ANP-JSSH
ISSN 2773-482X eISSN 2785-8863
DOI: https://doi.org/10.53797/anp.jssh.v6i1.1.2025

Systematic Literature Analysis on Flipped Learning: Focus on Interest, Engagement, and Understanding

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Available online: 20 May 2025

Abstract: Flipped learning is an active learning strategy that involves teaching and learning before, during, and after. Technology plays the role of teaching aid in implementing flipped learning and is a crucial element in executing the flipped learning method. In line with the recommendations in the 2015 Education Development Plan, Flipped learning enhances the use of technology in education and improves students' critical thinking skills. Students' achievements can be seen in their accomplishments, creativity, and innovation. Learning should take place anywhere and anytime. Therefore, flipped learning is a suitable learning method as it can be implemented both inside and outside the classroom with the maximum involvement of students in teaching and learning while teachers act as facilitators to assist students. The discussed technology includes audio, visual, graphics, animation, and text. This concept paper discusses the relationship between the Flipped learning method and students' interest, engagement, and understanding in conducting teaching and learning. A literature survey method was used in this study. Previous studies, both domestically and internationally, regarding Flipped learning were used to analyze students' interest, understanding, and engagement in teaching and learning. The findings show significant results in the implementation of Flipped learning. Students are interested in following teaching and learning by actively participating in learning and building their own understanding. This article provides space for future research by identifying issues in applying the Flipped learning method. This article serves as a reference for future research on Flipped learning.

Keywords: Flipped learning, interest, engagement, understanding

1. Introduction

Malaysia, as a developing country, prioritizes education to produce quality human capital capable of contributing to national development. Malaysia has various planning schemes to enhance the education sector. One example is educational policies that emphasize the needs and reforms in current education, such as improving technology and communication facilities. This is to meet the country's needs to promote and enhance the quality of politics, economy, society, and culture (Ikwan Lubis, Maimun & Siti Hajah, 2021; Malaysia Ministry of Education, 2019). The main reform identified is the use of technology in education. Therefore, to realize the aspirations of the Malaysia Ministry of Education (MOE) to sustain education, teaching and learning based on technology are made the foundation for the formation of the Malaysian education planning policy. This situation is realized through technological developments from the Industrial Revolution to the education revolution.

Teaching methods are a teaching plan based on learning objectives and efforts to make the teaching and learning process successful (Yusof & Zulkifli, 2021). Over the past two decades, teaching methods have been questioned and studied to improve the quality of the education system. Among the studies conducted on teaching methods is how teaching affects student performance in certain subjects (Mclaren, 1997; Segall, 2004). It is even said that excellent teachers, with

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extensive teaching experience, still cannot guarantee student performance without systematic teaching methods that are suitable for current education (Zain, 2005). Teaching methods should vary according to subject matter, student ability, environmental suitability, and diverse teaching methods. A teacher's failure to stimulate student thinking can reduce student involvement in teaching and learning activities (Mahamod & Lim, 2021). Teaching methods shape students' attitudes towards learning. Moreover, the learning style follows the student's comfort and an individual's real-life (Aljaberi & Gheith, 2018). Teaching methods are unique in learning, following the selection of methods according to the suitability of subjects, student abilities, and lesson content. Adapting new styles in learning encourages students to practice independently. Learning becomes easy, fast, interesting, and effective, leading to more creative results and achieving success (Bhat, 2014). According to Bishop & Verleger (2013), selecting appropriate teaching methods according to student groups will enhance students' understanding and knowledge in learning. Teaching methods need to change over time. This article reviews the concept and characteristics of Flipped Learning that affect students' interest, engagement, and achievement. Flipped Learning has become a favorite among researchers in the field of education who seek innovation and align with the times.

2. Literature Review

2.1 Flipped Learning

Flipped learning is a renewal of the conventional method in teaching and learning (Awidi & Paynter, 2019). Flipped Learning was inspired by Jonathan Bergman and Aaoron Sam, who are teachers. This method was developed following the intention of not wanting students to fall behind in learning (Doung-In, 2017). Reversed where teaching and learning that occurs inside the classroom occurs outside the classroom (Lage et al., 2000). Flipped Learning replaces the teacher's role in giving face-to face instructions with video instructions anytime and anywhere.Learning in the classroom is more focused on discussion and problem-solving (Uzunboylu & Karagozlu, 2015; Doung-In, 2017). Chen et al. (2014), stated that this method shifts instruction from the classroom to outside the classroom. Moreover, activities that were conducted inside the classroom are now done outside. There is a misunderstanding among educators that applying Flipped Learning is the same as sharing videos recorded by teachers earlier to be used as teaching materials or attending online courses (Bergmann et al., 2012; Rahmah, 2015). In fact, there are many teaching aids that can be shared with students online with technological advancements in the education world (Doung-in, 2014). Flipped Learning promotes the sharing of teaching aids among teachers and students (Uzunboylu & Karagözlü, 2017) and Student involvement (Finch & Crunkilton, 1999). Even the interaction between teachers and students shows a positive relationship and builds self-understanding among students and guides peers (Kurshan, 2008) and understanding (Caviglia-Harris, 2016). Student interest increases with the existence of understanding in learning (Tafonao, 2018). Flipped Learning helps students retain interest throughout teaching and learning (Jia et al., 2020).

2.2 Differences in Flipped Learning Research in Malaysia Compared to Overseas

Research conducted on Flipped learning for various subjects, research designs, research dimensions, research locations, and research populations were analyzed. By comparing studies related to Flipped learning in Malaysia with overseas studies from 2019 to 2023. It was found that Flipped learning research in the country is limited compared to abroad. Therefore, Flipped learning research needs to be expanded domestically. This statement is proven by data collected from Scopus, Era, UPSI Publication, Emerald, Jurcon, Jictie, and various research publications. The findings of the study show that there are more studies on Flipped Learning abroad than studies carried out in this country due to the fact that the exposure of Flipped Learning abroad is higher than in the country. But the data also shows an increase in Flipped Learning studies in the country. This shows a positive situation for the use of the Flipped Learning method.

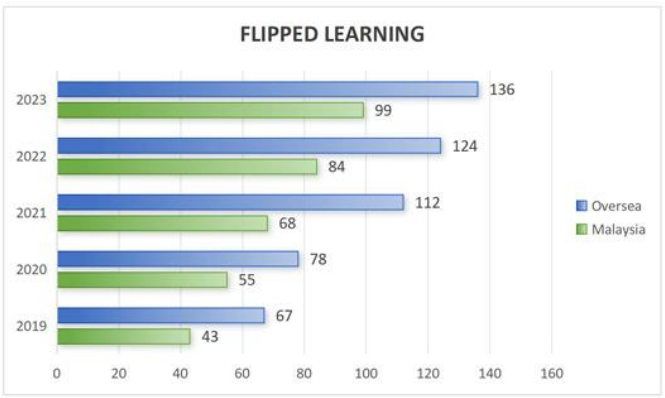

Fig. 1. Empirikal studies flipped learning

2.3 Favorite Study Methods in Flipped Learning

Flipped Learning studies are divided into three study methods, namely quantitative and qualitative and mixed methods. There is a difference between quantitative research and qualitative research. The quantitative approach prioritizes 'quantity'.Quantitative investigations involve numbers, numerical or statistical data.According to Lexy, 2007, the qualitative method is a study that produce observable visual data. The qualitative methods used in this research are case studies, interviews and so on.This method does not involve numbers but rather involves research facts.

Fig. 2 shows flipped learning studies conducted, researchers like to use quantitative and qualitative known as mixed methods followed by quantitative methods, qualitative methods and previous studies show little research methods. This shows that to test the Flipped learning method, quantitative methods are more suitable than other methods. This follows the quantitative method using numbers in analysis data. It will be more easier to interpret in data (Vijayakumaran et al., 2022;2023)

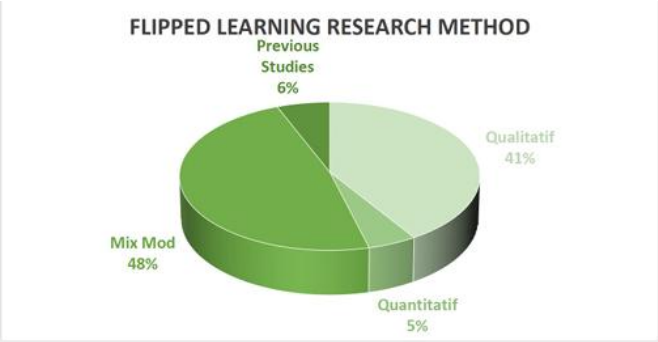

Fig. 2. Flipped learning analysis method

3. Methodology

A research design is a blueprint that details how a study is conducted (Sabitha, 2006). It also serves as a guide to help researchers in the process of collecting, analyzing, and interpreting the results of the research conducted. The analyzed research designs include questionnaires, surveys, pre and post-tests, interviews and previous research articles. Fig. 3 shows that pre and post-tests are often used in studies related to Flipped Learning. This is because this method is easy to measure before and after the study is conducted. In fact, this method can easily determine the level. The implementation of this study is based on quantitative research and quasi-experimental in nature. Early 2013 has stated that experimental designs are done with the aim of exploration, explanation, and description. Therefore, the selection of this quasi-experimental study was done because this form of study is suitable and good for measuring effectiveness. According to previous research by Creswell, 2013, quantitative or qualitative research methods, and mixed methods approaches are very often used. Sergis et al. (2018) also implemented experimental tests, questionnaires, observations, and interviews in their research. In this study, for example, we found that several design-based research papers used multiple data collection methods such as questionnaires, interviews, and observations (Lee et al., 2016) and experimental tests, interviews, questionnaires, and observations (Lo & Hew, 2017).

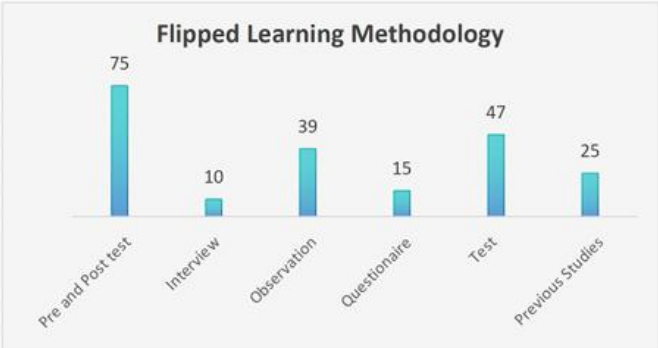

Fig. 3. Flipped learning design data

Leading databases such as SCOPUS and Emerald, international JSTOR and local publications like UPSI publication are used in the search for suitable articles. Keywords relevant to the study are used to analyze the research literature. The keywords used are 'flipped classroom', 'flipped classroom and perception' and 'inverted learning'. 'Flipped Learning' is used to find related articles in English and Malay. These keywords are used to obtain articles related to flipped classroom learning in education. In the study of flipped learning, several keywords are often used such as effectiveness, teaching methods, flipped learning methods, improvement and implementation of flipped learning.

Data in Fig. 4 shows that the most favored keyword among researchers is improvement. Improvement refers to student achievement, interest, understanding, motivation, and so on from the students' perspective and improvement in the use of Flipped learning teaching methods from the teachers' or educators' perspective. Thus, this shows that the implementation of Flipped learning is still at a low level. Future research can focus on the implementation of Flipped learning. If the implementation of Flipped learning uses the right strategy, there will be an improvement in the effectiveness of Flipped learning in the education world. Thus, further study is needed in the implementation of Flipped learning.

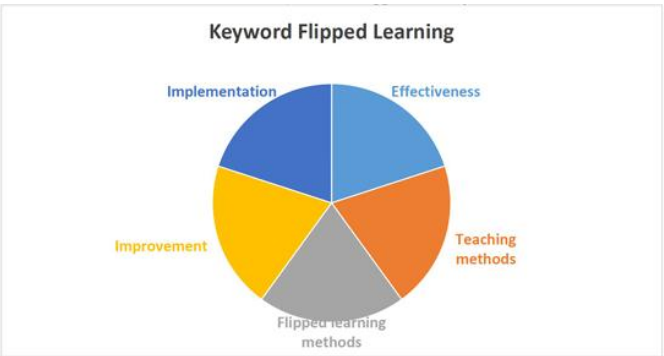

Fig. 4. Favored keyword for flipped learning

The study was conducted using a systematic literature review based on past studies through searches in Scopus, Research Gate, Mendeley, and the Google Scholars from 2014 to 2023 regarding the use of flipped learning in education. This study goes through four main phases to analyze and answer the research questions. The study search was based on keywords, namely flipped learning, engagement, interest, and achievement. Twelve studies were reviewed.The four phases involved are explained in Fig. 5.

In the first phase, 235 articles were collected to frame the research questions.Out of 285 articles, 80 articles were identified as suitable articles for the research paper. In the quality assessment, 65 articles met the research requirements, thus 22 articles were used to analyze and interpret the findings of this concept paper-review.

Fig. 5. Research rhases

4. Results

Table 1 shows several past studies on Flipped Learning from 2014 to 2023. This study compiles local and international studies to understand the response and scope of Flipped Learning usage both domestically and internationally. This past study serves as a reference for identifying areas for future research by evaluating research methodologies. Most Flipped learning studies were found to use quasi-experimental methods, conducting pre- and post tests followed by questionnaires and interviews. This is to measure the students' experiences in more detail. In Roach's study (2014), the use of Flipped learning was said to connect students' active learning and critical thinking. Students could express ideas through their learning. This indicates that students can think creatively in learning. This helps produce quality human capital. In 2016, the role of technology in flipped learning instruction.

Table 1. Literature review analysis results

Author/Year	Issue	Methodology	Findings
Roach (2014)	Evaluating flipped learning acceptance and student understanding	Quantitative & Qualitative	Flipped Learning connects active learning and students' critical thinking and increase level of learning
Long et al. (2017)	Flipped learning application challenge in learning	Quantitative	Positive perspective on the use of Flipped learning as a current
Chen et al. (2017)	Examining the scope and quality of studies on flipped learning and its effects	Previous study	Flipped learning increased motivation and student involvement
Rahman et al. (2019)	Identifying the use of Flipped learning to attract student interest	Previous study	Flipped learning show an increase in engagement and achievement
Almisad (2019)	Examining the level of access to digital technology required for flipped learning and their perceptions and engagement with flipped learning	Quantitative & Qualitative	Students are ready and able to take advantage of flipped learning
Raman et al. (2019)	The effectiveness of flipped learning and the level of student understanding	Quantitative	Flipped learning has apositive effect on engagement, interest and understanding, but gender does not affect the effect of flipped learning
Singay (2020)	Identifying attitudes and perceptions students in the use of flipped learning are able to attrac tstudents' interest	Quantitative & Qualitative	Student have positif perception and attitude towards flipped learning increased student interest
VanAlten et al. (2020)	Examining the role of Flipped Learning in self-directed learning and its effects on understanding	Quantitative	It concludes that support for flipped learning is beneficial for student learning but must be carefully designed to avoid student dissatisfaction
Gündüz & Akkoyunlu (2020)	The study of flipped learning to determine whether it will improve interaction, participation, and achievement	Quantitative & Qualitative	Students who are highly motivated and confident in participating in class activities and understanding the course content better
Fisher et al. (2020)	The flipped learning strategy needs to be conceptualized and understood	Quantitative	Although flipped learning can produce good student outcomes, preparation and peer engagement need to be considered in flipped learning
Singay (2020)	Flipped learning attracts student interest	Quantitative	Flipped learning affects students' interest and fosters positive experiences
Zain & Sailin (2020)	The effectiveness of learning methods traditional with flipped learning	Quantitative	Flipped learning shows maximum student engagement and improves their understanding compared to traditional methods. Future studies will focus on flipped learning teaching strategies
Sánchez et al. (2020)	Challenges of flipped learning in attracting interest and enhancing student understanding	Quantitative	The application of flipped learning in education
Yoon et al. (2021)	Flipped learning stimulates higher-order thinking skills through student understanding	Quantitative & Qualitative	Flipped learning increases knowledge and stimulates critical thinking in students
Park et al. (2021)	Design for the application of flipped learning affects student engagement	Previous study	Design flipped learning has apositive impact on teaching and learning methods

continued

Fisher et al. (2020; 2021)	Relationship between flipped learning with engagement, satisfaction	Quantitative & Qualitative	Engagement, student experience in flipped learning
Nugraheni et al. (2022	The relationship between higher-order thinking and flipped learning affects student interest	Quantitative	Flipped Learning impacts students' higher-order thinking skills, stemming from their understanding and capturing students' interest.
Vijayakumaran et al. (2022)	Flipped learning stimulates student interest, engagement, and understanding	Quantitative	Students' interest, understanding, and engagement increase with flipped learning
Alkandari & Alabdulhadi (2023)	Flipped learning effectiveness develop students interest and understanding	Quantitative & Qualitative	Flipped learning stimulates students' critical thinking, arouses their interest inlearning, andimproves their levelof understanding.
Sopamena et al. (2023)	Effectiveness of flipped learning	Quantitative	Flipped Learning contributes to the success inimplementing teaching and learning, and student achievement has also improved
Kadıoglu & Oskay (2023)	Flipped learning effect	Quantitative	Flipped Learning has an impact on student achievement by increasing student motivation

Research findings indicated that technology is closely related to the implementation of Flipped learning in Pedagogy with the help of teachers diversifying teaching aids and thus attracting the interest of students. Teachers capitalize on the technological environment to enhance student understanding. FL research was extended to the scope and quality of use by Chen et al. (2017) from 118 past studies, finding that the quality of Flipped Learning use showed improvements in student engagement and motivation. Rahman et al. (2020) also agreed that from the results of 19 past studies, student achievement and engagement also increased. In the study conducted by Vijayakumaran et al. (2022), it was stated that interest, understanding, and student engagement increased with teaching using flipped learning. This indicates a positive impact among students. Almisad (2019) helped unravel the level of access to technology needed to implement Flipped learning and student perceptions. It was found that students were ready to apply technology in learning, in line with IR 4.0. In fact, students showed a positive attitude towards the use of the Flipped learning method attract students' interest (Singay, 2020).

However, Van Alten et al. (2020) suggest that Flipped learning is structured strategically to avoid student dissatisfaction. As an innovation in Flipped learning, gamification has been applied in the FL method and it was found that apart from engagement, interest, and motivation, student interaction also increased (Gündüz & Akkoyunlu, 2020). In the study of Fisher et al., (2020) the Flipped Learning learning method needs to be more conceptualized and easy to understand. Early planning is necessary to make the Flipped learning method successful. If you compare the traditional method with the Flipped learning method. Flipped learning shows effectiveness in terms of engagement, interest and understanding (Zain & Sailin, 2020) although traditional methods were also planned before this teaching and learning following students' interest in technology access. Even Flipped Learning helps stimulate students' critical thinking (Lin, 2021; Yoon et al. 2021). Alkandari & Alabdulhadi (2023) in their study stated that Flipped Learning stimulates critical thinking. This method attracts the interest of students with the use of the Flipped learning method with the correct strategy that has an impact on students.

This method needs to be deepened and expanded in the field of education.This follows previous studies proving that students have a positive outlook (Singay, 2020) and are ready to accept the use of Flipped learning in learning (Park et al., 2021). In a study conducted by Sánchez et al. (2020) , suggest the use of games by applying technology in learning has an impact on student creativity. Students were found to be more involved in learning due to the feeling of fun and happiness. At the same time building understanding in students and improving student achievement, however there are weaknesses and challenges identified in the application of online game methods such as lack of equipment as well as skills and organized learning strategies. Students need early exposure in learning before applying game methods. So it can be concluded that the game method has a positive effect but without initial exposure regarding the learning topic does not show an improvement in learning, a strategic arrangement is necessary in the use of Flipped learning by combining technology at the same time with activities that stimulate learning before the activity is implemented.Additionally, the angle of use of teaching aids and student experience, other studies show new dimensions regarding the views and experiences of teachers in using technology as a teaching aid for the Flipped learning method. The findings of Long et al. (2017) show that teachers have a positive perspective on the use of Flipped learning as a contemporary teaching method.

However, there are some challenges because not all students benefit from the implementation of the Flipped learning method perfectly. Among the challenges revealed in his study are: the first is time, where students need to be given enough time to prepare before teaching and learning is carried out to ensure all students are ready and involved in

learning. Another challenge is secondly, the arrangement of a systematic and organized teaching plan. Teachers and students are aware of their responsibilities in learning. The third challenge is the design of teaching aids and activities in Flipped learning based on feedback from the students themselves. Teachers must provide space for students to organize the application of technological materials and applications according to student suitability and skills as well as the form of learning delivery in class. For example, students can decide whether to make presentations or dramas Games or other activities depend on individual creativity and skills. This can stimulate decision-making skills and creative thinking. The fourth challenge identified in the study is support from teachers. It is very important for students as encouragement and guidance to build self-confidence. Students will feel more confident with the support provided by teachers, which improves students' results. Mistakes corrected quickly with the help of teachers. Thus, students receive spontaneous guidance, making understanding easy to form. However, this study also provides suggestions that peer support is also important in learning to produce more solid and quality ideas. This opens up space for students to share ideas with one another. Therefore, it is suggested that peer influence can be studied further by testing student involvement and group activities conducted to build space for students to interact with peers to complete assignments in Flipped learning. By overcoming challenges in the implementation of Flipped learning and the recommendations provided from previous research, this study can respond to student involvement in the use of flipped learning.

Additionally, multidimensional studies in flipped learning have been conducted by Kim et al. (2021) discussing the importance of design in implementing flipped learning. It affects students and the environment.According to his research, the four elements in flipped learning, namely F.L.I.P, are used as a benchmark, which are a flexible learning environment, a learning culture, learning that occurs intentionally and spontaneously without being planned, and professional educators in their respective fields. By combining the four aspects of the study, it was found that students were more satisfied with the learning that took place while Flipped Learning was conducted in an orderly manner to achieve learning objectives. Thus, his research contributes to the arrangement of the design structure of this study by considering these four controlled dimensions to ensure flipped learning achieves the study's targets. Among the factors driving this study are considered as a reference for arranging activities due to the satisfaction obtained by students in his study. This study also evaluates student experiences, so student satisfaction is also prioritized in this study. With the use of Flipped Learning, student achievement increased at the same time as the learning and teaching that took place showed an impact on the students. The learning objectives of the students were achieved as planned (Sopamena et al., 2023).

5. Discussion

From past studies, several weaknesses have been identified in applying flipped learning in teaching and learning.According to Alias & Hafir (2009), technical problems in technology such as Internet speed, lack of ICT facilities, network coverage, and efficiency issues cause conventional methods to still need to be practiced in teaching and learning even though education requires renewal.The same statement was made by Ramirez et al. (2014). In addition, the weaknesses identified from previous studies are the limited ICT facilities to support multimedia-based teaching and learning. Moreover, technology is not used consistently and widely. The same multimedia is used every time teaching and learning takes place, causing students to lose interest and become bored (Sallehin & Ab Halim, 2015).

The study on Flipped conducted by Roach (2014) highlighted several weaknesses of the Flipped Learning method, where students' lack of seriousness in teaching and learning causes learning not to occur. This is proven in the study by Ramirez et al. (2014) due to no response from students regarding the videos watched. The reason given is that they do not understand the video's content. In Bhagat et al. (2016)'s study, students cannot refer to the teacher immediately if questions arise while watching the video shared by the teacher. The questions arising in students remain unanswered (Schultz et al., 2014; Lo & Hew, 2017).

This method depends on teachers to implement correctly and accurately. For the subject of economics, the teacher stated that the time allocated was rather short for class discussions (Goffe & Kauper, 2014). Students are not interested in watching videos longer than three minutes (Ramirez et al., 2014; Chen Hsieh et al., 2017). Teachers take a long time to explore suitable videos to share with students (Akçayır & Akçayır, 2018). This adds to the teacher's workload (Ramirez et al., 2014).According to the study by Kadıoglu and Oskay (2023), discussing flipped methods has a positive impact on students in terms of achievement.

At the same time, it motivates students to excel in their studies. This method is favored by students as it encourages their own creativity and innovation. This method directly impacts student learning.Moreover, the shortcomings identified from past studies found that accessibility has a significant impact on the implementation of Flipped Learning. Without complete technological facilities for students to use outside and inside the classroom, Flipped Learning cannot be implemented. Furthermore, technological skills also have an impact. Without technological skills by teachers and students, this method cannot be implemented (Wasriep, 2019). Therefore, these issues need serious attention. The implementation of the Flipped Learning method needs attention in future studies to ensure this method achieves its learning objectives.

6. Conclusion

Flipped Learning in education has sparked changes in the world of education in terms of the application of different methods. Moreover, Flipped Learning has become the choice of many educators and students. Flipped Learning shows

positive improvements in student engagement, interest, and understanding in teaching and learning. Flipped Learning is appropriately applied in PAK-21 learning. By addressing the weaknesses of Flipped Learning, this method can bring significant changes to the world of education. Flipped Learning can produce critical and innovative human capital. Educational needs can be met with the use of flipped learning. Research in Flipped Learning needs to be expanded to identify systematic ways to implement Flipped Learning at the school level in Malaysia. Also, in terms of population sample, research can be reviewed in the future as Flipped Learning is mostly used at the higher level. Flipped Learning can be extended to the lower level due to the existing advanced technology nowadays. It is hoped that this research paper will serve as a reference for other researchers in Flipped Learning in the future.

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