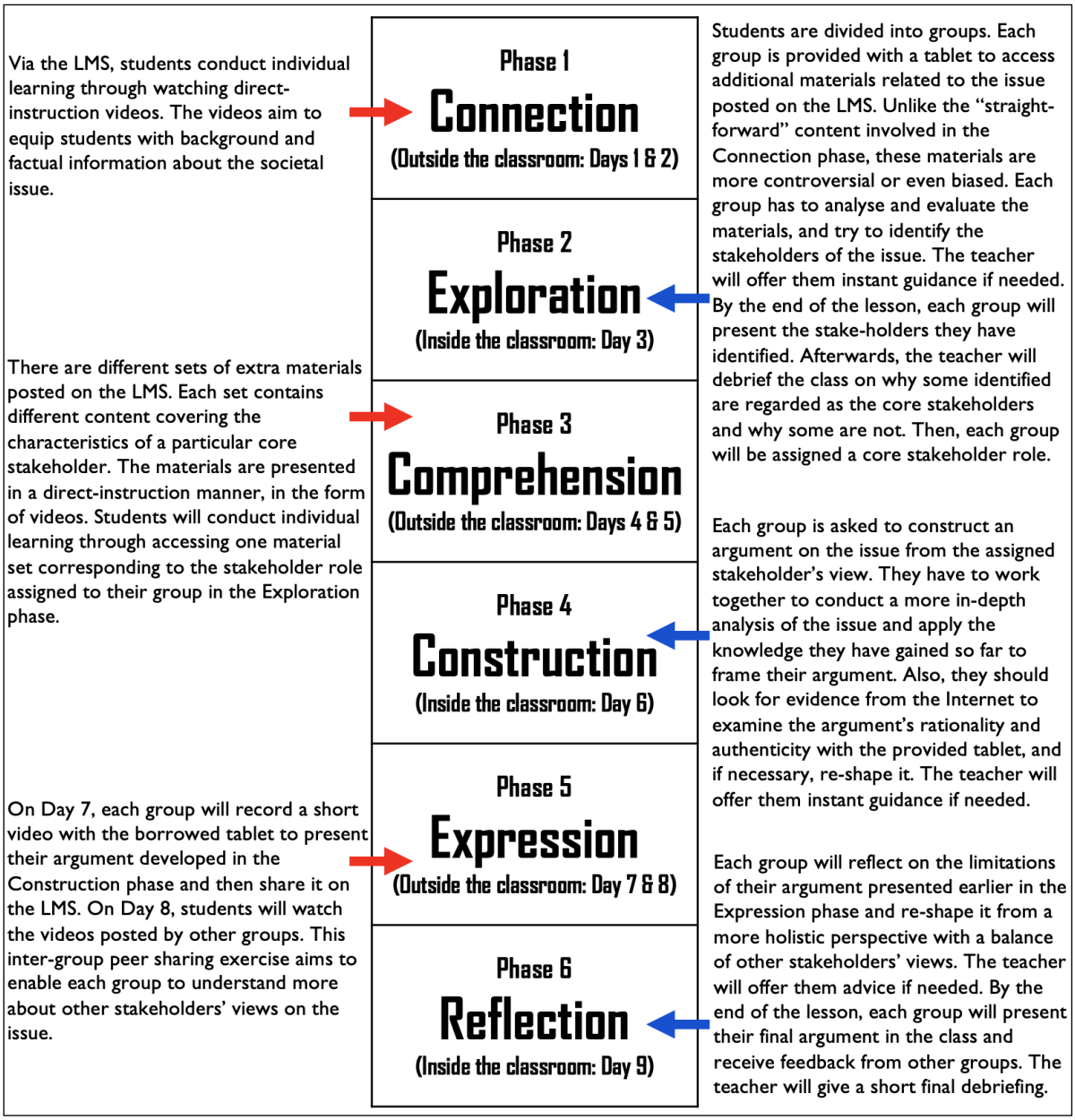

Figure 1. Design and Implementation of FIBER (Jong et al., 2019; in-press).

3. Research Design

3.1 Participating Schools and Teachers

In Hong Kong, secondary schools are divided into three bands based on students' academic ability. Band-1, Band-2, and Band-3 are respectively the top, middle, and bottom. We recruited nine LS teachers from 9 different secondary schools (3 schools from each band) who possessed comparable academic background and LS teaching experience with issue-based enquiry. Before the present study, three of them had observed the implementation of FIBER in our pilot study (Jong, 2017), and six of them had participated in our introductory workshop on flipped learning. Moreover, their schools were using the same type of learning management system (LMS).

3.2 Procedures

We have employed Design-based Research Collective's (2003) four-stage methodology which models the research process with iterative cycles of *Design*, *Enactment*, *Analysis* and *Redesign*. Observing the page limit (6 pages in total) of this working paper, the following will briefly describe the work we and each teacher did at the stages of Design, Enactment and Analysis in the first research cycle.

Design. In each school, we conducted a refresher training on flipped learning and FIBER for the teacher, in which the findings of the previous study (Jong, 2017) were also discussed. After that, the teacher participated in a quasi-experiment[1] in which s/he piloted to implement FIBER (Jong et al., 2019, in-press). Further, we assigned the teacher an enquiry module in the thematic area of "Society and the Environment," as well as re-examining and adjusting together with the teacher (i) the FIBER resources previously developed for the assigned module (Jong et al., 2017) and (ii) the existing facilitation acts in FIBER based on the school context.

Enactment. We supported the teacher in implementing FIBER to facilitate a Secondary-5 class to study the assigned module. We conducted data collection inside and outside the classroom during the entire implementation process from both teacher and student sides, as illustrated in Figure 2. We also conducted formative analysis on the collected data so as to provide the teacher with just-in-time information for adjusting his facilitation act if needed.

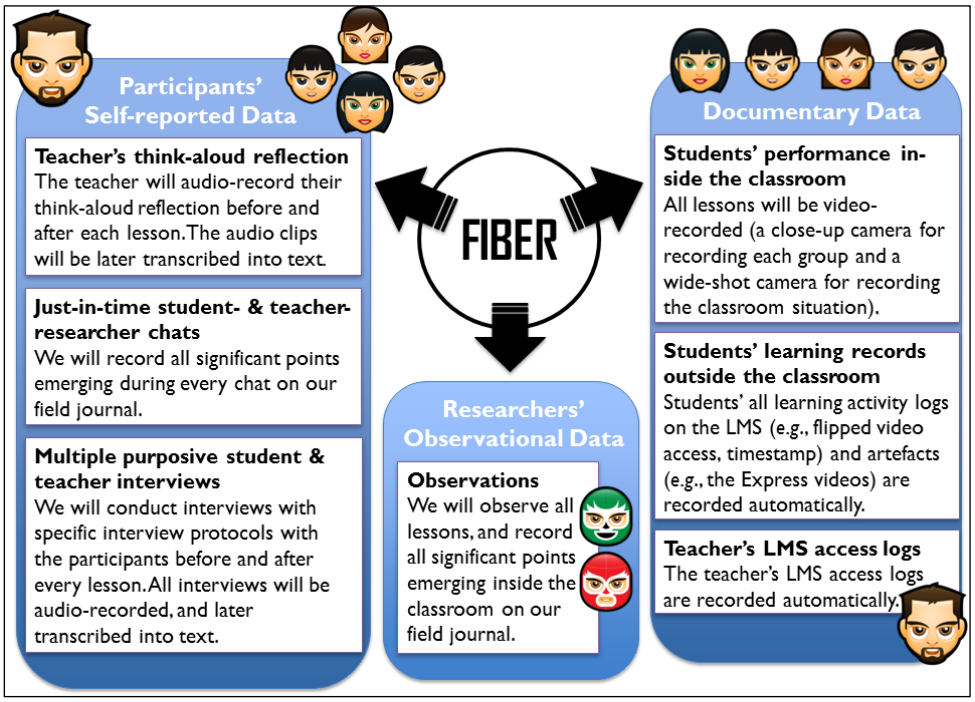

Figure 2. Data Collection Work at the Enactment Stage of the First Research Cycle.

Analysis. After the implementation, the class took a knowledge test[2] in which the questions were derived from the LS public examination questions (within the recent 5 years) related to the assigned module. The test and marking scheme were validated by a review panel which was composed of educators from local universities, curriculum officers and non-participating LS teachers. In addition to analysing the students' performance in the knowledge test, we also conducted post-learning interviews with some students to probe into their experience with FIBER. We employed Creswell's (2018) analytical strategies of theme layering and theme interrelating to study the qualitative data collected in both Enactment and Analysis stages.

[1] After the training and the discussion of the previous research findings, most of the teachers deemed that it would be much better if they could gain some real FIBER implementation experience before enacting the facilitation work at the Enactment stage of the DBR. Also, they were interested in knowing, in particular, would the pedagogical effectiveness of FIBER be really better than the conventional issue-based approach's in their own school. As agreed and consented by all teachers and their schools, before the Enactment stage in the first research cycle, each of them piloted to implement FIBER to teach a module ("Globalization") via an quasi-experiment (in comparison with the conventional approach) with 2 Secondary-4 classes (Jong et al., 2019, in-press).

[2] The test results in this cycle will be later compared with the results to be obtained in the next research cycle.

4. Findings

Observing the page limit, this working paper focuses on presenting the unforeseen impediments emerging in the implementation process of FIBER that hindered students' learning in the first research cycle, as summarized in Table 1. At the Redesign stage of this cycle, we set up three working groups with the nine teachers to optimize FIBER through addressing these unforeseen impediments. The three teachers from the same schools' academic band were grouped together. Through meetings and electronic communications, we (i) discussed the findings obtained in the first research cycle with the groups, and (ii) worked together to derive interventions for improving the empirical implementation of FIBER. The "optimized" teacher facilitation acts in FIBER to be enacted in the second research cycle of the DBR and their effectiveness will be presented and discussed in our upcoming papers.

Table 1

A Summary of the Common and Unique Impediments Emerging in the Band-1, Band-2, and Band-3 Schools at the Enactment Stage in the First Research Cycle

<table>
<tr><th>Band-1 schools</th><th>Band-2 schools</th><th>Band-3 schools</th></tr>
<tr><td colspan="3">• Some students were unmotivated to watch the flipped videos in the phases of Connection (out-of-class) and Comprehension (out-of-class) because the presenter in the videos was not their own teachers.
• Some students from families in low socio-economic-status were inexperienced in using the tablets, having difficulties to participate in the phases of Exploration (in-class), Construction (in-class), and Expression (out-of-class, Day 7).
• Some students complained that the lesson time was too short for them to accomplish the required collaborative tasks in the phases of Exploration (in-class), Construction (in-class), and Reflection (in-class).
• Some students were unable to recall some vital knowledge/ conceptions gained in the phases of Connection (out-of-class) and Comprehension (out-of-class), hindering their participation in the phases of Exploration (in-class) and Construction (in-class).
• Some students realised that they should have been given more time to plan and create their short videos for presenting their arguments in the phase of Expression (out-of-class, Day 7).</td></tr>
<tr><td rowspan="2">• Some students were less motivated to learn with FIBER as they deemed that the conventional issue-based enquiry approach was more effective to help them do well in the examination.
• Some students in the same group had very divergent views while conducting the discussions in the phases of Exploration (in-class), Construction (in-class), and Reflection (in-class), provoking serious verbal conflicts.
• Some students were too dominating in the phases of Exploration (in-class), Construction (in-class), Expression (out-of-class, Day 7), and Reflection (in-class), hindering other groupmates to elaborate their views.</td><td colspan="2">• Some students had poor Internet-searching skills and were frustrated when conducting the task in the phase of Construction (in-class).
• Some students did off-task activities with their tablets (e.g., watching unrelated YouTube® videos) in the phases of Exploration (in-class) and Construction (in-class).
• Some students found that the contents of the flipped videos in the phases of Connection (out-of-class) and Comprehension (out-of-class) were too abstract to understand, and eventually they came up with serious misunderstandings of some important conceptions.</td></tr>
<tr><td>• Some students were unwilling to interact with their groupmates in the phases of Exploration (in-class), Construction (in-class), and Reflection (in-class).
• Some students were too shy when recording their videos to be shared in the LMS in the phase of Expression (out-of-class, Day 7), hindering the peer-sharing exercise in the phases of Expression (out-of-class, Day 8) and Reflection (in-class).</td><td>• Some students regarded that the contents of the flipped videos in the phases of Connection (out-of-class) and Comprehension (out-of-class) were too hard to understand, and eventually they skipped watching the videos before the phases of Exploration (in-class) and Construction (in-class).
• Some students were unwilling to participate in the group discussions and present their ideas in front of the class in the phases of Exploration (in-class), Construction (in-class), and Reflection (in-class), and show up their faces when recording the videos in the phase of Expression (out-of-class, Day 7).</td></tr>
</table>

5. Conclusion

FIBER is a teacher-facilitated pedagogical framework to integrate flipped learning into the approach of issue-based enquiry in social humanities education. The present two-cycle DBR spans two consecutive school years with the aim of enhancing the pedagogical effectiveness of FIBER in the context of formal curriculum learning and teaching in Hong Kong. This paper has presented the former part (the first research cycle) of the entire research. The findings of the unforeseen impediments emerging in the course of FIBER not only shed light on how to improve and optimize the current teacher facilitation acts in FIBER to be enacted in the second research cycle of the DBR, but also alert "flipped" educators and researchers to the potential problems occurring in the process of flipped learning.

Acknowledgements

The work described in this paper was substantially supported by a grant from the Research Grants Council of Hong Kong Special Administration Region, China (Project No.: 14604817). Thank you very much to all teachers and students who participated in this study.

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