FLIPPED CLASSROOM: AN INVENTIVE LEARNING APPROACH IN ENGAGING 21ST CENTURY LEARNERS IN DIGITAL AGE

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ABSTRACT

Nowadays, ini digital era, traditional classroom which mostly provide face-to-face lectures in classroom and doing homework at home is not relevant anymore with learners' learning style as "digital natives". Teacher as "digital immigrant" must be able to make some adaptation to learning approach in order that the learners can attend meaningful learning for their daily life and future career. The present paper aims to review of flipped classroom as an inventive learning approach which could accomodate 21st century learners to have better learning engagement through digital technology in instructional practices. The elaboration will include some related sub-topics, namely (1) concept and definition of flipped classroom, (2) theoretical backgroud of flipped classroom, (3) benefits and obstacles of flipped classroom and (4) cycles of flipped classroom implementation.

Keywords: *Flipped Learning, Flipped Classroom, Blended Learning, 21st Century Skills, Digital Age School, Scientific Literacy, Elementary Student.*

INTRODUCTION

The occurrence of various changes in the civilization of human life has an impact on various aspects of life. For example, the industrial revolution has an impact on human creativity in realizing their daily needs and future careers. Humans become very dependent on technology. The education sector is one of the areas affected by technological progress. Today's young generation known as millennials or the digital generation have their own way of getting and processing information. Unquestionably this has become a capital in creating a golden generation for Indonesia's own future.Associated with the field of education, a saying from China that says "if music changes, dance must also change" is felt very relevant. That is, the education sector must be able to adapt to the changes that are happening now in the digital age.

Moreover, changing living conditions, increasing economic pressures, globalization and business life impacts, technological developments and accordingly facilitating the access to information have shown that traditional teaching models are insufficient and led to a situation in which the expectations from education differ. The generation, today, is called "millennial generation" or "digital natives" (Prensky, 2001). It is possible to assert that one of the most leading reasons of the disparity in the ideas and experiences of the digitalimmigrants and digital natives is the modern digital revolution which influences our lives deeply, and the resultant newconditions. Digital revolution is acknowledged as one of the most noteworthy changes, which have a profound impression on humanity, following industrial revolution. That radical change reveals itself in a plenty of fields including particularly the pedagogy, sociology, psychology, economy and culture of societies (Çevikbaş &Argün (2017).

Advanced technology in the 21st century brings about new opportunities and challenges in societies throughout the world. Consequently, learners in this century need to be well-equipped with

the content knowledge and all necessary skills for their lifestyles and future careers (Sakulprasertsri, 2017). It is now a well-worn cliché that the role of the teacher has changed in a significant and positive way: no longer a 'sage onthe stage', the teacher now functions as more of a 'guide on the side'.i This change in function is embedded within the more general shift from what might be termed a 'teacher-centered' model of education to a 'student-centered' model (Morrison, 2014).

Current educational approaches within higher education utilise blended learning; where students may for example, receive a combination of traditional face to face (F2F) instruction in class and are also required to complete activities outside of the class, facilitated through a range of technological resources (O'Flaherty & Philips, 2015). One sort of blended learning that will facilitate 21st century learners as"digital natives" is flipped classroom approach since it helps them to keep digital technology to support students during lesson outside and in the classroom.

This paper aims to elaborate flipped classroom as an resourceful instructional approach to encourage 21st century learners to learning engagement in digital era. The discussion will concern on several subtopics, namely (1) concept and definitions of flipped classroom, (2) theoretical background of flipped classroom, (3) advantages of flipped classroom, (4) challenges of flipped classroom and (5) stages of implementing flipped classroom.

DISCUSSION

What Is Flipped Classroom?

Flipped Classroom has been very popular nowadays and identified by scholars with various terms, such as "flipped learning," "flipped pedagogy," "reversed clasroom," "inverted classroom," "24/7 classroom", (Bergmann and Sams, 2012; Threnkel, 2017, Lage, et al., 2000).Not all of scholars agree that flipped learning is synonymous with flipped classroom. Flipped classroom means any approach where the teacher instructs the students to accomplish practices outside class, everything from reading, watching suplemental videos, or similar; whereas, flipped learning has more extensive scope, (Yarbro, et al., 2014). In general, flipped classroom can be defined as an instructional approach "which is traditionally carried out in-class time now is completed at home, and that which is traditionally carried out as assignment or homework is now executed in class. (Bergmann and Sams, 2012). In other words, homeworks are rearranged and rescheduled to take place during in face to face interaction in the classroom. (Mehring, et al. 2018)

In addition, a flipped or inverted class refers to a pedagogical model combining instructional technology and active learning techniques, (Brook, 2014). Flipped classroom involves pedagogical digital tools to create pre-recorded lectures and in-class activities include student-centered learning activities, (Wolf & Chan, 2016). The micro-lecture made by the teacher which is used in before class activity is a key component to successful flipped classroom practices, (Sweet, 2012).

Flipped Learning Network (2016) provides defenitionof Flipped Classroom as in the following:

"Flipped classroom" means a pedagogical inversion of traditional class: actions that are used in class are now prepared by students previously to classroom. Therefore, when students come into class they already know what ismain topic and more important problems that will be under scope. Classroom is used to debate, to do exercises, to perform experimental protocols, to further discus main implications of scientific issues related with course subject matter."

Mary (2016) claims that flipped classroom is an instructional strategy and a type of blended learning that reverses the traditional learning environment by delivering instructional content, often online, outside of the classroom. It moves activities, including those that may have traditionally been considered homework,into the classroom. In a flipped classroom, students watch online lectures, collaborate in online discussions, or carry outresearch at home and engage in concepts in the classroom with the guidance of a mentor.

(Staker & Horn, 2012). Driscoll cited in Çevikbaş &Argün (2017) defines blended learning as "the learning comes out from the amalgamation of in-class face-to-face (F2F) learning and online learning. Stake and Horn (2012) site flipped classroom as one of rotation model as a part of blended learning. Rotation model refers to an instructional program which combines two kinds of learning modalities—online learning and other controlled learning activities such as small-group or full-class instruction, group project, individual tutoring and pencil-and paper assignment. In this kind of course, learners revolve on a rigid timetable or at teachers' responsibility. The position of flipped learning as a type of blended learning can be viewed in the figure 1:
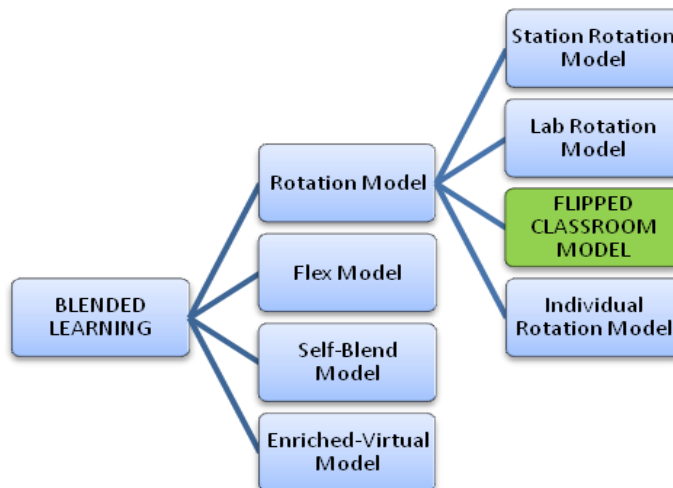

Figure 1. Flipped Classroom Model as a Blended Learning Model

As it is presented in figure 1, flipped classroom model means a part of rotation model in which assigned course alternated on a fixed schedule between face-to-face teacher-guided activity (or projects) on online tranfering of content and instruction of the same subject from a distant place (often home) after school. The essential mode of content and instruction is online, which differentiates a flipped classroom from students who are simply doing assignment online at night. Flipped-Classroom model accords with the idea that blended learning includes some element of student control over time, place, path, and/or pace because the model allows students to choose the location where they receive content and instruction online and to control the pace at which they move through the online elements.

Classroom time in flipped classroom primarily spent engaged in active learning experiences that stimulate higher-order thinking, as well as a broad array of other learning objectives and goals. Classroom activities include, but are not limited to, group work, peer instruction, discussions, and mastery quizzes. Therefore, with flipped learning, class time is not traded for online delivery. Rather, class time is preserved and transformed into active, student-centered learning. This means that, for students and for faculty, time spent preparing for and participating in the class may be greater than time spent in traditional and hybrid courses. Flipped learning is not a shortcut for either the faculty or the student, (Roehling, 2018). Hamdan et. al. (2013) states that instruction can be delivered by recording narrated screencasts of work electronically, by creating videos of teachers giving lessons or by gathering video lessons from trusted internet sites.The flipped classroom can take many forms. In short, the core idea in all flipped classroom models is the use of teacher-created videos and interactive lessons so that instruction that used to occur in class is now accessed at home, in advance of class (Marks, 2015).

According to Basal (2015) teachers can record videos, add interactive elements, and share previously recorded segments from other teachers. Students should watch these videos before coming the classroom so that they can be active in the classroom activities. With Internet access becoming more ubiquitous, sources of language teachers to reach more videos for using in their language teaching classes have been on the increase. Therefore, the videos embrace a "bring the world to the

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classroom" approach and are more engaging, motivating, and attractive to students. (Bergmann and Sams, 2012) notify thatthe flipped classroom is explained as the establishment of problem-based learning inside the class by replacing direct instruction with video lessons in order to provide instructional content that can be accessed by students whenever and wherever it is required.

In flipped classrooms students watch lesson videos at any computer, from their tablets, smart phones or from different media players at any time as they want. They bring their homework to the classroom and participate actively to learning process. Flipped classroom approach does not eliminate the education in the class directly. On the contrary, this approach maximizes the time spend for each student instead of spending time for all students at once (Hamdan et al., 2013).

To make clear concept of flipped classroom, figure 2 displays the comparison between traditional and flipped classroom, as follows:
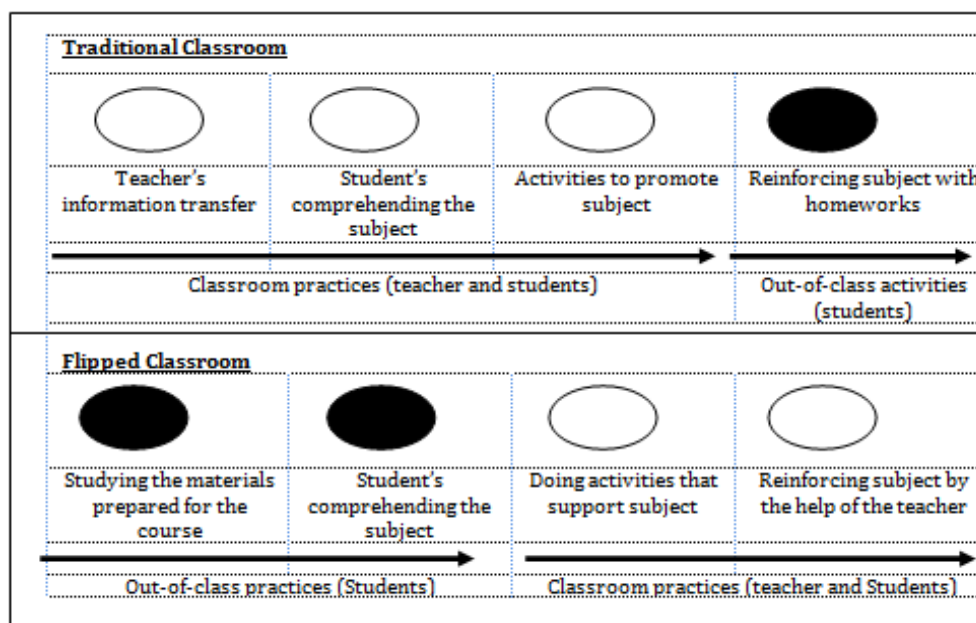

Figure 2. Comparison of Traditional Classroom Modoel and Flipped Classroom Model
(Moravet *et al*., 2010, cited in Hamdan *et al*, 2013)

As it is shown in the figure 2, we see that the places of classroom practices are changed out-of-class practices in flipped classroom model. In flipped classroom model, educator is no longer a direct person to educate, use different technologies and provide flexible learning to students one by one or as a group. Teacher discusses the subjects that are not understood well by the students and reinforce the subject with different activities (Hamdan *et al*., 2013). A key component to successful blended or flipped classroom practices has been the micro-lecture", which means activity before class is as vital as the in-class activity (Sweet, 2012). If an educator implements micro-lecture for his or her class prior to coming to class, the in-class activities can be varied by guiding students in groups or individually, answering questions, mastery learning or giving remediation depending on the students' progress in the topic, (Bergmann and Sams, 2012).

Theoretical Background of Flipped Classroom

According to Baker (2000), the Flipped Classroom approach then gives priority to students where all students are engaged in their learning and the teacher becomes the "guide on the side" and not the "sage on the stage" because people learn effectively when they construct their own learning, rather than being told about it. The educator moves off the stage and becomes the Guide on the Side, (Hatherly, 2014). The "the sage-on-the-stage" characterization of the teacher's role is synonymous with a teacher-centered approach to education, in which the standard lecture is considered to be the

principal mode of delivery. Delivery is in a very real sense precisely what most lectures serve to do: deliver content from the one who knows to those who do not know. In this traditional classroom, the students are perceived as a passive note-taker, a receiver of content, an accumulator of factoid. Consequently, this obvious passivity on the part of students is one of the recognized problems with the "sage on the stage/lecture format (Morrison, 2014).

The "guide on the side" associates to the role of students in flipped classroom—learner-centered. Learner-centered refers to focusing attention on student learning: what the student is learning, how the the student is learning, the conditions under which the student is learning, whether the student is retaining and applying the learning, and how current learning positions the student for future learning. Learner-centered teaching shifts the responsibility for learning to the students and away from the teacher—when instruction is learner-centered the focus is on what students, not teachers, are doing. Because the instructional action now features students, this learner-centered orientation accepts, cultivates, and builds on the ultimate responsibility students have for learning, (Saunier, 2008).

Flipped Classroom and 21st Century Skills

According to P21 or The Partnership for 21st Century Learning (2015), the collaborative partnerships among education, business, community, and government leaders in the United State of America to emphasize the importance of 21st century skills for all learners regarding the constant change throughout the world, they recognize there are three main skills that 21st century learners must have namely information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills in order to be ready for the challenges in the 21st century and beyond.

Under the three main skills sets as mentioned above, each contains sub-categories in order to assist educators and teachers in designing lessons and learning activities in their classrooms. First, on information and communication skills, learners are expected to develop information, media literacy and communication skills. Second, regarding thinking and problem-solving skills, learners are supposed to be able to think critically and systematically, identify problems and solutions, be creative, and have intellectual curiosity. Lastly, with regard to interpersonal and self-directional skills, learners are expected to develop their interpersonal and collaborative skills, self-direction, accountability and adaptability, and social responsibility.

One possible way to help 21st century learners to develop 21st century skills suggested by the partnership for 21st century learning (2011) is to use 21st century tools. It is undeniable that information and communication technology or ICT such as computers, social networking, audio, video, media and multimedia and other technologies play an important role in 21st century learning context. These 21st century tools are enablers for learners to perform what they have gained from the classroom more effectively. By using these tools, the traditional classroom will be transformed from where teachers are the center of the classroom to the 21st century classroom where learners are the most important part.

Hence, the flipped learning approach has stood out as an alternative pedagogical and practical approach that has been recently introduced in teaching not only core subjects like Mathematics and Sciences, but also English language across the globe to help learners develop 21st century skills. For instance, learners gain content knowledge and develop their information, media literacy, and self-directional skills via the use of technology outside classroom. On the one hand, the learners develop interpersonal and collaborative skills with their peers through the tasks inside classroom (Baker, 2013; Bergmann &Sams, 2012; Cockrum, 2014). In addition, it has been proven that learners engage more in the lessons and become more active learners after participating and experiencing flipped instruction (Sakulprasertsri, 2017)

Classroom and Higher-Order Thinking Skills (Hots)

In the flipped classroom model, students are required to use their new factual knowledge in class where they have access to immediate feedback from peers as well as the instructor. Immediate feedback is invaluable in correcting misconceptions and providing scaffolding for students to think about their developing understandings of the concept. Bransford *et al*. (2000) argues in effective flipped classroom models is a "metacognitive" approach to instruction where students define learning goals and monitor their own progress in meeting these goals. "A 'metacognitive' approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them". Although students' thinking about their own learning is not an inherent part of the flipped classroom, the higher cognitive functions associated with class activities, accompanied by the ongoing peer/instructor interaction that typically accompanies them, can readily lead to the metacognition associated with deep learning. The idea of "thinking about their learning" is developed when students engage in higher-level thinking activities accompanied by meaningful peer/instructor interactions.

Flipped classroom has two significant phases. First is out of the class which is independent studies carried out online stage; whereas second stage is in-class activities—inquiry-based activities. In this case, out of class activities are used as basis for in-class activities (Çevikbaş &Argün, 2017). Cognitive tasks play a crucial role in learning within the framework of flipped classroom model practices and applications. The most recent cognitive domain taxonomy is very beneficial to have an insight about the flipped classroom model practices. Generally, low level cognitive tasks (remember, understanding) are executed as out of class flipped classroom activitieswhile higher-level (application, analysis, evaluation, creation) cognitive activities are performed in classroom setting. Therefore, the flipped classroom activities starting out of class and continuing in class carried out in confirmity with the revides levels of Bloom's taxonomy of cognitive domain level (Brame, 2013).

The position of in-class and out-of-class flipped classroom applications among Bloom's revised cognitive domain levels can be viewed in Figure 3
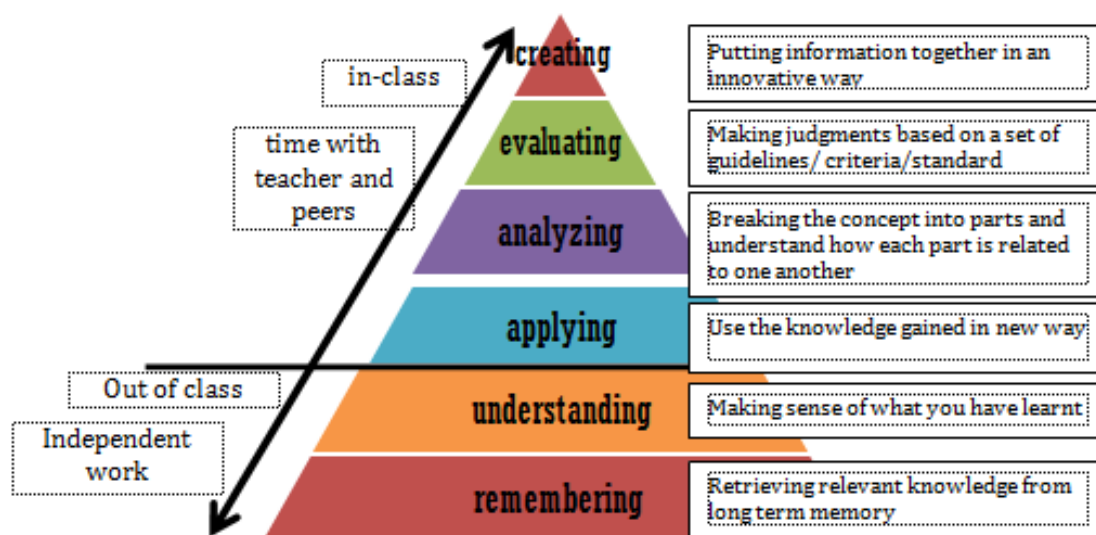

Figure 3. Flipped Classroom and Cognitive Domain of Revised Bloom's Taxonomy

The flipped classroom is an approach to organize the learning process and the learning content, (Kvashnina & Martynko, 2016). If we consider Bloom's revised taxonomy, first learners work independentlyto watch digital media like recorded video lecture or talkcreated by the teacher in order to the learners comprehend basic level of knowledge with the lower levels of cognitive work (recalling relevant background knowledge, gain new knowledge and check its comperehension via quizzes or

tests) before entering the class and take the students' learning responsibility. The learning development process of the student continues intensely within the classroom. Students are able to interact with their peers and teachers and deepen this social interaction that they initiated. In addition, the students are involved in active learning activities in the context of real life through engaging in the cooperative works performed in the class. In this sense, they learn how to share the learning responsibility. The implementation stage of in-class activities require higher order level of thinking abilities (Çevikbaş &Argün, 2017).

The Pillars of Flipped Learning

Flipped Classroom model has four pillar which is known as acronym FLIP—Flexibel Environment, Learning Culture, Intentional Content and Professional Educator, (Hamdan *et al*. 2013; Subramaniam. & Muniandy, 2016; Sakulprasertsri, 2017; Roehling, 2018;) which will be explained item by item as follows:

Flexibel Environment refers to learning modes being introduced in the classroom. The physical classroom space must accommodate different types of classroom experiences and assignments. Student assessment must also be flexible to reflect the more active types of learning that occur during the flipped class period. The learning environment in a flipped classroom is characterized by a variety of learning modes being introduced in the classroom including group work, independent study, research, performance and project work that optimize learners' learning capacity. By participating in different learning environments, learners themselves have flexibility to choose when and where to learn which can gradually and constantly increase their autonomy level.

Learning Culture refers to a switch of role of teacher in learning from teacher-centered model to students-centered active learning model since we entered 21st century. Learners in flipped classrooms mustparticipate in constructing meaning and applying the concepts covered in the course, receive a great learning opportunity and explore the topics in greater depth. They can also pace and evaluate their own learning. Meanwhile, the teachers can emphasize the use of classroom interactions to ensure their comprehension of each learning topic to explore content of the topic in greater extent and creating a richer learning environment.

Intentional Content refers to the responsibility of teachers to design intentionally the flipped learning experience. The teachers need to consider carefully approppriate material which to be learnt by learners outside classroom on their own pace and the activities that the learners will engage in during class time. These decisions must be designed to facilitate higher-order thinking and promote course goals. Therefore, the content chosen by the teachers is specific content to maximize classroom time, allowing learners to experience various methods of instruction such as active learning, peer-instruction, inquiry-based learning, project-based learning or problem-based learning depending on the subject matters and grade level of the learners.

Professional educators means the criteria that must be owned by the teachers in flipped classroom. They must be experienced, skilled, and wise enough to convert a lecture-based class into an activity-based class which requires more planning and creativity. Professional teachers are required more than ever. The teacher are essentially responsible to create and orchestrate classroom experiences in flipped learning. They have to decide whether when and how to shift away from direct instruction towards individually directed learning. They also have to decide how to provide the interaction between learners or even teachers and learners. In this way, face-to-face sessions between teacher and students can be maximized. In addition, the teachers in flipped classroom usually reflect on their teaching and share with others in order to improve their instruction as well as to gain mutual understanding of the particular concept taught in the flipped classroom.

The four pillar of flipped classroom approach can be seen in Figure 4, as follows.
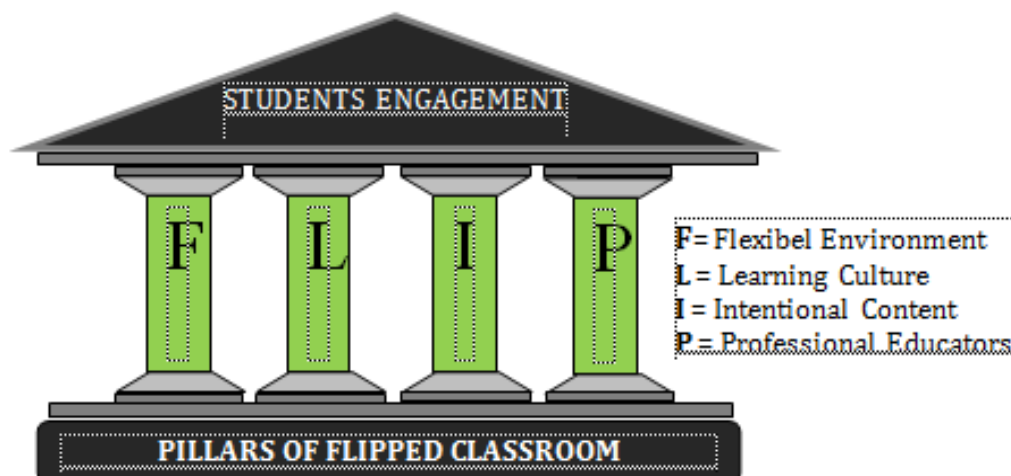
Figure 4. Pillars of Flipped Classroom (Yarbro *et al.*, 2014)

Taylor & Statler cited in Çevikbaş &Argün (2017) states thatthere is a connection between student engagement and learning. Throughout flipped classroom activities, students are able to get involved actively in the problem-solving process and assess their own learning, interact more with their peers, cooperate and identify their learning obstacles, develop their crtitical thinking skills repeated discussion activities, and to start creating more connections between existing knowledge and new knowledge. Consequently, as it can be clearly seen in Figure 5 flipped classroom model raises the degree of participation of students significantly and thus it is possible to realize active and meaningful learning.
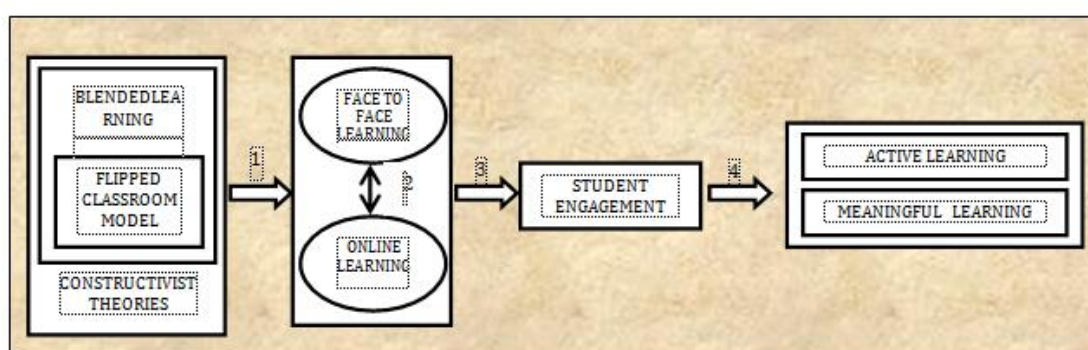

Figure 5. Theoretical Framework of Flipped Classroom Model Adapted from Reeve cited in Çevikbaş &Argün (2017)

In Figure 5, the four basic features which are highlithed in the theoretical framework in flipped classroom model is elaborated one by one as follows
1. Flipped classroom model is a type of blended learning and supported by constructivist theories, includes both online and face-to-face learning
2. Instruction is carried out of the school setting through uploading videos into online platforms. In this respect, more time is gained to implement more effective teaching in the class. In other words, online learning offers opportunities to increase the quality of face-to face learning
3. In flipped classroom model practices both online and face-to-face learning environments are utilized and a rich learning environment is created. Thus, the level of students' engagement increases.
4. Flipped classroom model develops 21ˢᵗ century skills, lift the boundaries of the class, and ensures that learning activities are assessed in real life context. The results in active and meaningful learning.

Why should Flipped Classroom?

Concerning to learning principles, flipped classroom applies both constructivist (in-class) and behaviourist (ouside the class) learning. The students figure out initial accredited content that is required in behaviorist learning theory. In the classroom, the students will use the previous knowledge and take their own responsibility for their own learning. This will change teacher's role from "sage on the stage" into "guide on the side." (Mary, 2016). Consequently, flipped classroom can be promoted as constructive learning approach. It is very advantageous for both students and teachers with enhanced learning engagement inside and outside the classroom. Each benefit will be given in detail in the following.

Firstly, flipped classroom is one step toward a more customized learning environment since it can eradicate ineffectiveness of face-to-face lesson and support teachers using technology so that the learners have more preparation before attending the class. Besides, it is more preferred by the students to the traditional lectures (Lage *et al.*, 2000) because the teacher has chance to spend more time on classroom activities (Yildirim & Kiray, 2016) not to deliver information but to help learners (Bergmann and Sams (2012).

Secondly, for before-class activities of flipped classroom, it permits students to access content 24/7 allowing them to learn new knowledge on their own time (Mary, 2016). In other words, the students can learn at own pace (Marks, 2015). Comprehending the content is under the control of the students—watch, reward and fast-forward the video as necessary, so that the course can be viewed more than once (Pinelli & Firoucci, 2015). All the students do not have the same level of capability and skills. Some students understand the content quickly while some may take a bit longer to understand the same content. The students who learn the subject faster can fast-forward the content while others who need more time can reverse or pause if needed. Moreover, if a student, for one important reason, cannot attend the class, he/she will easily grasp the course content from the videos since the course contents are provided to students prior to class and they go through them in advance at home (Neupane, 2017). Consequently, the students will be more prepared.

Thirdly, in flipped classroom, the time of in-class activities will be spent to engage the students to come to deeper learning. The students will be involved in implementing the content they learned through digital material obtained outside the classroom (Mary, 2016). Moreover, flipped classroom enables students to participate actively in the class to provide fruitfulness of interaction in the learning process Çevikbaş &Argün 2017). The students are obliged to be more active to voice out their opinion and share knowledge through collaborative and cooperative tasks with their peers in teacher's guidance. Flipped classroom approach will increase interaction both student-student and student-teacher interaction (Pinelli & Firoucci, 2015; Çevikbaş &Argün2017). Therefore, healthy communication network between students and teacher can be built up (Lage *at al*., 2000).

Fourthly, flipped classroom approach can promotes some softskills needed by 21st century's learners. Outside class activities in flipped classroom focusses on comprehending learning content based on students' time and pace. At the same time, it promotestudents' self-efficacy in their ability to learn independently (Enfield, 2013). In-class activities of flipped classroom approach emphasizes to encourage students to implement the previous knowledge acquired from outside classroom activities into deeper and morecontextual learning through colaborative and cooperative activities, such as discussion, debate, peer-work and other group projects. Simultaneously, those activities can encourage social interactions, team-based skills and cultural diversity among students. Besides, flipped classroom allows students to working with peers on the project during school hours to enhance students' mutual understanding and trust (Du, Fu & Wang, 2014). The participation of the students in the classroom activities develops cooperative skills that are positioned among 21st century skills (Hamdan *et al.*, 2013).

Next, according to Bretzmann (2013) flipped classroom promotes students' higher order thinking skills by making learning more student-centered. Moreover, flipped classroom

applicationinvolves metacognitive activities to increase students' performance and academic achievement since students internalize concepts, gain critical thinking skills and controll their development in terms of learning outcomes (Hamdan *et al.*, 2013). Therefore , the students become in charge for both individual and group learning processes within the framework of flipped classroom implementation (Baker, 2000; Bergmann & Sams, 2012).

Finally, teachers, like students, play an active role in applying flipped classroom approach and keenly provide support and assistance to their students. They also restore themselves by revealing students' learning tasks. In this sense, flipped classroom approach supplies positively teachers' professional development (Alvarez as cited in Çevikbaş & Argün2017).

Challenges of Flipped Classroom

Besides the benefits of flipped classroom, it also includes some obstacles for both the students and teacher when implementing flipped classroom approach. Each of them will be explained one by one in the following.

Firstly, flipped learning can be dynamic and flexible. However, if not implemented correctly, it can increase student workload and frustration without adding value to a student's education, so that the tremendous time commitment needed to convert a class into a flipped learning experience (Roehling, 2018). Among many obstacles of flipped classroom, the activities are prominently critized are preparing lesson video, and visual and written material because theyare challenging and time consuming tasks (Hamdan *et al.*, 2013). However, those challenges will occur only for the first time offering the course since the video and documents prepared used at the previous year with necessary modification can be used again in the next year (Çevikbaş & Argün 2017). In other words, teachers can expect the time invested in creating materials for the flipped classroom to be reduced after the first implementation, because reuse and adaptation will mitigate time investment in future classes.

Next, the problem faced by the teachers come from necessary skill that should be owned by the teachers to make video. In order to make those videos teachers are required to have certain skills. If teachers are unable to make videos themselves it would be difficult to maintain the flipped classroom. If other people are asked to make the videos it might be expensive (Neupane, 2017). However, this problem can be solved by collaborating with other teachers who has necessary skills to make the video. This sort of problem is not unique from flipped classroom approach, actually all innovative approaches will face the same sort of difficulties.

Thirdly, another potential drawbacks to flipped classroom implementation are limited access to internet connection and appropriate technology both from technical and economical perspectives (Roach, 2014; Tucker, 2012). Inequities in students' home lives can also cause a barrier for the flipped model. Technology needed for viewing or interacting with lecture material may not be available in every student's home (Nielsen, 2012). To face this problem, the teachers should use the compatible application to many devices such computers, tablet PCs, smartphones, etc. Nevertheless, this is not a big problem since almost everyone has smartphone including children nowadays Çevikbaş & Argün 2017) since 21st century learner can regarded as "digital native."

Finally, the most difficult and challenging problem in applying flipped classroom is students' mind set of learning theories and approaches. They are more comfortable with their passive role in learning process because they are familiar with the traditonal classroom. The students perceive constructivist approaches will be wasting time.

How to Implement Flipped Classroom?

Before implementing flipped classroom approach, teachers need to be aware of some principles of designing flipped classroom. The first key element that ensures the success of the flipped classroom is the development of a well organized teaching plan, which specifies the activities that will be carried out, as well as the resources and contents that will be consulted (Flores & Silva, 2016). According to

Kim *et al.* (2014) and Miller as cited in Yildirim & Kiray (2016), there are some principles should be considered by the teachers when they want to apply flipped classroom as follows.

Firstly, the course content should be meaningful. The teacher should set up course content that will be used in the flipped classroom by considering relevancy of the content with students' need. In this sense, content should be creative, increase students' involvement in learning and significantly relevant with students' need in real life context.

Secondly, technology is important part in the application of flipped classroom. Teachers need to consider which technology will be more effective for students' learning process such as media could be used to play the video, the quality and the size of video. Teachers should select technology which is approppriate with students' condition and situation. In other words, the teachers should provide the use of technologies that can be easily accessed by students.

Thirdly, students' flexibility to arrange time and place to watch lesson video becomes main consideration in flipped classroom. Teachers should provide an approppriate time and place if the students want to access the course content to gain preliminary information before class activities. Therefore, teachers should encourage them to watch video lecture by designing meaningful pre-class activities.

Fourthly, teachers' preferences in using strategy to apply knowledge in-class activities should facilitate the students acquire content into experience contextually. Student-centered approach with constructivist and behaviorist learning models, like project-based learning, inquiry-based learning, group interactive model and project-based learning will be beneficial.

Finally, teachers should have expectation for each video prepared for students. Teacher should expect students be aware of the things they learned, transfer and adapt their knowledge in the scope of the video they watched. If reflection is not a planned fact within the scope of general structure, it will be a wrong attitude to expect flipped classroom be successful. It is important to improve the high-level skills of students and make them deal with contents and activities that can be reflected towards goal of courses.

After considering some principles of designing flipped classroom approach, then teachers can organize some stages or steps should be followed by the teachers when they want to implement flipped classroom. Flores & Silva (2016) state the collaborative work in and outside the classroom is a key element on the implementation of the flipped classroom. Gunyou (nd) and Kvashnina & Martynko (2016) propose some stages in applying flipped classroom. Each stage with modification will be elaborated one by one as follows.

First is **video lesson**. Students study the material from *short video lesson* which is about 8-10 minutes long. The lessons are not taped lectures, but rather include multimedia content designed to acquaint students with specific *kernel of information*. To ensure whether students comprehend the contents, teachers should provide two or more questions to make the students more prepared before attending the class. Ideally, more challenging, open-ended question and spreadsheet calculations would allow students to more fully demonstrate incremental mastery.The students must answers all questions correctlyand send them to link provided by the teacher.

Second is **in-class short oral quiz**. In-class. teacher checks students' overall comprehension by a *short oral quiz* (e.g. by demonstrating any material and asking students to identify its main properties). There can also be a teacher-led discussion of the supplementary resources that the student have studied prior to the class.

Third is **active learning session**. Classroom activities are mostly bestowed to encourage students to apply knowledge into experience contextually. Students get to apply their knowledge from all the previous stages and demonstrate what they have learned individually or via collaborative group work. Therefore, discussion, creative projects or presentations are encouraged to extend learners' knowledge beyond the lesson which can be related to their everyday lives. For example, students are

organized into small groups and are given a case study task with the teacher's instruction (e.g. they come up against a problem selecting a material for a purpose which is specified). Students discuss their solutions in the groups, then, present their feedback to the class.

Four is **follow-up task**. The teacher asks the students to review their peers' work according to the assessment criteria outlined by the teacher. Based on the result of peer's review, the students must create new proposal individually or in small team in innovative way. In this stage, the students must perform higher level cognitive task with deeper analysis.

Finally, **mastery and competency**are confirmed with individual and small team graded exercises and exams. Regarding the assessment process, teacher aims to develop a type of continuous assessment throughout the academic year. The goal is to achieve a type of assessment that advances in juxtaposition with the learning process, which raises relevant questions among students while also encouraging them to learn from their mistakes. Type of assessment must be as follows:

- Integral, i.e. that encompasses the work carried out both in and outside the classroom.
- Responsible, i.e. that lets the students carry out part of the assessed activities outside the classroom without the direct guidance of the professor.
- Thoughtful, i.e. that analyzes and synthesizes the information.
- Shared, i.e. that includes co-assessed activities among students, which promote a cooperative and co-responsible learning.
- Competence-related, i.e. that includes theoretical and practical activities that do not rely on the student's memory, but rather on his/her practical problem-solving skills.

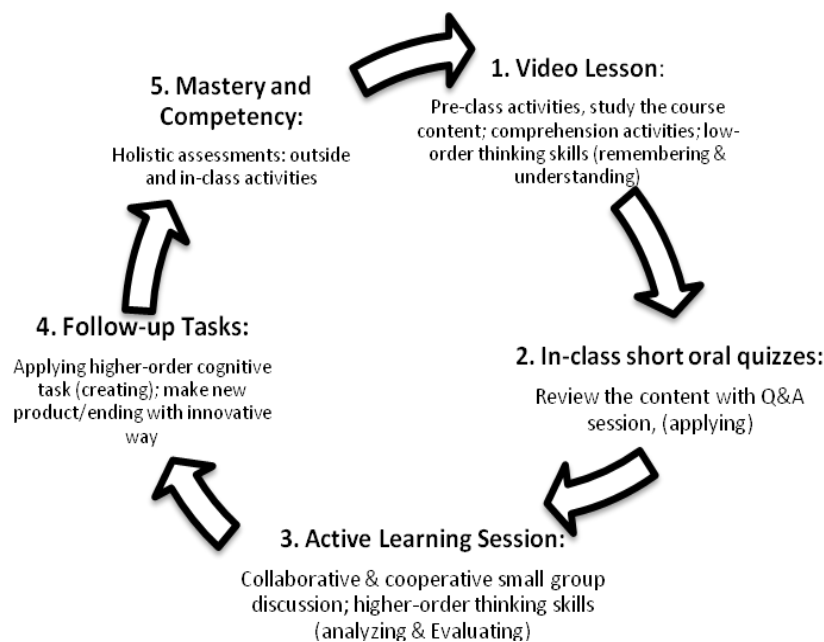The cycle of flipped classroom implementation can be drwan in the Figure 6 as follows

Figure 6. Cycle of Flipped Classroom Approach Implementation with modification

CONCLUSION

Flipped classroom is an instructional approach that reverses the learning process in traditional classrooms—what is done outside the classroom is now done in the classroom. Students are asked to master course content outside the classroom through watching digital videos that have been designed by the teacher based on students' need. Therefore, students can master the content according to students' learning style, time available, and pace. Besides, the teacher should considers type of technology used in accordance with students' abilities and capabilities. When learning material is difficult, the video can be played repeatedly. Whereas, if the material is understood easily, it can immediately speed up the video by pressing the fast-forward button. In this way, students will be better prepared to take part in the learning phase in the classroom, which of course uses more challenging learning activities. Face-to-face interaction in class is used more effectively to guide students to apply the knowledge they have mastered before entering the class. Learning activities in the classroom are designed to master higher cognitive levels, namely applying, analyzing, evaluating and creating. These are the advantages of flipped classroom. Implementing a flipped classroom approach is not without constraints. One of them is the availability of an internet connection in students' houses. However, we can be sure all students and even children as millennial generation known as "digital natives" already have smartphones. This can be used as capital to apply a flipped classroom. Actually, the biggest obstacle is changing the mind-set of students, they feel comfortable with their passive role in traditional classrooms. The sequence of flipped classroom implementation are: video lesson, oral quizzes, active learning session, follow up tasks and mastery and competency.

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