【Teaching Practice Report】

Designing a Technology-Enhanced Flipped Classroom Model Using Instructional Slideshows and Computer-Mediated Asynchronous Discussions

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Abstract

With flipped classroom pedagogy becoming increasingly popular with educators and the field of Computer-Assisted Language Learning also seeing a rapid increase in popularity, sped up by the recent COVID-19 pandemic, this paper explores the possibility of combining these methods of learning by using technology to provide out-of-class instruction and practice-time to learners. After the discussion of existing frameworks and methodologies, instructional PowerPoint slideshows were designed, and an online discussion forum was used to apply a blended approach to several flipped classrooms. Observations were made, test scores were analyzed and learners' opinions were recorded via an online questionnaire. The study concludes with the belief that a blended approach to a flipped classroom is effective in facilitating more meaningful knowledge creation through critical thinking at the learners' own pace.

Keywords: flipped learning, CALL, forums, PowerPoint, instructional design

Introduction

Due to the onset of the COVID-19 pandemic, teaching establishments worldwide have been forced to provide online classes to their students. This has led to the introduction of new technologies and online platforms that can be used both inside and outside of a classroom. In Japan, digital devices have been provided to students in all schools, and Information and Communications Technology (ICT) classes are being conducted for students at a much younger age. This increased reliance on ICT in the field of education means that ELT educators have had to adapt the way they conduct their classes and look at new methodologies based not only on synchronous but also asynchronous learning and communication through digital platforms and materials (Levy & Stockwell, 2006).

One approach that has gained attention in recent years is the idea of flipped learning (Webb & Doman, 2016). While this approach existed before the pandemic, new demands from online teaching environments have increased its popularity, especially amongst ELT researchers (Turan & Akdag-Cimen, 2020). Flipped learning is an instructional approach where the presentation of course content is introduced outside of the classroom. Common methods include the use of instructional slides or videos that are viewed and studied outside of class time (Hockley, 2017). The purpose is to allow more in-class time to be spent on production and reflection. The use of technology with a flipped approach is a form of blended learning, which combines both face-to-face instruction and online materials.

For a flipped approach to work in a digital environment, educators have been looking into new ways of presenting content to their learners using computer-assisted methods. One such method is using presentation slides via software such as PowerPoint, Keynote, or Google Slides. Slides can be used for initial teaching, practice and drilling, games, reviews, and tests (Fisher, 2003). They can be published online, allowing them to be easily accessible to learners, and help learners attend to and

retain much of what is presented (Roblyer & Hughes, 2018). While presentation slides can help present target skills or language, online platforms have been designed that allow learners to practice using the taught content asynchronously before synchronous use in class.

Another computer-assisted method is via the use of CMC (Computer-Mediated Communication). A popular example of this is the use of online forums that allow learners to communicate and collaborate online. These forums provide learners with the opportunity to share content, knowledge, and media while working synchronously or asynchronously and at their own pace. The popularity of such forums has led to the development of websites that focus on specific functions such as forum-based discussion or content sharing.

This paper explores the use of technology to provide a flipped approach to a language classroom. Research will be conducted via the use of slides and a newly developed online discussion site named Kialo that describes itself as 'the purpose-built tool for critical thinking, thoughtful discussion, and collaborative decision-making' (Kialo, 2017).

Discussion

Blended Learning – A Flipped Approach

The flipped learning model is becoming increasingly popular amongst educators, especially within universities. The idea is that learners review the content of the course prior to the class session and complete exercises that would usually be conducted together in a face-to-face environment (Bishop & Vergleger, 2013). This pedagogical concept replaces the standard in-class presentation of content with the opportunity for learners to discover their own concepts while also reviewing materials from outside of the class. This removes the need for a lecture-style format delivered within class time, and rather this information is given through homework assignments. This explains the term 'flipped' as historically, the classroom is the usual place where content is delivered. This approach is defined by Gerstein (2012) as a place for problem-solving, and to discover advanced concepts and engage in collaborative learning. Flipped learning can also include digital integration and, in this case, can be considered a form of blended learning. Blended learning is defined as being a student-centered, self-paced, flexible, and multi-modal approach to language learning (Vaughan, 2007). It is considered to be an intersection of face-to-face settings, which includes synchronous and human interactions, and computer-assisted synchronous or asychronous situations in which the learner operates independently. Therefore, when ICT-based settings are used in a flipped classroom, this instructional model can be considered to be both 'flipped' and 'blended'.

The benefits of flipped learning are categorized by Kerr (2020) as: personalization, active learning, and engagement. Kerr highlights the increase in learner personalization by a) supporting learner difficulties; b) encouraging learners to work at their own pace; c) providing a range of study materials for the learner to choose from, and d) delivering personalized support. Fulton (2012) provides additional benefits such as a) insights into students' learning styles; b) ongoing customization to meet learner needs; c) use of technology to boost learning; d) increased learner engagement, and e) support for students who are absent from the class. Kostka & Marshall's (2017) research on the advantages of a flipped classroom showed that if lower-order skills are accomplished before class, then more time can be spent focusing on higher-order skills such as analysing and creating (Woodward & Padfield, 2021). Strayer (2012) also found that students embraced the cooperative learning and innovative teaching methods used in a flipped classroom. This led to increased

engagement by facilitating the learners' ownership of their learning process. As the learners have more control over their learning, they feel more accountable for their contributions and performance in class (Johnson & Marsh, 2016).

While many benefits have been suggested, the flipped approach has potential drawbacks, including a) a possible lack of learner participation; b) ineffective study habits; c) issues with technology or computer illiteracy; and d) resistance to the approach due to a preference for traditional teaching styles (Kerr, 2020). For example, in Japan, many teachers conform to a teacher-fronted, lecture-style approach to teaching, so students may initially be resistant to a new approach. In addition, without knowing the benefits, students may question why they have to complete work at home and whether they are receiving the education that they deserve. Milman (2012) suggests that low proficiency students may struggle to remain engaged with the target material on their own for extended periods and also may have difficulty with various types of media such as online videos.

Both the advantages and disadvantages of a flipped classroom raise the question of how to flip effectively. The learning materials presented outside of the classroom must be both engaging and easy to use and follow. In addition, instructional learning should help the learners understand and transfer what they have learned in in-class production. The successful transfer of knowledge is essential, allowing learners to use their knowledge 'creatively, flexibly, and fluently in different settings and problems' (Wiggins & McTighe, 2006, p.26). In Fries et al.'s (2020) practising-connections framework, they creating a three-step process that can be applied to instructional design. These steps include 1) create a productive struggle (i.e., responsive teaching); 2) making connections explicit, and 3) providing practice with variations. Using technology-assisted learning, I believe this framework can be applied to a flipped classroom.

Presentation Slideshows

The field of CALL (Computer-Assisted Language Learning) has seen a rapid increase in popularity due to the demand for online classes brought on by the pandemic. This means the use of technological tools has become very common in the classroom. This has led teachers to look at new ways of providing classroom instruction and to keep learners engaged. Presenting with software, such as Microsoft PowerPoint, has become the most popular method. Szaboa and Hastings (2000) suggest that the use of PowerPoint can help learners focus attention and reduce distraction. This idea is supported by Catherina (2006) and Wanner (2015) who feel that PowerPoint presentations are more interesting than traditional lectures. In Wanner's (2015) research, his university students stated that pre-lecture PowerPoint presentations were helpful for their understanding of the lecture content. Increased engagement can be explained by Cashman and Shelly's (2002) research that found students learn most effectively when using their five senses. PowerPoint presentations appeal to varying learning styles, such as the use of visual, auditory, kinesthetic, and creative. In Oommen's (2012), study, he found that out of 50 of his university students, 94% of them responded with a positive attitude towards the use of PowerPoint, saying it was easy to follow, stimulated thinking, helped make better use of class time, and held their attention.

For slides to work in a flipped classroom, the slides must be accessible outside of class time. This is possible through online publishing. Google Slides provides the function to publish slides online as HTML. The coding can then be added to other clients and easily viewed by the learners. In many universities, an online application named Blackboard (or Blackboard Learn) is used for online teaching, where the slides can be uploaded and viewed before in-class lessons. In addition, the

research and suggestions made so far imply that these slides should be both visually pleasing and interactive. Presentation software allows the utilization of media such as videos, audio, and images. Animations and timings can also be used to necessitate when content is presented to the learner, simulating the instruction of an in-class instructor. This means that the common use of slides as a tool to complement a class or as a communication aid (Levy, 1997) has developed into the ability to act as a surrogate teacher or manager of tasks.

Online Discussion Forums

Discussion forums/boards are a form of CMC (Computer-Mediated Communication) (Levy & Stockwell, 2006). They are not a new tool in online learning and have been the focus of an abundance of research (Beatty, 2010; Thomas, 2002). They provide many benefits such as allowing students to interconnect at their own pace, participate in group discussions, share content and knowledge, and take part in pre-task planning (Ortega, 1997; Biesenback-Lucas, 2003; Bradshaw & Hinton, 2004; Levine, 2007). Another benefit of having asynchronous online discussions is that they prevent dominant students from monopolising discussions, and students may feel more comfortable expressing their honest ideas and speak freely. Biesenback-Lucas (2003) believes that online discussion boards provide a platform that allows ESL students to achieve "new levels of linguistic competence" (Mahoney, 2021, p. 57) and provides the opportunity to express their opinions in their own words.

Online discussion forums also promote more active participation in students. Research has shown that the forums promote the use of a larger lexical range. Warschauer (1997) found that students used language that was lexically and syntactically more complex in electronic discussions compared with face-to-face environments. Students can learn from their peers' entries while also correcting their lexical mistakes by noticing differences in their usage (Fitze, 2006). This may enable ESL learners to boost their pragmatic competence and give them more time to reflect on their ideas and the language being used. This idea is echoed by Satar & Ozdener (2008) whose research showed that computer-mediated communication offers learners a safe environment to practice what they have learned and also evaluate themselves while also understanding the benefits of speaking skills.

The use of online discussion forums has also been met with some criticism, especially from learners. Recent studies of online discussion boards used in Japanese universities have suggested that students find the discussion boards useful but also challenging, and some did not appreciate the extra time spent outside of the classroom completing discussion board tasks (Miyazoe & Anderson, 2010; Nielson, 2013). Other studies have also been less conclusive where it has been argued that while quantity and attitudes improved, there were no significant increases lexically or syntactically in asynchronous CMC discussions (Gonzalez-Bueno & Perez, 2000; Abrams, 2003).

Regarding the use of discussion forums in a flipped classroom, they can provide a place to practice through pre-task planning. The practising-connections framework put forward by Fries et al (2020) explains the need for varied practice after explicit instruction. In-class discussions would traditionally follow a Present, Practice, Produce (PPP) method, and after being presented with the class content (e.g. slides), the discussion forum would allow the learner to practice what they have learned in an asynchronous discussion. Levelt's (1989) speech production model explains that production starts with conceptualizing, then formulating, and finally articulating. For second-language learners, focusing on both meaning (i.e. generating ideas) and form (i.e. selecting grammatical and lexical forms) at the same time adds an additional cognitive load and may affect

production (Ellis, 2009). However, through pre-practice discussions online, the burden on working memory can be reduced, allowing learners to focus on their L2 proficiency and in-class task performance.

Research Study

Method

The purpose of this study was to apply Fries et al.'s (2020) instructional design framework to a flipped classroom, allowing L2 learners in a university English Discussion class to discover lesson content, make connections to the lesson topic, and practice using what they learned prior to in-class production. The participants were 109 first-year university students from 11 English Discussion classes.

The Discussion Class is a mandatory course that students take once a week. For the first four weeks, before their first discussion test, traditional methods of teaching were used. For their homework, they had to read an article in their textbook to understand the next lesson's topic. In class, the discussion skills and target language were given through a lecture-style presentation, which the students then used during in-class discussions.

After their first discussion test (Lesson 5), a flipped approach was applied to the classes using technology-assisted tasks:

1. Students were presented with discussion skills and target language that would usually be presented in class. Slides were created, which were uploaded to their class Blackboard website (Appendix, Image.1-4). The discussions skills and language were presented through varying methods such as a guided discovery task (e.g. gap fill activity) or dialogue comparison (e.g., one dialogue containing the taught skill and the other without). Then, using animated slides, the discussion skills were explicitly explained in more detail.

2. The students took part in asynchronous, online discussions using a website named Kialo (Appendix, Image.5-6). A discussion question was taken from their textbook and added to the website. The students then added their opinion by adding a "thesis". Other students in the class could then add opinions in agreement or disagreement. They were advised to add at least four responses each and had to use the skills that they had learned from the slides. They were also able the vote on how impactful others' ideas were.

3. The students' entries were collated and added to slides that were reviewed before starting the in-class discussions (Appendix, Image.7).

After their second discussion test (Lesson 10), the students were issued a Google Form questionnaire requiring responses using five-point Likert scale-based answers, where students provided their opinions related to the use of Kialo as a pre-task practice exercise. Qualitative data was collected in the form of students' reasons for whether they preferred the flipped or traditional approach.

In addition, differences in their discussion test scores were observed through the collection of quantitative data.

Results

Out of 109 students, 100 completed the online survey (Appendix, Table.2). The first set of questions were related to learner outcomes. When asked whether Kialo was an easy-to-use tool, 90% responded positively. This also implied that 10% of the students had difficulty with the website, which highlights the issues stated earlier by Milman (2012). The majority (86%) of students believed the online discussions were helpful or very helpful in preparing them for the class, and most students felt that it helped them practice/improve their critical thinking skills. While not an intention of the research, nearly every student believed the online discussions helped improve their English reading and writing skills. In addition, every student believed it was a useful tool to practice the discussion skills that they had learned from the slides. When asked whether their ideas from the online discussions were used in class, 24.2% of students chose 'Always', and only 8.1% chose negative responses. Instead of using ideas from a textbook article, students were able to research and present their own ideas which were later used in class. This may imply that their cognitive load was lessened as they had already generated ideas prior to in-class production. Finally, 97% of the students said that they had used other class members' ideas during in-class discussions which supports earlier research regarding the sharing of content and knowledge.

Part 2 asked the students whether the use of Kialo motivated them to research or think about the textbook's topics before class. Only 19% chose 'Always', which may indicate that the students did not wish to spend out-of-class time researching. Although, 77% of the students chose options 3 or 4 (i.e., Sometimes and Often), which shows high levels of positive motivation.

Part 3 was a general assessment. 82% felt that using Kialo prepared them better for in-class discussions, while 18% chose the textbook reading. Reasons were given such as the examples below:

- *We can see other answers and expand our perspective using Kialo*
- *Reading textbooks takes time, but Kialo doesn't need long time. So, We can do it in our free time. I think Kialo is efficient.*
- *It is because we can write freely what we thought of the question. It's very good tool to prepare to discussion, and practice to say own opinion. It has more uniqueness than reading textbook.*
- *I can research and get some information about the topic. If I have them, the discussion is going smoothly.*
- *Kialo is interesting but many people write Kialo late. So, I hard to coment three person. I usually write coment at the very limit.*
- *I think Kialo is difficult to use. I couldn't log in or anything to Kialo*

In the comments, many of the students liked the collaborative aspect of online discussions, as they could share ideas and understand each other better. This helped them clarify their own opinions and prepare them when presented with ideas in class. Also, many students found it easy to use, and the use of technology (e.g., smartphone) made it an efficient process for them. From a negative perspective, the less computer literate students were not able to access the website. These students never addressed this issue during the course.

Out of the 100 responses, 92% of the students said that Kialo should be used in future classes, and on a scale of 1-10, all students chose 5 or over as an overall assessment, with 20% giving a perfect score of 10.

Test Scores

The Discussion Test is a skill-based test that has five categories. Each category is scored out of 5, with a total test score of 25 points. Points are gained through the utterance of taught skills, questions, or new content.

The results (Table 1) showed a slight increase in test scores from nine of the groups after four lessons of flipped teaching. This increase varied from 1.2% to 14%, with two classes scoring slightly lower than their previous test. It's important to note that the students were given the test questions prior to both tests, which may have affected the results. This was done for ethical reasons. Also, other factors may have affected the results, such as the students being more familiar with the test structure, the students being more comfortable after completing half of the course, and motivation to improve on their previous scores. The use of a control group (that only uses the traditional methods) was considered but was thought to be ethically questionable in an education setting where all students should be treated equally.

Therefore, while the increase in test scores may be attributed to the flipped approach, I feel the results are inconclusive.

Table 1
Test scores

Group	Traditional Teaching Method	Computer-Assisted Flipped Method	Points Difference	% Difference
1	14.4	17.9	+3.5	+14
2	23.6	24.8	+1.2	+4.8
3	20.2	23.8	+3.6	+14.4
4	19.1	22.6	+3.5	+14
5	22.3	23.5	+1.2	+4.8
6	23.4	23.1	-0.3	-1.2
7	21.8	22.8	+1	+4
8	23.4	24.4	+1	+4
9	21.2	20.6	-0.6	-2.4
10	22.4	22.7	+0.3	+1.2
11	22.5	23.1	+0.6	+2.4
Mean Average	21.3	22.7	+1.4	+5.6

Conclusion

The study provided support to existing research regarding the use of both "blended" and "flipped" learning, allowing students to work at their own pace to prepare ideas and better understand course content before their in-class lessons. With the use of technology, the presentation stage of content can be simulated outside of the classroom, giving students more time to process and understand it and creating more time during the class to be spent on production and reflection. In addition, the use of online discussion forums (or in this case an online discussion website) can aid students in preparing and practicing course content by allowing them to asynchronously research, formulate, and develop ideas that can be later presented face-to-face. As explained by Ellis (2009), this can reduce the learners' cognitive load, allowing them to focus more on form.

The research survey results provided evidence in support of such methods, as most students favored the flipped 'blended' approach to the use of traditional methods. An added benefit was highlighted regarding improved reading and writing skills, which adds plausibility to ideas by Biesenbach-Lucas (2003), who stated that discussion forums help with grammar and vocabulary.

A blended approach to a flipped classroom should be considered by ESL educators, as advancements in technology have made it possible for content to be presented and practised in new and more effective ways. Most importantly, it allows learners to have more control over their learning and facilitates more meaningful knowledge creation through critical thinking at their own pace.

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Appendix

Image 1-4

PowerPoint Slide Examples

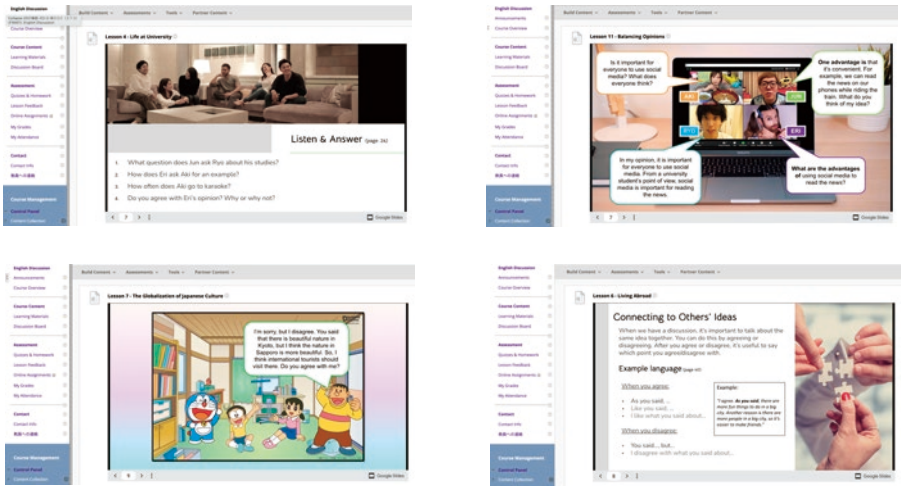


Image 5-6

Kialo Entries

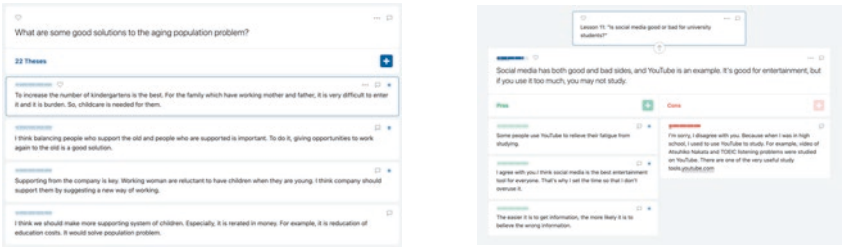


Image 7

Presentation of Kialo Debate



Table 2

Questionnaire Results

Question	Choices	Number of students	Percentage %
1. **Do you think Kialo is an easy-to-use tool?**	Strongly agree Agree Neutral Disagree Strongly Disagree	29 40 21 8 2	29 40 21 8 2
2. **Do you think Kialo helped you prepare ideas for your in-class discussions?**	Strongly agree Agree Neutral Disagree Strongly Disagree	43 43 11 2 1	43 43 11 2 1
3. **Do you think Kialo was a useful tool to practice and improve your critical thinking skills?**	Strongly agree Agree Neutral Disagree Strongly Disagree	29 42 22 7 0	29 42 22 7 0
4. **Do you think Kialo was a useful tool to practice an improve you English writing skills?**	Strongly agree Agree Neutral Disagree Strongly Disagree	36 39 22 0 2	36.4 39.4 22 0 2
5. **Do you think Kialo was a useful tool to practice and improve your English reading skills?**	Strongly agree Agree Neutral Disagree Strongly Disagree	34 39 22 5 0	34 39 22 5 0
6. **Do you think Kialo was a useful tool to practice using Discussion Skills?**	Strongly agree Agree Neutral Disagree Strongly Disagree	35 42 23 0 0	35 42 23 0 0
7. **How often did you use your ideas from the Kialo discussions during n-class discussions?**	Strongly agree Agree Neutral Disagree Strongly Disagree	24 38 29 7 1	24.2 38.4 29.3 7.1 1
8. **How often did you use other class members' ideas from the Kialo discussions during in-class discussions?**	Strongly agree Agree Neutral Disagree Strongly Disagree	18 37 32 10 3	16.3 37.8 32.7 10.2 3.1
9. **Do you think Kialo motivated you to research or think about the textbook's topics before each class?**	Strongly agree Agree Neutral Disagree Strongly Disagree	19 46 31 3 1	19 46 31 3 1
10. **Which Discussion class homework better prepared you for your in-class discussions?**	Using Kialo Completing the textbooj reading	82 18	82 18

Question	Choices	Number of students	Percentage %
11. **Please give reasons for your Question 9 answer.**	Examples from 68 responses: • *Because we can see other people's answers and expand our perspectives using Kialo.* • *Writing my ideas is good for preparing for class.* • *Discussions became smooth after using Kialo.* • *I think Kialo is difficult to use.*		
12. **Do you think Kialo should be used in the Discussion course next year?**	Yes No	92 8	92 8
13. **What is your overall assessment for Kialo as a tool to prepare students for Discussion classes?**	Great Good Neutral Bad Very Bad	32 57 11 0 0	32 57 11 0 0