

Designing a Technology-Enhanced Flipped Learning Model Using Schoology LMS

Zamzami Zainuddin¹, Habiburrahim Habiburrahim², Hardika Dwi Hermawan³

^{1,3} *Information and Technology Studies, Faculty of Education, The University of Hong Kong, Hong Kong*

² *Department of English Language Education, Faculty of Education, Universitas Islam Negeri Ar-Raniry, Indonesia*

Abstract—This study aims to provide a design of the flipped learning instructional model for teaching a Cross-Cultural Understanding course for EFL students. A bottom-up of flipped learning model based on Blooms' taxonomy of cognitive domain has been produced. A Learning Management System (LMS), known as 'Schoology' adopted as a platform to share the recorded video lectures for students' learning before attending class. Three main activities are proposed and recommended for students' learning outside of the class, namely, 'Watching', 'Note-taking', and 'Quiz' (WNQ), while group discussions and peer-evaluation are two mains activities practiced in the class. This study suggests that a bottom-up of flipped learning model based on Blooms' taxonomy is potentially implemented not only for teaching a Cross-Cultural Understanding but also other subjects. Finally, this study recommends that the Ministry of Research, Technology and Higher education or policymakers in Indonesia, including instructors, students, and community members, must be actively involved in developing, supporting, and maintaining a transformed learning culture, from being traditional to a technology-based learning environment.

Keywords—*Flipped classroom, Cross-Cultural Understanding, EFL, Video lectures, Learning Management System, Schoology*

I. INTRODUCTION

Now, more than ever, students spend much of their waking time using some sort of technological tools. As a result, it is possible for them to interact with friends, teachers, and learning contents everywhere, not only in class but also outside of it [1]. Many free learning materials are provided on websites. One study [2] argues that in today's digital age, every student can access many free Internet learning resources such as online video lectures. The students can watch these free online videos everywhere and at their convenience. Development of technology has transformed the style of teaching-learning activities from passive learning to active learning and from a traditional classroom to a modern one [3].

Even more, the use of traditional learning approach which focuses on the teacher as the center of knowledge is irrelevant in today's digital age [4]. Traditional learning tends to make students act passively and finally get tedious while listening to a long lecture. While instructors act more active in delivering the lecture, the students tend to be the opposite of instructors' character, they tend to be passive. The implementation of instructor-centered approach leaves little room for peer interaction, students' motivation, engagement, and self-directed study.

As a solution, traditional classroom activities such as lectures, labs, homework, and exams can be transferred to

videos and students can study everywhere outside of the classroom [5]. This positive impact of technology growth has influenced the development of instructional technology in education and replaced the use of blackboard with online video lectures. The flipped classroom is one of those variants implemented in current teaching and learning practices using technology tools [6].

II. DEFINING FLIPPED LEARNING

The flipped classroom is often defined as an instructional strategy and a part of blended learning instruction, where students attempt to understand and comprehend the instructional contents before attending class by watching video-recorded lectures. In-class activities are subsequently more focused on promoting students' higher-order thinking skills or knowledge construction, such as small group discussion, dialog, presentation, and take-and-give conversation or the so-called Socratic questioning process [7]. The flipped classroom is also defined as synonymous with using the videos and replacing the conventional classroom lectures. In order to preserve the time designing or recording the video lessons, the lecturers may use an alternatives way by adopting a short video lecture from several free websites such as Khan Academy, TED-Ed, BBC News, or YouTube [8].

In the flipped classroom approach, students learn by interacting with the video lectures outside the class and having homework or interactive group discussion in the class [5]. The lecturers provided the video lesson and instruct the students to learn the material from the video they watch outside class hours. This approach is also termed reverse learning where most of the class activities belong to students, the lectures and the students improved the use of class time for real-world activities such as a group discussion and hands-on activities.

III. PROBLEM STATEMENT

In Indonesian higher education institutions, most students are still educated in the environment involving lectures and textbook-centered approaches, which make learning unattractive and result in passive learning activities. Students usually lack the time to interact with other students and instructors in class or outside of class [9], [10]. In order to respond to this issue, the authors believe that the employment of innovative instruction such as flipped classroom approach is relevant and required. According to the New Media Consortium (NMC) Horizon Report published in 2014/ 2015, flipped classroom are considered as emerging pedagogies and technologies in the 21st century

and recommended to be performed in schools and higher education institutions worldwide to support 21st-century learning skills [7]. One study reported that the flipped-class approach has been implemented worldwide in various fields of study (e.g., Algebra, Economics, Public Health, Psychology, Science, Mathematics, and English language courses) and promoted students' innovative and effective learning [11]. However, few studies, if not none, have employed the flipped-class instruction in teaching a course related to a Cross-cultural Understanding, particularly in the Indonesian context. Therefore, in this paper, the researchers endeavor to design the flipped learning model for teaching a Cross Culture Understanding course at a university in Indonesia, with the aims of promoting students' higher-order thinking skills (HOTS) and self-directed learning skills (SDLS). Besides, it is also expected to become a model to be applied in the entire universities in Indonesia.

IV. METHODS

This study aims to design a flipped learning instructional model for teaching a Cross-Cultural Understanding course for EFL (English and a Foreign Language) students at an Indonesian higher education institution, and at the same time to promote higher order thinking skills (HOTS) in students. The current study employs a design-based research (DBR) approach for instructional technology [4]. This research was conducted in several phases, namely planning, designing, formative evaluation, revising, re-designing, and summative evaluation.

A. Instructional design model

In a developmental research paradigm, instructional design models are used to provide a guideline for instructional designers or researcher to organize the process of effective instruction and to enable its implementation in real-world applications [12]. This means that an instructional design model provides structure and meaning to the instructional design problem. Many of these approaches have common instructional design principles and patterns. In order to meet the instructional outcome goals, this study was designed based on Bloom's Revised Taxonomy of the Cognitive Domain model. Educators can benefit from using this taxonomy to ensure that they are not leaving out important items when designing instructions. Bloom's Revised Taxonomy provides six levels of learning (See Figure 1).

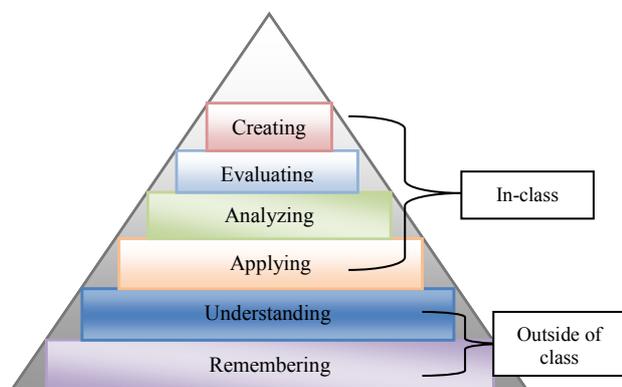


Fig. 1. Bloom's Revised Taxonomy in the flipped classroom

These are in turn organized from the lowest level of cognitive domain (Remembering and Understanding) to the highest level of cognitive domain (Applying, Analyzing, Evaluating and Creating) [13]. In the lowest level, new material is introduced to students outside of class through videos and other supporting materials such as online magazines or news. Meanwhile, at the highest level, students and instructors are responsible for working together during class hours in group discussions and hands-on activities.

B. Data collection

In collecting the data for the first phase (planning), a literature review was conducted to get an idea of the flipped learning concept based on Bloom's Revised Taxonomy. Furthermore, in the initial design phase, a team of experts was involved in a formative evaluation, revision, re-designs, and summative evaluation of the flipped learning model. Two experts from the field of Educational technology were interviewed to obtain ideas, comments, and recommendations for improving the model. The experts were selected based on the following criteria: (a) experienced as an instructional designer; (b) has prior knowledge regarding emerging technologies in education, and (c) has published academic articles regarding the flipped-classroom in reputable journals (i.e., Web of Science index).

C. Settings

The topics of this course refer to issues of cultures worldwide, namely Indonesian culture (i.e., The Social cultures of Bali, Living with the dead in Indonesia, Toraja), Asian culture, American culture, African culture, and Arabic Culture. Technological tools used in this study include Internet access, video lectures adapted from free websites (e.g. YouTube), Learning Management System (LMS) Schoology (<https://www.schoology.com/>), and student learning devices such as a computer, laptop, or smartphone.

LMS Schoology is a Learning Management System (LMS) that allows instructors to interact with students in a way that satisfies both technological needs and curricular elements. This platform is suitable for all student levels, including K-12 and college students, as well as the corporate level. Instructors can post unlimited learning materials, create discussion questions and quizzes, initiate collaborative groups, or introduce boards for assignments that allow for dynamic interaction between students and their instructors. Within Schoology, students are able to access their grades, attendance records, and instructors' feedbacks. Schoology is easy to use because the framework of the website looks similar to Facebook. This LMS provides several material menus such as assignment, quiz, link/external tool, discussion, page, media album, package, import from resources, and finding resources. The LMS also provides plenty of useful features such as an attendance list, updates, grade book, badges, members, analytics, calendar, and event creation.

V. DESIGNING THE FLIPPED-CLASS MODEL

This section provides a design of a flipped learning instructional model in a Cross-Cultural Understanding course, based on Bloom's Taxonomy. In this phase, the authors will briefly explain the steps of implementing flipped classroom instruction starting from preparing and designing the contents for student learning outside of the classroom. In the interview with the experts, Expert 1 mentioned that flipped classroom instruction may include blended learning activities consisting of both in- and out-of-class activities. Students may also learn concepts from video lectures before attending class and supported by other materials such as articles, magazines, or websites. The class activities are subsequently used for student project-based learning or group discussions. Expert 2 recommends that students should learn the content at their own pace outside of class by taking notes of the pre-class contents.

The literature review also suggests that in preparing the video lessons, the instructors may record the video using various software. Meanwhile, in order to save time, the instructors may adapt content from videos posted on free websites such as YouTube, BBC News, VOA News, Khan Academy, TED-Ed, or National Geographic. The videos are then uploaded to a free Learning Management Systems (LMS) or social media for students to watch and learn outside of class hours. In this study, the instructors adopted all videos from some YouTube channels and National Geographic. Based on the literature review and expert recommendations, the researchers summarize eight learning activities for the flipped-class instruction to be followed by students and instructors.

The following steps explain the flipped learning instructional model for the Cross-Cultural Understanding course in an Indonesian university. Learning objects used in this instruction are online videos and websites, and the LMS Schoology was employed as the online learning system. There are eight steps for implementing the instruction to achieve the highest level of cognitive domains or higher-order thinking skills. The steps are classified into out-of-class and in-class activities. See Table 1:

TABLE 1. STEPS OF FLIPPING THE COURSE BASED ON BLOOM'S TAXONOMY

Steps	Out-of-class activities
1	Recording and preparing contents
2	Transferring contents
3	Watching and Note-taking (Remembering domain)
4	Quiz (Understanding domain)
In-class activities	
5	Reviewing of WNQ (Watching, Note-taking and Quiz) (Applying domain)
6	Group discussion, questions, and answers (Analyzing domain)
7	Instructor and peer-evaluation (Evaluating domain)
8	Constructing knowledge, critical thinking, and problem solving (Creating domain)

A. Step 1: Recording and preparing contents

In this step, the instructors may prepare instructional video lectures adopted from YouTube and National Geographic. The videos are first downloaded to the laptop/computer, or their URLs (Uniform Resource Locators) saved for direct sharing with Schoology LMS.

Besides videos, the instructors may also use additional materials from websites to support students' understanding of the topics. Figure 2 presents an example of 5 folders of each topic that has been created on the Schoology.

B. Step 2: Transferring contents

The second step for the instructor is the uploading or transferring of video lessons and URLs onto Schoology LMS. In this phase, the instructor begins to create an account for Schoology and inviting students to access the site using a class code. Then, the students will be able to access the content on Schoology, watch online videos, read articles and view other sources outside of class hours, and according to their preferred times. The following Figures 3 exposes the content that has been transferred onto LMS Schoology including links to video, online discussion, and quiz and Figure 4 shows a pre-class video lecture adopted from YouTube.



Fig. 2. Snapshot of five topics on the Schoology



Fig. 3. Snapshot of content 1 (Indonesian culture) on the Schoology



Living with the dead in Indonesia - BBC News

Fig. 4. Pre-class video lecture: Living with the dead in Toraja, Indonesia

C. Step 3: Watching and Note-taking (WN)

The students are then instructed to log in to Schoology LMS and access the Cross-Cultural Understanding class using the following code: 2TN9J-GPGPG. The students are required to watch the video lectures, read articles, and view other sources (e.g., e-magazines and newspaper) on Schoology before attending class. The instructors firstly explain how to watch the video lessons and read other sources to the students. The instructors also encourage the students to interact with peers on the Schoology discussion board. While watching the videos, the students are required to take notes and pause, stop, re-watch, and fast-forward the videos as needed. This means that the students could watch and repeat the video according to their needs, take notes, and prepare some questions for in-class discussion. The students are also urged to ask critical questions based on the materials they have just learned. This activity will support students to practice their listening and writing skills independently outside of the class.

D. Step 4: Quiz (Q)

In this phase, the instructors provide online self-assessment quizzes for students to do before every class meeting. Resources quizzes could motivate students to watch the videos because of each quiz question related to the pre-class video content. Besides, this can evaluate students' understanding of the contents they have learned. For online quizzes on LMS Schoology, the instructors may design questions with various models such as multiple choice, true/false, essay questions, matching, fill in the blanks, and ordering. The grade will automatically appear personally to students with the automatic grade setting and the instructors will be able to give personal comments and feedback on the students' quiz results.

E. Step 5: Reviewing of WNQ (watching, note-taking, and quiz)

The instructor begins the classroom activities by reviewing the pre-class contents, which they have learned outside of class. The instructor may also provide feedback on correctness for pre-class quizzes. The instructor then groups the students into clusters of 3-4 and asks them to share everything about what they have learned at home.

F. Step 6: Group discussion, questions, and answers

The core of implementing flipped classroom instruction is not only focusing on watching video lectures outside of class; the students are also required to participate in-class activities. The classroom activity is the most crucial activity in the flipped classroom approach, where the students will be able to learn from hands-on activities, inquiry-based learning exercises or give-and-take conversation by sitting in round-chairs/tables.

Before the class, the instructor is recommended to always post an announcement on Schoology regarding what needs to be prepared for the incoming class, for instance, in the third meeting, the instructor posted on Schoology: "Watch the video and view the website! Summarize and take a note of what you have watched and read. In the next class meeting, we will have a small group discussion about this topic." Later, in the in-class activities, the students will be facilitated to discuss the pre-class topic they have learned, with the instructor acting as facilitator. The instructor might also be involved in the student discussion by giving comments or challenging students with critical questions. Socratic questioning activities are emphasized in in-class activities in an attempt to foster students' critical thinking and inquiry by asking questions thoughtful. Besides, this activity will encourage students to practice their English-speaking skills and learn about world cultures.

G. Step 7: Instructor and peer-evaluation

In this phase, the instructor might give immediate feedback on the student discussion through instructor-students evaluation. The students might also evaluate their peers regarding the material or issue (students-students' evaluation) they have learned. The instructor might explain and clarify the concepts that are misunderstood or have led to confusion during the in-class discussion. The instructor might also give students ample opportunities to provide feedback on the activities through peer-feedbacks or assessment. In peer evaluation, the individual reflects upon and evaluates the work of others. The instructor can determine some appropriate types of peer evaluation such as a Likert scale rating, a written/ memo or oral comment. In this phase, the question comes up with "can the learner justify a position or decision?"

H. Step 8: Constructing knowledge, critical thinking, and problem solving (Creating domain)

In the final phase, the students can create a new product, generate a new idea, or create a different thought process, for example, after completing this course, students will be able to publish an article regarding the topic they have learned such as how to respect other culture, or how to live in harmony with diversity. In the summative evaluation phase, two experts mentioned that this model could be possibly further experimented not only in a Cross-Cultural Understanding course but also in any other course subjects and levels. Expert 1 remarked that this initial model can be possibly implemented in a variety of subjects and at any educational level.

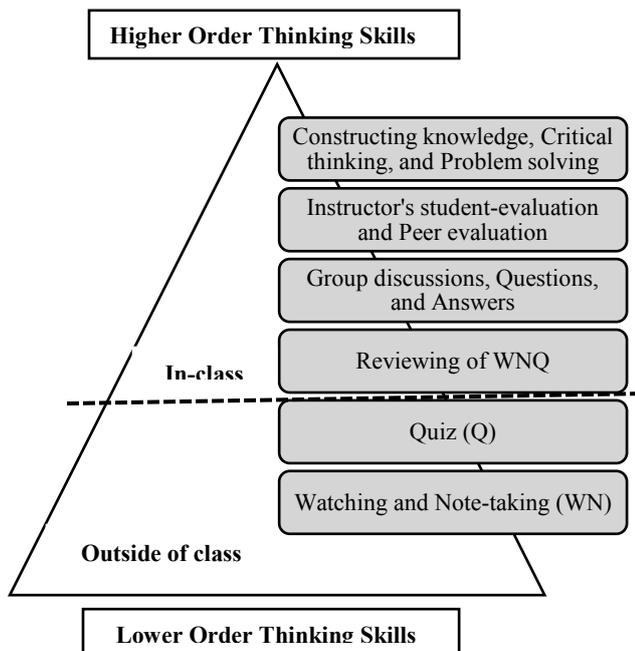


Fig. 5. A bottom-up flipped learning model

The evaluator also believes that this model may help transform a traditional learning environment into a digital learning culture and smart learning environment. Furthermore, Expert 2 declared in the interview that this model is ready to be implemented or experimented on for student learning by modifying the contents or online platform according to student needs or objectives of the study. This modification can be performed by adjusting the environment and culture of student learning or student learning styles.

In the final interview of the summative evaluation phase, the experts mentioned that there is no any single model flipped-class instruction as yet. They, therefore, suggested that the instructors could apply and modify any instruction using different models, media or online platforms according to the objectives of the study and the needs of learners.

The main activity proposed in this learning model is mastering the content outside of the class by viewing a pre-class video lecture, taking a note, and answering a small quiz question. Hands-on activities through Socratic questioning techniques are then conducted in the classroom. Based on all analyzed phases (planning, designing, formative evaluation, revising, re-designing, and summative evaluation), the model for the flipped-class instruction can be generated as depicted in the following Figure 5.

VI. CONCLUDING DISCUSSION AND RECOMMENDATIONS

This study has successfully designed and developed a bottom-up flipped learning model for teaching a Cross-Cultural Understanding course for EFL students. The study recommends that the “Remembering” and “Understanding” levels of the cognitive domain should be practiced outside of the classroom. In the “Remembering” level, students begin learning new content by watching online video lectures on the Schoology LMS. This is the first level of

cognitive learning domain, where the students attempt to become familiarized with the concepts. In the “Understanding” level, students try to understand the basic concepts and principles of the content they have watched and learned. This is a formative assessment, where students are able to summarize the contents they have learned through note taking and producing some critical questions. In other words, watching, summarizing, note-taking, and quiz (WSNQ) are the main activities proposed by the researchers for outside-of-class activities.

For the cognitive area i.e. the “Applying” domain practiced by students during in-class activities, students attempt to recognize and recall the information they have received from the pre-class content. In this level, students talk about what they have watched and asked each other questions in a group discussion. In the “Analyzing” level, students use their critical and creative thinking to solve problems, ask critical questions, respond, comment, and answer problems during the discussions or debates. The instructors may encourage students' critical thinking and inquiry by asking them thoughtful, open-ended questions, and encourage them to ask questions to each other.

In the “Evaluating” level, the instructors provide immediate feedbacks on the student discussions. In this step, the instructors may also ask some critical questions to students in order to confirm the items that they had discussed during that period. The instructors may also post questions on the LMS after the class to evaluate the students' understanding of the concepts they have learned. Besides instructors' evaluation, peer's evaluation also plays crucial roles in evaluating domain. One study mentioned that formative feedback from peers can help individual members fine-tune their contributions and help the group increases its overall effectiveness [14]

Finally, the highest domain in Bloom's Taxonomy is “Creating”, where students are encouraged to produce a product regarding the topic they have learned. In this phase, the instructors may encourage students to produce diverse innovative products to reflect their understanding of the contents they have learned, for instance, a short video, which can be created using Movie Maker or Adobe Premiere software. The video can then be uploaded to YouTube. Other products could be in the form of a story or digital storytelling, songs, Blog posts, Podcasts, advertisements, or essays in newspapers.

The researchers conclude that the main activity in the flipped classroom is Socratic questioning as the heart of critical thinking. In line with this study, flipped instruction brings many benefits for students' higher-order thinking skills. In line with this, several studies have published that the implementation of flipped classroom instruction is more effective than the traditional classroom approaches. One study revealed that students' outcomes in the flipped classroom were significantly better than those learning in conventional classrooms or control classes [15]. Furthermore, students' perceptions of the learning environment were also improved. Formative assessment is also one of the reasons that students could improve their learning achievement in the flipped classroom. One study remarked that through the formative assessment in the

flipped classroom, the instructors could always evaluate students' learning improvement, whereas the students would be able to recognize their progress or lack thereof [14].

Although the advantages of the flipped classroom are clear, the instructors may also encounter some limitations as they implement these methods. In other words, the implementation of the flipped classroom may potentially have its challenges. The previous study reported that implementing the flipped classroom is not as simple as recording a video and asking students to watch it outside of the class [16]. Some students may resist what they perceive as extra work because they must review the content outside of the class or before coming to class. Instructors will also inevitably encounter students who do not wish to engage in active learning, insisting they prefer a traditional lecture format [18].

To address this issue, the instructors are encouraged to inform the class on the first day of the semester about the concept of flipped classroom instruction. Hence, before implementing the flipped classroom, the instructors must be well-trained by experts on how to implement this instruction. This is because the instructors must perform additional work and requires more preparation if they want to implement effective flipped classroom approach [19]. In terms of pre-class video lectures, Enfield in his study stressed that if the content of video lecture is not attractive and fun, the students will easily get tedious to watch it outside of the class [17]. Accordingly, the instructors must prepare an attractive video for students' pre-class learning in the flipped classroom. Furthermore, this study was an initial design model of flipped-class instruction which has not been implemented yet to students' learning. Thus, to fill this limitation, we will implement this model of learning in the further studies and research. Finally, stakeholders, including students, parents, all university staff, and community members, must be actively involved in developing, supporting, and maintaining a transformed learning culture, from being traditional to technology-based learning environment.

VII. REFERENCES

- [1] Ç. Uluyol and S. Şahin, "Elementary school teachers ICT use in the classroom and their motivators for using ICT," *British Journal of Educational Technology*, vol. 47, no. 1, pp. 65–75, 2014.

- [2] T. Richter and M. Mcpherson, "Open educational resources: education for the world?," *Distance Education*, vol. 33, no. 2, pp. 201–219, 2012.
- [3] C. Tan, "From Teacher Talk to Student Talk: Dialogue-Style Teaching," *Learning from Shanghai*, pp. 153–159, Nov. 2012.
- [4] S. Wang and N. Heffernan, "Ethical issues in Computer-Assisted Language Learning: Perceptions of teachers and learners," *British Journal of Educational Technology*, vol. 41, no. 5, pp. 796–813, 2009.
- [5] Z. Zainuddin and C. J. Perera, "Exploring students' competence, autonomy and relatedness in the flipped classroom pedagogical model," *Journal of Further and Higher Education*, pp. 1–12, Jul. 2017.
- [6] Z. Zainuddin and M. Attaran, "Malaysian students' perceptions of flipped classroom: a case study," *Innovations in Education and Teaching International*, vol. 53, no. 6, pp. 660–670, 2015.
- [7] L. Abeysekera and P. Dawson, "Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research," *Higher Education Research & Development*, vol. 34, no. 1, pp. 1–14, 2014.
- [8] "Khan Academy," *The SAGE Encyclopedia of Online Education*.
- [9] A. Collins and R. Halverson, "Technology Supports for Lifelong Learning," *International Encyclopedia of Education*, pp. 184–188, 2010.
- [10] Y. Yulia, "Teaching Challenges In Indonesia: Motivating Students And Teachers' Classroom Language," *Indonesian Journal of Applied Linguistics*, vol. 3, no. 1, p. 1, Jan. 2013.
- [11] Z. Zainuddin and S. H. Halili, "Flipped Classroom Research and Trends from Different Fields of Study," *The International Review of Research in Open and Distributed Learning*, vol. 17, no. 3, 2016.
- [12] A. Herrington, J. Herrington, L. Sparrow, and R. Oliver, "Journal of Mathematics Teacher Education," *Journal of Mathematics Teacher Education*, vol. 1, no. 1, pp. 89–112, 1998.
- [13] D. R. Krathwohl, "A Revision of Blooms Taxonomy: An Overview," *Theory Into Practice*, vol. 41, no. 4, pp. 212–218, 2002.
- [14] M. K. Kim, S. M. Kim, O. Khera, and J. Getman, "The experience of three flipped classrooms in an urban university: an exploration of design principles," *The Internet and Higher Education*, vol. 22, pp. 37–50, 2014.
- [15] P. Baepler, J. Walker, and M. Driessen, "Its not about seat time: Blending, flipping, and efficiency in active learning classrooms," *Computers & Education*, vol. 78, pp. 227–236, 2014.
- [16] S. J. Delozier and M. G. Rhodes, "Flipped Classrooms: a Review of Key Ideas and Recommendations for Practice," *Educational Psychology Review*, vol. 29, no. 1, pp. 141–151, Jun. 2016.
- [17] J. Enfield, "Looking at the Impact of the Flipped Classroom Model of Instruction on Undergraduate Multimedia Students at CSUN," *TechTrends*, vol. 57, no. 6, pp. 14–27, 2013.
- [18] R. Elliott, "Do students like the flipped classroom? An investigation of student reaction to a flipped undergraduate IT course," *2014 IEEE Frontiers in Education Conference (FIE) Proceedings*, 2014.
- [19] Z. Zainuddin, "First-Year College Students' Experiences in the EFL Flipped Classroom: A Case Study in Indonesia," *International Journal of Instruction*, vol. 10, no. 01, pp. 133–150, Mar. 2017.