Flipped Classrooms in the Age of Remote Learning

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The flipped classroom methodology is a student-centered teaching style which inverts the traditional order of instruction. Lectures or lessons which introduce new material and concepts are conducted outside of class before synchronous classroom sessions. This allows the synchronous sessions to immediately dive into the material with no preamble, often involving student-centered, active learning tasks which are thought to develop learner autonomy and agency. The current qualitative study sought to investigate 169 Japanese university students' prior levels of experience with this teaching style and discover their cognition towards it after experimenting with it for a full semester. Results found that 36.7% of students had some degree of prior experience in this learning style, and that 70.4% of students felt that it was somewhat, or very effective as a learning style. Students' comments, both in favor of and against the methodology, are presented and discussed.

Key Words : Flipped Classroom, Active Learning, Student-Centered Learning, Remote Learning

1. Introduction

Classroom-based instruction can broadly be divided into two methodologies: teacher-centered and student-centered learning. The teacher-centered approach envisions the instructor as the authoritative figure and the possessor of knowledge. The role of the teacher is to disseminate knowledge deemed appropriate to the students, whose job it is to memorize the contents of the lecture and be able to reproduce it on demand (e.g., homework, assessments). This method is sometimes referred to as the transmission method of teaching (Sotto, 2007)[1]. While this methodology has the positive aspects of being economical and suited towards lecture-style classes with large numbers of attendees, several drawbacks have been identified. One common criticism of teacher-based pedagogy is that it is a closed loop. The teacher determines what the students need to know, how to best transmit that knowledge, and then is responsible for testing if the students can successfully reproduce it. As such, students are viewed as empty vessels into which the teacher pours information. Students' tasks are to retain and repeat what the teacher says in a sort of an echo chamber without necessarily synthesizing the information. The goal of instruction tends to become assessment oriented. As teachers both control the lesson contents and the testing materials, there exists a tendency to teach for the test (i.e., washback effect; Bailey, 2018)[2]. As students' futures depend heavily on such assessments, this style of teaching encourages students to focus narrowly on what will be on the test and prioritize scoring well over actual learning (e.g., Johnson, 2019)[3].

Student-centered methodologies, on the other hand, encourage students to take control of their own learning by taking the initiative (i.e., active learning; Bonnell & Eison, 1991)[4] Essentially, any activities where students engage with the subject material, instead of passively listening, are considered to be student-centered. Common examples are group discussions, task-based learning, project-based learning, roleplaying, and creative writing. In these cases, the instructor takes on the role of a facilitator who offers individual advice to students, more akin to a coach than a lecturer. This paradigm shift in a teacher's role has been referred to as going "from sage on the stage to guide on the side" (King, 1993, p. 30)[5]. The instructor devises activities which align with the course's intended learning outcomes and initiates them. Students then construct their own

learning while the instructor goes around and offers support and advice where necessary, along with ensuring that students remain on-task and that all students are participating appropriately.

Specifically, the current study focuses on the student-centered pedagogy of the flipped classroom. Also known as backwards or inverted classroom, reverse teaching, or the Thayer Method (see Connors, 2000[6] for background on the Thayer Method in the United States Military Academy), the flipped classroom reverses the traditional order of instruction. Whereas traditionally, an instructor presents new material during class contact hours and assigns homework assignments to be done by students individually outside of class, the flipped classroom has students individually study new material before class convenes. This is often delivered in the form of a video lesson, although many methods of delivery are possible (e.g., pre-class reading, brainstorming, group chat/discussion, etc.). When classes convene, students are then able to quickly engage in active learning activities as they are already familiar with the basic concepts of the contents for that week. As class contact hours are typically extremely limited (sometimes mere minutes per week), the flipped classroom proposes to make more efficient use of class time while aiding the development of student autonomy and agency.

In response to the global COVID-19 pandemic, classrooms across the world have transitioned to a distance-learning format and simultaneously, students are spending more time at home than ever. This combination motivated the current research, which sought to investigate the use of a flipped classroom pedagogy for Japanese university students of English as a Foreign Language (EFL). To state formally, the current study sought to answer the following research questions (RQs):

1. What percentage of students at the target university have experience learning in a flipped classroom?
2. To what degree do students typically preview material when learning in a traditional teacher-centered style?
3. What were students' thoughts regarding the flipped classroom pedagogy after experiencing it for a full semester?

2.　Review of the Literature

The concept that lecture-based instruction is inefficient for skills or personal development is not new (for a research synthesis see Bligh, 1998)[7]. Fundamentally, this type of instruction seems to go against the principles of the self-determination theory of motivation (Ryan & Deci, 2000[8]; 2017[9]) which states that people need to feel competent, in control, and understand the relevance of a task in order to succeed at it. Lectures clearly satisfy only one of these facets (competence), and perhaps another (relevance), for a proportion of students. Unfortunately, the autonomy component of learning is completely relegated to time spent outside of the classroom. The transmission method also makes inefficient use of arguably the most valuable resource in a classroom, that of the instructor. Students have precious few contact hours with a professor in a university setting, yet the transmission method (i.e., teaching by telling) essentially reduces students' access to only the knowledge the professor chooses to disseminate. While this is sufficient if the goal is merely passing the course, it limits the scope of learning and introduces a bias as students only learn what the instructor believes to be important. Furthermore, independent thinking and consolidation of knowledge thus occurs outside the classroom, without the benefit of an instructor present for personalized advice or guidance. The flipped classroom approach thus takes the information transmission component of a lesson outside of the classroom in order to free up contact hours for more collaborative tasks (Abeysekera & Dawson, 2015)[10]. This is often accomplished by assigning readings, having students watch lectures on videos, or answering problems ahead of class time (e.g., Bishop & Verleger, 2013)[11].

Theoretically, the flipped classroom methodology (and student-centered methodology in general) draws primarily from theories of constructivism, collaborative, cooperative, and peer-assisted learning. While these theories are similar in that they overlap in some qualities, peer-assisted learning is loosely defined as "the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions" (Topping & Ehly, 1998, p. 1)[12]. This, of course, differs significantly from teacher-centered methodologies which tend to confer upon students a sense of inferiority and a position of lacking knowledge and capability. Cooperative learning, on the other hand, views the students as interdependent units of a group which each contribute to a common goal; each member is responsible for the achievement of the group's goals (Doolittle, 1995)[13]. In either case, learning is seen as the product of interaction between those in the classroom as they progress through organized activities (i.e., social constructivism; Vygotsky, 1978)[14].

Although the flipped classroom methodology can be used for any discipline, of particular interest to the current study is how it can be used in the context of EFL or language learning. Ekmekci (2017)[15] notes that "(s)tudies on flipped classroom (sic) are limited, but studies on flipped language learning classrooms are much more limited" (p. 155). However, the theoretical underpinnings of flipping the classroom blend seamlessly with the current direction of instructed second language acquisition (ISLA) research, such as trends to "empower students by allowing them to take control of the language learning process" (Cohen, 1998, p. 70)[16]. Particular to ISLA is the theory of communicative language teaching. Whereas previously, language learning was believed to be a mostly cognitive matter which could be accomplished by memorization, modern language teaching focuses on developing interlocuters' communicative competence (e.g., Littlewood, 1981)[17]. As such, the processes of language learning do not appear to be much served by the transmission method, which prioritizes rote memorization, and instead would seem better suited to the practical, hands-on activities that the flipped classroom offers. This assumption has thus far been supported by the few empirical studies that have compared flipped classrooms to traditional lecture-based classes. Several studies of writing performance in a second language (L2) have found that students produce longer prose under the flipped condition (Ahmed, 2016[18]; Ekmekci, 2017[15]; Leis et al., 2015[20]). While not direct evidence of language acquisition, increased production in the L2 is considered desirable for EFL learners as it offers more opportunities for reinforcing form-function mapping of acquired L2 features (e.g., Lantolf, 2000)[21].

Technological advancements have also been cited as a boon for student-centered methodologies such that the quality of materials have increased, raising the satisfaction and engagement of students who must implement them in a self-directed context (e.g., Brewer & Movahedazarhouligh, 2016[22]; Chen et al., 2017[23]). The development of smartphones and high-speed internet have made delivering course content easier than ever, and with more multimedia and interactional capabilities than were possible in past decades. Courses that mix traditional classroom activities with online-mediated activities (i.e., blended or hybrid courses) have been suggested to even outperform face-to-face courses in terms of both learning outcomes and student retention (Dziuban et al., 2018)[24]. In fact, students are increasingly using mobile phones in the classroom (e.g., Anshari et al., 2017[25]; Norris et al., 2011[26]), and those who do not, report a great willingness to begin doing so (Lee, 2019[27]). Effectively using technology for learning is now seen as a basic skill, necessary for success in the modern world (Lee, 2021[28], a notion that was supported by the sudden shift to online learning in 2020 as a result of the global COVID-19 pandemic.

3.　Study Design

3.1　Participants

The current study was conducted during the second semester of the 2020 academic year, at a small private university in Japan. This university had transitioned to online learning for the entirety for the academic year, meaning that at the time of the study, the participants had already experienced online learning for an entire semester (i.e., the spring term) in a traditional, lecture-based format. The course chosen to flip was a preparation course for the TOEIC® test (Test of English for International Communication), which students typically take during their sophomore year at the university. This course was considered to be an ideal candidate for flipping, as the course is typically taught in a lecture style with a heavy emphasis on memorization of grammatical rules and solving sample problems. As such, the course traditionally has very little active learning elements or student-initiated components.

As a form of classroom research, five intact classes, comprised of 169 students, were instructed in the flipped methodology. All participants were in their second year at the university and thus 19 or 20 years old. The gender ratio of the sample population was overwhelmingly male (M = 94.1%; F = 5.9%), though this is in line with the composition of the student body at large and should not be considered as a sampling error. Students from seven different academic departments were represented: mechanical engineering ($n = 32$), applied nuclear technology ($n = 8$), architecture/civil engineering ($n = 22$), applied chemistry/food science ($n = 12$), design ($n = 18$), management and information sciences ($n = 33$) and sports/health sciences ($n = 44$).

3.2 Materials and Methodology

The duration of the study lasted for the entire fall semester of the 2020-2021 academic year (i.e., 15 weeks). Each week, the students were assigned pages from their textbooks to read, which had vocabulary and grammar lessons which were related to sample questions which followed. The questions from the textbook were digitized onto the university's learning management system (LMS) such that students could answer the questions and submit them before the scheduled class time. Audio recordings for all questions with a listening element were uploaded to the LMS so that students could freely play the audio as many times as they desired. The LMS would report the students' scores upon submission, so that both the students and the instructor could monitor the students' performance before class started.

Synchronous sessions were conducted once a week through an online meeting platform. Before the start of the synchronous sessions, the instructor would review the students' LMS submissions, checking for completion and reviewing the accuracy of the students' responses. The instructor would make notes as to which items were answered correctly by the majority of the students, and which ones appeared to be problematic, as this information formed the basis of the synchronous sessions' contents. When students logged into the class, the instructor would begin by initiating dialog with the students where they were encouraged to discuss any issues they might have been experiencing, either with the contents of the class or with online learning in general. While these discussions were not pre-planned, the topics generally were directed to focus on learning strategies. Students were encouraged to share how they went about completing the asynchronous sessions: what media they were using, where they went when they had questions about the content, and what other resources (e.g., apps, websites) they thought might be useful for the other members of the class to be aware of.

The instructor then proceeded with the lesson by presenting questions from the LMS on the screen. As the students were already given the correct answer from the LMS upon submission, the instructor instead asked pointed questions which encouraged students to approach the questions analytically. The students were challenged to figure out what aspect of language was being tested with each question (e.g., parts of speech, singular vs. plural, subject-object-verb structure, etc.). Students could respond verbally, or by typing in responses into the meeting's chat box. After a period of brainstorming and discussion, the instructor would contribute extra information or insights, where applicable.

The data collection material was an original survey, conducted after the final lesson of the semester (i.e., Week 15). The survey was composed of six items, asking students to report their past experiences with the flipped classroom methodology and about various aspects of their studying habits over the semester. Finally, students were asked to report their overall thoughts on the methodology in a free writing section (see Table 1).

4. Results

Table 1

Responses to Survey Items

Item One:		Yes		No	
Was this your first experience with a flipped classroom?		63.3%		36.7%	
Item Two:	Never	Sometimes	50%	Mostly	Always
Did you always complete the asynchronous assignments?	4.1%	16%	15.4%	22.5%	42%
Item Three:	Nothing	Almost Nothing	50%	Mostly	All
Could you comprehend the asynchronous assignments?	1.2%	21.6%	36.4%	35.9%	4.9%
Item Four:	Never	Sometimes	50%	Mostly	Always
Before this course, did you engage in pre-lesson study?	24.2%	33.7%	34.9%	4.8%	2.4%
Item Five:	Not At All	Not Much	Neither	A Little	Very
Do you think the flipped classroom is effective?	1.2%	5.9%	22.5%	43.2%	27.2%

Note. Participants who responded "Never" to Item Two were exempted from responding to Item Three.

4.1 Research Questions 1 & 2

The quantitative responses are reported above in Table 1 provide the answers to RQ1 and RQ2. The responses to Item One address RQ1, which asked what percentage of participants at the target university had prior experience in the flipped classroom methodology. As reported in Table 1, 36.7% of the participants reported that the current study was not their first time using this study method. This result fell exactly in line with the academic majors of the participants involved, with students from the departments of mechanical engineering, applied chemistry/food science, and design thus responding so ($n = 62$). Members from the other academic departments reported that this was their first experience. In response to Item Two, 79.9% of students reported completing more than half of the asynchronous assignments. While this result shows that engagement in the flipped classroom style was not perfect, this level of participation lends validity to the responses in other parts of the survey. The students who reported never doing the asynchronous assignments did not answer Item Three as it would be invalid. Of these remaining students ($N = 162$), 77.2% reported comprehending a majority of the contents of the asynchronous assignments.

The results of Item Four provide the answer to RQ2, which sought to investigate what percentage of students engaged in pre-lecture studying under normal (i.e., lecture-based) circumstances. As 57.9% of students reported only sometimes, or never preparing for their lessons by doing any kind of pre-reading or studying, RQ2 can be answered that 42.1% of students regularly engage in pre-lecture preparatory studying. However, after experiencing the flipped classroom methodology for a full semester, 70.4% of students felt that it was somewhat, or very effective as a learning style.

4.2 Research Question 3

Finally, RQ3 inquired about what students' cognitions were regarding the flipped classroom methodology after experiencing it for a full semester. The qualitative free responses which asked students to explain their answers to Item Five provided the basis for this answer. The students' responses were first translated from Japanese into English by the researcher, then coded in accordance with emergent themes (see Table 2). Note that comments which contained multiple themes were coded as one instance of each theme, resulting in a larger number of responses than participants.

Table 2

Emergent Qualitative Themes (Number of Responses)

Positive Responses	Better comprehension of synchronous sessions ($n = 57$)
	Effective use of class time ($n = 42$)
	More time for private reflection ($n = 34$)
	Feeling of increased English ability ($n = 8$)
	Personal preference ($n = 7$)
	Synchronous session reinforces self-confidence ($n = 6$)
	Increased studying time ($n = 6$)
	Increased motivation ($n = 4$)
Negative Responses	Self-directed study was difficult ($n = 22$)
	Difficult to participate if one did not do the preparation work ($n = 15$)
	Increased studying time ($n = 10$)
	No difference to traditional lectures ($n = 8$)
	Less communication with the instructor ($n = 6$)
	Personal preference ($n = 4$)
No Comment	($n = 10$)

From an analysis of the responses reported in Table 2, it appears that out of the eight positive themes, the three themes of a) having a better comprehension of synchronous sessions, b) enjoying more effective use of class time, and c) having more

time for private reflection were the most popular. Within the comments that reflected a negative disposition towards the flipped classroom style, the themes of a) difficulty with self-directed study, b) the necessity of faithfully doing the preparation work, and c) requiring more time than traditional lecture-based classes were the most frequent. These themes and their implications will be discussed in the following sections.

5. Discussion and Pedagogical Implications

The current study sought to investigate students' level of experience with the flipped classroom methodology and their cognition towards it. The finding that 36.7% of participants had prior experience with the methodology shows the growing popularity of the teaching style, given both the engineering focus of the target university and its rural location. Starting with the positive comments towards the methodology, the comment that flipping the course led to better comprehension of the synchronous sessions is perhaps the most obvious argument that can be made in favor of preparatory study. Naturally, previewing the material to be discussed in class will result in enhanced comprehension, at the very least in terms of familiarity with concepts and terminology. This leads into the second comment that class time is able to be used much more effectively. As discussed in Section 1, contact hours with an instructor can be extremely limited depending on the learning context. In the case of higher education, these contact hours can also come with associated tuition fees which can be quite substantial. As such, effective use of those hours is desirable not only from an educational perspective, but also an economic standpoint. It cannot be forgotten that students are in essence, paying customers. Institutional stakeholders may thus take note that increasing the efficacy of class time by remitting introductory material to outside of class seems to result in increased customer/student satisfaction.

The third most popular comment regarding increased private reflection refers to the amount of time students engaged in independent thinking. In lecture-based classes, students typically remain passive and wait for the instructor to give them information. On the rare occurrence that a lecturer poses a question to the class, most students know that if they remain silent long enough, either another student in the class will answer, or the lecturer will reveal the answer to keep the class from going overtime. In the current study, participants had a full week to attempt to answer the questions before the synchronous session. Participants noted that this extra time allowed them to think about the problems they encountered much more independently and actively. While quantitative learning outcome measures (i.e., test scores) were not analyzed, it should be noted that some students commented on their increased English ability ($n = 8$), self-confidence ($n = 6$), and motivation ($n = 4$) (Table 2).

Among students who reflected negatively on the flipped classroom methodology, the difficulty of self-direct study was the most popular, followed by students' observation that synchronous sessions are difficult to follow if one had not done the preparatory work in advance. Both comments are valid and reflect the realities of the classroom. Certainly, taking control of one's own learning is more difficult than passively listening to lectures. For one thing, it requires students to be proactive and put in extra work hours ($n = 10$; Table 2), studying things that might end up not being on the test. For students who merely want to pass a course and are not genuinely interested in the course material (e.g., compulsory courses), this methodology is certainly daunting. Teachers also need to be aware that some students may not know how to approach self-directed learning and may need to be taught how to learn. As the second comment accurately details, the flipped classroom methodology depends on students doing the asynchronous portion in good faith. If they are not able to do so for any reason, the synchronous sessions then lose their preamble and those students may be left behind.

One poignant sentiment was that flipping the classroom seemed to result in less communication with the instructor ($n = 6$; Table 2). While it is natural that removing the instructor from being the center of attention into a support role will reduce the amount of time that the instructor is speaking, the human element of education cannot be forgotten. In fact, the instructor's role is still vital in student-centered methodologies, as they are expected to design and monitor students at their tasks, engaging where necessary. However, there perhaps exists a tendency for instructors to step too far back when transitioning from a teacher-centered to a student-centered methodology as they wish to encourage the development of student autonomy. The results of the current study serve to remind instructors that personal interaction with students is a key feature of education, and one that students desire despite their need to develop autonomy and agency.

6. Limitations and Future Directions

The current study was limited in several ways which limit the generalizability of the findings. The first thing that must be stated is that the current global COVID-19 pandemic has forced students and teachers to suddenly transition to online learning. The disruptions brought about by these learning conditions is not able to be quantified, but it is conceivable that students faced increased stress, both in adapting to new technologies and in efficient management of their time. The inability of students to even visit campus was also a significant factor, as this absence of face-to-face interaction might have contributed to the students' stress levels, impacting motivation, which is essential for the success of any student-centered methodology.

Several aspects of the study design were also salient factors, including the course type, language proficiency of the students, age of the students, and learning outcome measures. The current study focused on a standardized test preparation course, where students must master grammatical structures and lexical items, along with honing their English listening abilities. As these are all receptive skills (i.e., students have to discern the correct answers, not produce any original language of their own), it is impossible to claim that the teaching methodology had any impact on their language production ability. In fact, the current study was largely qualitative in nature, investigating students' cognition, and did not include quantitative learning outcome measures such as test scores. Future studies may wish to quantitatively compare students' end performance on the TOEIC® test to determine the efficacy of the flipped classroom methodology, but that was not the purpose of the current investigation.

Finally, as a student-centered methodology, the ability of students to effectively engage in self-directed study is the major concern which must be taken into consideration. This is one reason why the flipped classroom is more commonly seen in tertiary education and perhaps not suited for younger learners, as they have a lower degree of self-discipline and learner agency. However, the language proficiency of the students added another layer of complexity to the study as students with lower English proficiency would thus experience more difficulty when engaging in the asynchronous assignments. As the results showed that 20.1% of students (Table 1) did the assignments less than 50% of the time, it would be informative for future studies to investigate potential correlations between language proficiency and outside-of-class engagement. Another line of research that may of interest is a longitudinal study, which investigates learner behavior after experiencing the flipped style. Table 1 showed that 57.9% of students had never prepared for class before this study. It would be interesting to see if their positive experience from this study influenced them to prepare for classes in the future, even those which are taught in the traditional transmission style.

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