The Urgency and Challenges of Flipped Classroom as A Learning Mode in The Digital Era in Indonesia

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Abstract. The development of information and communication technology (ICT) demands progressive changes in the world of education in Indonesia, one of which is a change in learning modes. This research aims to reveal the importance of implementing flipped classrooms in Indonesian schools as a learning model in the digital era. This research is a literature study from various sources, both print and electronic sources or cyberspace. The results of the study found that: (1) ICT progress can be utilized in the learning process at school; (2) The concept of "flipped classroom" is found in another term, namely "flipped learning"; (3) flipped classroom is a choice of hybrid learning modes; (4) flipped classroom has been used in Indonesia in several lessons in schools; (5) the big challenge of implementing flipped classrooms in Indonesia is the readiness of educators and students to utilize ICT as learning resources and media. The conclusion is that the flipped classroom is important to implement in the digital era, but it needs the support of adequate educational facilities, the readiness of educators and students. Suggestions from the results of this study, namely: (1) educators need to understand the concepts and procedures for implementing flipped classrooms more deeply; (2) the effectiveness of flipped classroom implementation needs to be done through further research in Indonesia.

Keywords: urgency, challenge, flipped classroom, learning mode, digital era

INTRODUCTION

The era of the industrial revolution 4.0 (ERI 4.0) was marked by the rapid development of information and communication technology (ICT). ERI 4.0 is often called the era of the digital revolution. Where, ERI 4.0 is characterized by a much more ubiquitous mobile internet, by smaller and more powerful sensors that are becoming cheaper, and by artificial intelligence and machine learning [1]. A new breakthrough in ERI 4.0 internet technology called "internet of things (IoT)". IoT is described as the relationship between things (products, services, places, etc.) and people made possible by technology connected across multiple platforms.

The development of the digital world, especially IoT will have an impact on the implementation of education in schools. A positive impact on the world of education can provide greater benefits, both for teachers and students [2]. Teachers can make learning activities easier with students, as well as to make work tools and assignments, everything becomes limitless and limitless due to internet and digital developments in the 4.0 era [3]. The digital era brings students to various facilities in learning [4]. According to Pacansky-Brock (2013), emerging technologies can support learning outcomes, increase student engagement, and prepare them to become successful learners in this digital era [5].

In the digital era, the teacher as an educator not only acts as a figure who only provides knowledge but also trains skills that are useful for students in the learning process [6]–[8]. Whitby (2007) states that students are seen as having skills that can be useful in dealing with existing challenges, namely critical and creative thinking skills, communication skills, skills in finding solutions to a problem, and skills for collaborating [9]. The learning mindset is no longer about the process of direct interaction between students and teachers, but has shifted to a

single process of finding out from all sources. New styles and ways to learn in this digital era are the impact of the availability of science and technology products and emerging global trends. Students in this era are self-taught users who rely heavily on technology in carrying out their daily learning activities [4].

In line with the development of ICT, many models, sources and learning media for digital-based innovation have been developed. One model that is currently being implemented in schools is the Flipped classroom. This flipped classroom is a learning approach that can be chosen in the digital era. Where, the concept of flipped class is that what is usually done in class is now done at home, and what is usually done as homework is now completed in class [10].

In Indonesia, subject teachers in schools are used to giving additional assignments in the form of homework (PR). Homework is a learning activity carried out by the school outside the school hours specified. By being given homework which is an additional study hour, it is hoped that children will be motivated to excel and master the subject matter outlined in the curriculum [11], [12]. In essence, homework for students has a good purpose, that the purposes of homework serve three main functions instructional, communicative, and political. In instructional function, homework is a natural extension of the curricular program because it is an integral component of instruction. It can also serve as a vital link between the school and family [13]. However, the effectiveness of homework is seen as less successful, and is even considered a burden for students [14].

Why homework is considered a burden for student learning. This is because the homework given by the teacher only repeats the learning that has been done at school in the form of working on questions. In addition, traditional learning patterns can be understood as learning patterns where the teacher gives a lot of lectures while students listen, take notes and memorize more [15]. Therefore, teachers need to change the form of homework by applying the Flipped Classroom model [8], [10], [15]–[21].

METHOD

This research is a literature study in examining the urgency and challenges of the flipped classroom as learning capital in the digital era [2]. The literature used is sourced online, both books and journal articles. All the literature obtained was analyzed by reading and taking notes, as well as managing in obtaining the truth of the flipped classroom aspect which included: concepts, principles, and practical implementation methods. The results of the literature study concluded according to the findings based on the objectives of this study [22], [23].

RESULTS AND DISCUSSION

Flipped Classroom Concepts and Principles

Flipped classroom was born from the experiences of two education figures in Colorado, Jonathan Bergmann and Aaron Sams. Both are science teachers at a Colorado high school. Basically the concept of flipped class is that what is usually done in class is now done at home, and what is usually done as homework is now completed in class [10].

In accordance with the passage of time, Flipped classrooms have spread to several schools and even to universities, both in the United States and outside the United States, Canada, Europe. In addition to the term "Flipped Classroom", several educational figures put forward the term "Flipped Learning" [24]–[27]. The Flipped Learning Network (FLN) board firmly stated that "Flipped Classroom" and "Flipped Learning" are clearly different. Flipped Classroom is defined simply as “schoolwork at home and homework at school,” However, Flipped Learning is an approach that allows teachers to apply a methodology, or methodologies, in their classroom. The flipped classroom and flipped learning are not synonymous; simply moving lectures outside of the classroom does not result in a true flipped learning experience [25].

In principle, "Flipped Classroom" and "Flipped Learning" are student-centered active learning approaches that were formed to improve the quality of learning while in class [19]. Flipped Learning is a pedagogical approach in which hands-on teaching moves from group study spaces to individual study spaces, and the resulting group space is transformed into a dynamic and interactive learning environment where educators guide students as they apply concepts and engage creatively in subject matter [26]. As stated by Jonathan Bergmann and Aaron Sams (2012) that the reverse learning approach is an alternative instructional approach in which direct teaching during class time and homework is reversed. Teaching materials that contain the content of a particular unit are introduced and viewed by students at home before class begins. While homework such as exercises, projects or class discussions are carried out during class hours. Videos created by teachers and posted online or selected from online sources or commercially available materials are key tools in the flipped classroom [5].

Flipped Learning Network (FLN), together with Pearson's School Achievement Services (2013) identify the main features, or pillars, of a flipped classroom that make flipped learning possible. The four pillars of F-L-I-P, namely (1) Flexible Environment, (2) Learning Culture, (3) Intentional Content, and (4) Professional Educator [27].

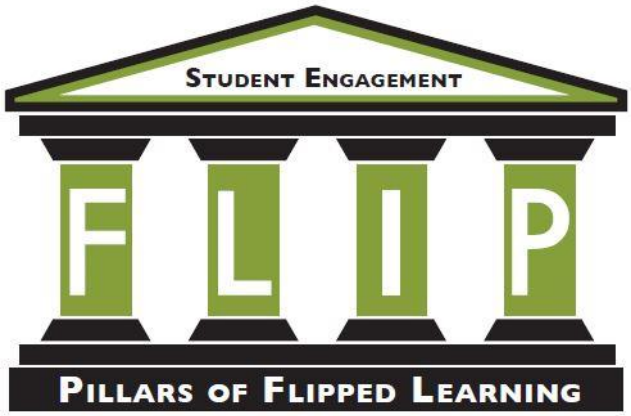

FIGURE 1. The Four Pillars of Flipped Learning [27].

Flexible Environment, Flipped Learning requires a flexible environment. Reverse classrooms should allow multiple learning modes; educators must frequently physically rearrange their study spaces to accommodate lessons or units, which may involve group work, self-study, research, performance, and evaluation; educators must create a flexible environment, where students choose when and where they study; Educators must accept that class time will be somewhat chaotic and noisy, compared to the typical quiet class during lectures. In addition, educators who reverse their classes are flexible in students' schedule expectations for learning and how students are graded; educators build appropriate scoring systems that objectively measure understanding in ways that are meaningful to students and teachers.

Learning Culture, Flipped learning requires a shift in learning culture. Where, in the traditional teacher-centered model, the teacher is the main source of information. In contrast, the Flipped Learning model deliberately transforms teaching into a learner-centred approach, wherein class time is dedicated to exploring topics in greater depth and creating rich learning opportunities. As a result, students are actively engaged in knowledge construction as they participate in and evaluate their learning in personally meaningful ways.

Intentional Content, Flipped learning requires intentional content. Reverse Learning Educators are constantly thinking about how they can use the Reverse Learning model to help students develop conceptual understanding, as well as procedural fluency. They determine what they need to teach and what material students have to learn on their own. Educators use Deliberate Content to maximize class time to adopt student-centered, active learning strategy methods, depending on grade level and subject matter.

Professional Educator, Flipped learning requires professional educators. The role of a professional educator is more important, and even more necessary, in a flipped classroom than it is in a traditional classroom. During class time, they continuously observe their students, give them feedback that is relevant to the moment, and grade their work. Professional Educators are reflective in their practice, connect with one another to improve their teaching, accept constructive criticism, and tolerate controlled chaos in their classrooms. While Professional Educators take a less prominent role in the reversed classroom, they remain an important ingredient in enabling Reverse Learning to occur.

In general, every approach, strategy, model or learning method, of course, has advantages and disadvantages, including this flipped classroom. The advantages of Flipped Learning are summarized in Table 1.

TABLE 1. The potential advantages of flipped learning

Aspek Kelebihan	Deskripsi
Personalisation	• Helping with specific learning difficulties • Self-pacing • Offering a personal choice of study material • Providing individual support
Active Learning	• Focussing on 'higher order skills' • Facilitating increased interaction between students • Creating more opportunities for useful feedback
Engagement and Attitudes	• Addressing classroom management issues • Encouraging learner 'ownership' of learning • Promoting contact between school and parents/carers

[24]

In addition to the advantages of Flipped learning, several disadvantages were stated by experts, including quoted from [19]: (1) it is difficult to prepare good quality videos and it takes time (Herreid & Schiller, 2013), (2) Springen (2013) revealed that the teaching design model to be applied during a limited approach, (3) Kordyban and Kinash, (2013) had difficulty in how the teacher believed that students carried out their responsibilities well outside the classroom, (4) Bristol (2014) revealed difficulties if students come to class unprepared, (5) students lack equipment such as smart phones, tablets or computers and have internet problems (Kordyban & Kinash, 2013), and (6) the teacher not only prepares or broadcasts video lectures, but prepares activities in in the classroom and integrate it into the flipped classroom approach, thus increasing the teacher's task rather than reducing it (Lafee, 2013).

Table 2 Student perspectives on the potential advantages and disadvantages of flipped learning

Advantages of flipped classroom
• Enhanced learning • Students can view recorded lectures at own pace • Recorded lectures can be reviewed at convenient times and places • Class time can be used for more effective active learning activities • Instructors can work directly with students when they encounter difficulties • Instructors can have more direct contact with students, facilitating and deepening relationships
Disadvantages of the flipped classroom
• Recorded lectures can be less engaging than live lectures • Compliance with watching videos is difficult to monitor • Instructor is not available to answer questions while viewing vodcasts • Flipped classes often require a greater time commitment and workload for the student • Technical problems may interfere with learning • Quality of recorded lectures and in-class exercises can be variable

[25]

Implementation of Flipped Classroom

In implementing Flipped Classroom or Flipped Learning in class, it is necessary to prepare the following: (1) learning logistics; (2) the flipped classroom model; (3) assessment of learning outcomes [18]. Learning logistics according to Jonathan Bergmann and Aaron Sams [10] includes: (1) homework: The Videos; (2) class time.

In order to apply the flipped classroom approach, there are different models. If the condition of class is taken into consideration in choosing these models, the results will be more effective (Bajunury, 2014) in [19], including:

(1) Traditional Flipped Classroom Model; (2) Partial Flipped Classroom Approach Model; and (3) Holistic Flipped Classroom Model. Planning the Flipped Classroom includes: (1) The Flipped Classroom Model, (2) Planning the Flipped Classroom Approach, (3) Lesson plan elements, (4) Assessment: The role of assessment and its types, Checklists, Questionnaires, quizzes [18].

The choice of model in implementing Flipped Learning is related to determining the following: (1) Overall Instructional Goals, (2) Assessment Items, (3) Learning outside the classroom: Teacher's Online Role, Student's role in learning outside the classroom, (4) Learning in the classroom: The role of the teacher in learning in the classroom, the Role of the student in learning in the classroom.

The traditional flipped learning model is often used by teachers who have never used the flipped classroom model before [16]. In the traditional flipped learning model students are asked to watch learning videos or other media at home in the previous lesson. Students prepare themselves to take part in classroom learning by studying at home first. The next step is for students to come to class to carry out activities and work on assignments related to learning material. In class students apply skills in projects or other simulations. Activities that take place in class can be guided using student activity sheets (LKS). Related assignments are also given in LKS. The next activity is to measure student understanding by holding a quiz at the end of the lesson. Traditional flipped learning steps according to Steele (2013) in [16] as illustrated in Figure 2 below.

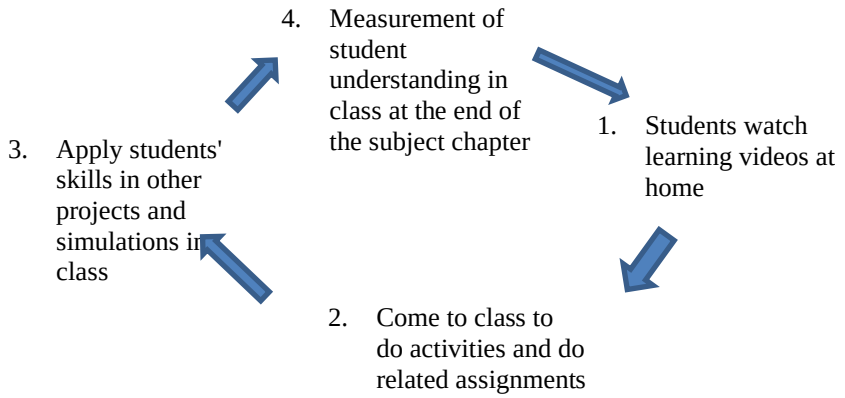

FIGURE 2. Traditional Flipped Classroom Model steps

In addition to the traditional model, flipped which is widely used is also the peer instruction flipped learning model. Where, students who are smarter help students who are still lacking in learning, so it's like peer tutoring [16]. Whereas in the peer instruction flipped learning model students are asked to watch learning videos at home. While in class, the teacher gives the first test questions individually. Students argue with each other regarding their answers and apply learning to strengthen concepts. If the student has finished with the first question test then proceed with the second question test and so on until the learning time is over. At the end of the lesson the teacher measures student understanding through quizzes. The flipped peer instruction learning steps according to Steele (2013) are depicted in Figure 3 below.

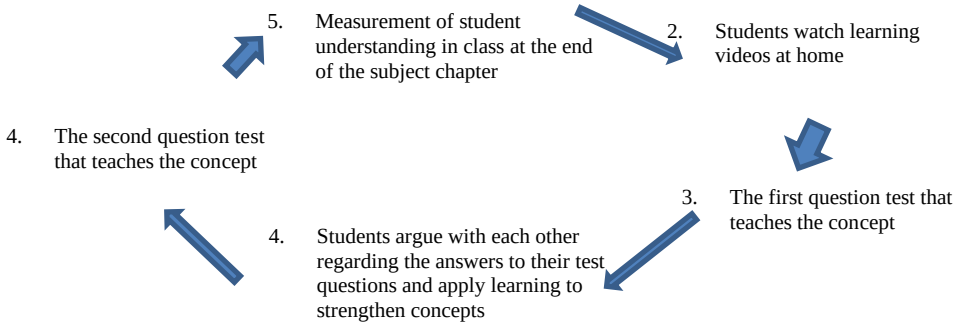

FIGURE 3. Peer Flipped Classroom Model Steps

Differences in traditional learning and Flipped Classroom in the distribution of time in the learning process are shown in Table 3.

TABLE 3. Comparison of Class Time in Traditional versus Flipped Classrooms

Traditional Classroom Aktivity	Time	Flipped Classroom Aktivity	Time
Warm-up activity	5 min.	Warm-up activity	5 min.
Go over previous night's homework	20 min.	Q & A time on video	10 min.
Lecture new content	30 – 45 min.	-	-
Guided and independent practice and/or lab activity	20 – 35 min.	Guided and independent practice and/or lab activity	75 min.

[10]

The implementation of Flipped classroom and Flipped Learning can be checked by using indicators based on the 4 FLIP Pillars, as shown in Table 4.

TABLE 4. Indikator Implementasi Flipped Learning

Aspek FLIP	Deskripsi
F.1	I establish spaces and time frames that permit students to interact and reflect on their learning as needed.
F.2	I continually observe and monitor students to make adjustments as appropriate.
F.3	I provide students with different ways to learn content and demonstrate mastery.
L.1	I give students opportunities to engage in meaningful activities without the teacher being central.
L.2	I scaffold these activities and make them accessible to all students through differentiation and feedback.
I.1	I prioritize concepts used in direct instruction for learners to access on their own.
I.2	I create and/or curate relevant content (typically videos) for my students.
I.3	I differentiate to make content accessible and relevant to all students.
P.1	I make myself available to all students for individual, small group, and class feedback in real time as needed.
P.2	I conduct ongoing formative assessments during class time through observation and by recording data to inform future instruction.
P.3	I collaborate and reflect with other educators and take responsibility for transforming my practice.

[26]

Best Practice of Flipped Classroom Implementation

Since the spread of Flipped Classroom or Flipeed Learning, all over the world, several schools and colleges have implemented this model in various subjects or courses [5], [17], [20], [24], [28]–[30].

Flipped Classroom and Achievement of Learning Outcomes

The flipped classroom approach is a system that provides increased interaction time between teachers and students, presents conditions in which students take responsibility for their own learning, shifts the role of teachers

to mentors, combines constructivist learning with teaching methods, each student attends individual education, consistency of learning with repetition and prevent students from falling behind class who cannot come to class for any reason. Flipped Classroom is effective in achieving student learning outcomes. These results prove that students' mathematics learning achievement using the flipped classroom model is more effective than the traditional learning model [31].

Flipped Classroom and Higher Order Thinking Skills

Shifting the learning process from traditional to flipped classroom, there is a tendency for students' learning outcomes to increase, not only to achieve learning mastery, but to achieve higher students' thinking skills. This active learning within the classroom seeks to focus on higher level skills, such as creating, analyzing, evaluating [18]. Flipped classrooms are also proven to build a culture of independent learning and students' critical thinking [17].

Flipped classrooms can be used to develop critical thinking skills and master ways to absorb a wide range of information by engaging students in active learning processes. Recognizing, reading, understanding lecture topics are carried out at home, and class time is used for higher levels of learning such as analyzing, evaluating, and applying basic information [30].

Flipped Classroom and Attitude or Character

Of the educators surveyed, 100% agreed that after flipping their classrooms, learning became more active. Over 90% said that positive interactions with their students increased; students had greater access to course materials and instructions, students could work at their own pace; students were more likely to engage in critical thinking; and instructions became more differentiated and personalized. Close to 80% reported that positive interactions between students increased; that students became more likely to engage in collaborative decision-making; and that students were more likely to have choices in how they demonstrated what they'd learned. Over 50% agreed that students were more likely to have a choice of which learning tasks to engage in [27].

In addition to increasing the achievement of cognitive learning outcomes, Flipped learning shows an effect in improving student attitudes and character, including: independence and responsibility [17], motivation with a percentage of 66.6% and at the same time this motivation is able to increase learning outcomes cognitive skills of MAN Salatiga students in cell material with a percentage of 46.7% [28]. When flipped classrooms are designed effectively, the reverse class method can increase students' motivation towards learning [20].

Challenges of Implementing Flipped Classroom in the Digital Age

Flipped Classroom is a learning approach that requires a lot of learning materials that involve digital technology, including online teaching materials, internet or web-based resources, multimedia media.

Understanding and Implementation of Flipped Classroom

Flipped Learning Network (FLN) reveals that there are still many misconceptions that occur among educators and researchers about Flipped Classroom and Flipped Learning [26]. Flipped classroom approach is not synonymous with online videos, the important point is the interactive activities done during the time when teachers and students are face to face. It is not using video instead of teacher. It is not working unsystematically of students. It is not students spending all course period in front of a computer. It is not a student studying alone [19]. Therefore, there may be errors in implementation in the field.

Availability of Digital Networks and Facilities

Indonesia still has many obstacles in utilizing the digital world, especially network problems. Constraints that are usually experienced by the community when accessing the internet, including (1) 81% relate to an unstable network, so the connection is often lost; (2) 30% is constrained by data package costs/limited quota, (3) others Internet coverage is uneven, devices do not support accessing the internet [32]. In addition, educators in Indonesia still do not have their own digital tools. Of the more than 56,000 teachers and librarians who responded, 6%

indicated they were using videos they found online and 3% said they had already created videos as part of flipping their classroom [27]. This technology-based model depends on facilities and infrastructure as a platform to support science literacy in addition to the technological capabilities of teachers and students [21].

Digital Literacy (Understanding and Skills)

Digital literacy according to the Katadata Insight Center Kominfo includes digital skills, digital ethics, digital safety, and digital culture [32]. When implementing Flipped Classroom or Flipped Learning, educators and students are required to have digital literacy. When an educator creates a video, there are four stages: planning the lesson, recording the video, editing the video, and then publishing the video. Reverse class can give students more time to create their own content. Today's students have a variety of ways to create content to demonstrate their understanding of a variety of topics. They can blog, create videos, create podcasts and create a variety of educational products that help students build their knowledge. We see great value in student-generated content. Based on the 2022 Ministry of Communication and Informatics report, the digital skill level of the Indonesian people in understanding hardware (42%) and software (45%) is still low [32].

Teachers in implementing Flipped classrooms must be able to use a Learning Management System (LMS), such as Moodle and take advantage of broader features in blended learning. Because apart from learning videos, multimedia technology, virtual classrooms, voice messages, email, remote conferences, online text animations and video streaming can be used in the FC model to expand the reach of education which will ultimately improve and optimize the learning process [33] .

CONCLUSIONS

Based on the findings from the results of this literature study, several conclusions can be drawn, namely: (1) the concept of "flipped classroom" is still equated with the term "flipped learning", which are actually two different things, (2) the implementation of flipped classroom is very important in learning in the digital era, both at school and in higher education, (3) flipped classroom implementation can be carried out with various learning models in accordance with the learning objectives to be achieved, (4) learning resources and media must be prepared in an online form that is easily accessible to students, anywhere and anytime, (5) the challenges faced by educators and students relate to learning facilities, infrastructure, readiness for implementation, and digital literacy.

Suggestions from the results of this study include: (1) flipped classrooms are implemented according to the needs of students, (2) educators plan flipped classrooms as best they can, (3) educators and students improve digital literacy.

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