



# Modified Flipped Classroom to Increase Readiness, Engagement and Understanding of Midwifery Students in Basic Science Course

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<i>Abstract</i>	
<p><b>Track Record Article</b></p> <p>Accepted: 23 June 2023 Revised: 11 November 2023 Published: 23 December 2023</p> <p><b>How to cite :</b> Oktorina, L., Nurchasanah, Y., &amp; Feriandi, Y. (2023). Modified Flipped Classroom to Increase Readiness, Engagement and Understanding of Midwifery Students in Basic Science Course. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 5(4), 1406–1415.</p>	<p>Covid-19 pandemic has prompted an opportunity to use technology to help students understand difficult topics such as basic science. The flipped classroom method has been widely used to increase the students' active roles. This study aims to measure the impact of modified flipped classroom to the undergraduate midwifery student's readiness, engagement, and understanding. This study used an embedded experimental model with an uncontrolled one-group pre-post-test quasi-experimental design on a total sampling of 37 first-year undergraduate diploma midwifery education students. The treatments were exposure to pre-class physiology video teaching materials and the flipped classroom. Kirkpatrick levels 1 and 2 were used to measure satisfaction and learning using closed Likert scales and open-ended questionnaires. Students' pre and post-test scores were measured and analysed using paired t-tests. Open questionnaire answers were analysed using content analysis. The statistical result showed significance difference (<math>p &lt; 0.0001</math>) with an increase in the average pre-post test score of 49%. The qualitative data revealed that the modified flipped classroom could increase active learning, self-reflection, learning material mastery and repetition, student readiness, lecturing effectiveness, and learning pace equity. The modified flipped classroom method was effective to increase the readiness, engagement, and understanding of the midwifery students in basic science course. Suggestions for future researchers are to add additional variables in the study to measure the impact of modified flipped classroom, such as learning motivation, student satisfaction, and academic outcomes. This will provide a more comprehensive picture of the effects of using this method on learning outcomes and student experience.</p> <p><b>Keyword:</b> <i>Flipped classroom, Kirkpatrick, Midwifery, Online learning, Physiology</i></p>

## INTRODUCTION

Along with implementing an output-based curriculum and student-centred learning, an interactive learning approach is needed to support various learning styles and modalities. The use of technology to support this process is called technology-enhanced active learning (McCoy et al., 2015). Research conducted by Chan on 346 medical students shows that 61% of respondents consistently use their mobile devices to search for multimedia materials such as images, videos, animations, or sound files that assist learning (Leary, 2017).

On the other hand, large class lectures often lead to ineffective delivery of material because it only goes in one direction, and students tend to be passive in the process (Switri, 2022). Using learning aids such as multimedia technology can improve the quality of lectures (Swanwick, 2014). One of the causes of the ineffectiveness of the lecture method is the low readiness of students and learning modalities that are static, one-way and do not allow learning repetition (Luscombe & Montgomery, 2016).

Active learning is a student-centred learning theory that emphasises learning responsibility for students (Sugrah, 2019). This model states that to learn, students must do more than listen. Students must be involved by doing something and thinking about the things they are doing (Agustina, 2020). Teaching methods supported by active learning principles include the Flipped Classroom model and an audience response system. The active learning method positively impacts students in several areas of learning readiness and competency acquisition (Bonwell & Eison, 1991; Pivač et al., 2021; Swanwick, 2014).

Midwifery students consider basic biomedical science courses to have a high level of difficulty. The Covid-19 pandemic has prompted an online learning transition that opens up opportunities for using technology to help students understand these difficult topics (Lucey & Johnston, 2020; Nerantzi, 2020). Otherwise, the flipped classroom method has been widely used at various levels of education and can increase students' active roles. Based on the Covid-19 experience in using the modified flipped classroom method and the possibilities of using the hybrid learning in the future, it is important to evaluate the effectiveness and effect of the modified flipped-classroom method in facilitating the student-centred learning approach (Dehghanzadeh & Jafaraghaee, 2018; Kolifah et al., 2017; Tan et al., 2017).

This study aims to measure the effect of providing pre-classroom video teaching materials and the flipped classroom method on students' readiness, engagement, and understanding in online physiology courses of an undergraduate midwifery education.

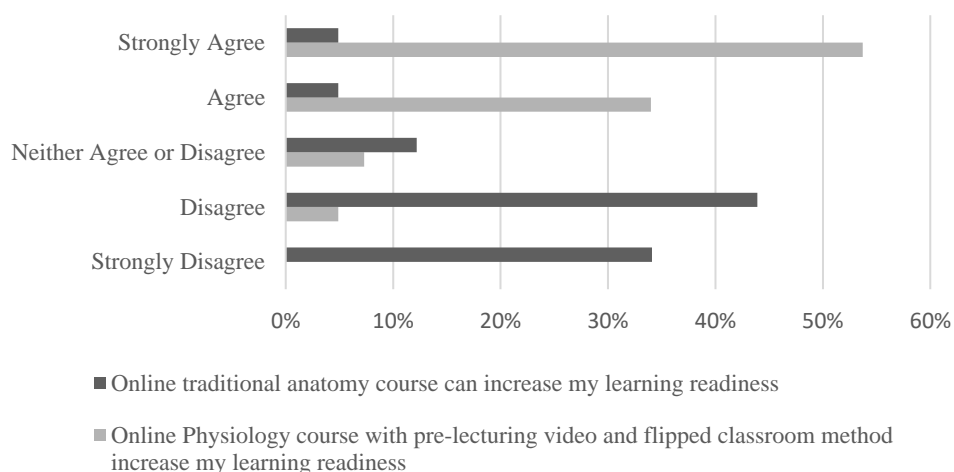
## **METHODS**

This study is class action research with an embedded experimental model. The quantitative phase used an uncontrolled pre-post-test quasi-experimental design (Hastjarjo, 2019). The population of the research is the midwifery students of the undergraduate diploma IV Midwifery education program of Poltekkes Kemenkes Bandung West Java Indonesia. The sample of this research was total sampling of 37 first-year students who received the basic science course in modified flipped classroom method. All subjects received exposure to pre-class physiology video teaching materials and the flipped classroom method in the lecture process. The evaluation was carried out using the Kirkpatrick 1 and 2 frameworks. Student assessment of the learning process was measured using four Likert scales and two open-ended questions to express the student's perception of the benefits and disadvantages of traditional and the research treatment. The perceptions of students' readiness and engagement after treatment compared to the previous conventional anatomy lectures. Student pre-test and post-test scores were measured using multiple-choice questions based on the lecture blueprint

assessment and analysed using a paired t-test. The hypothesis was accepted if  $p < 0.05$ . Answers to open questions were analysed using the content analysis method with Atlas.ti Ver.23 software.

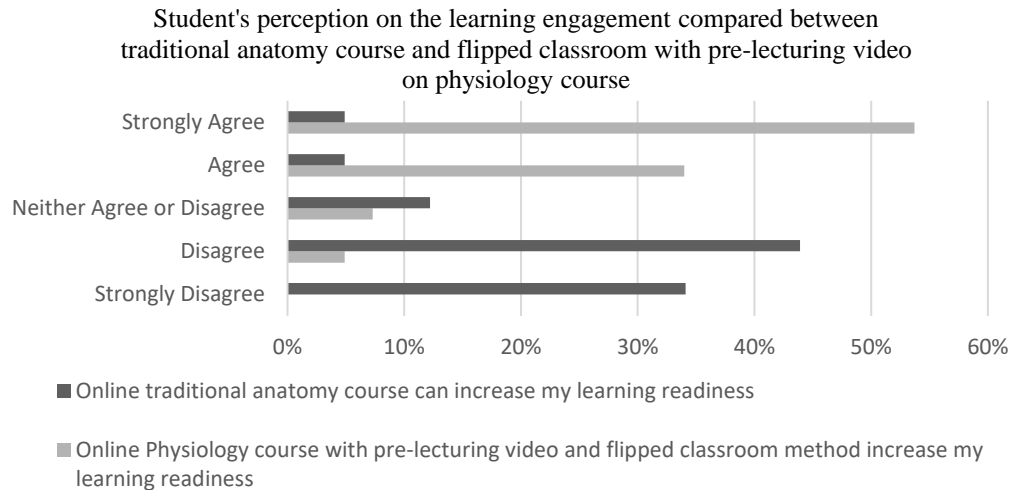
## RESULTS

Thirty-eight first-year students (total sampling) voluntarily participated in the research and filled out informed consent and questionnaires via Google Forms with a response rate of 100%. The Kirkpatrick level 1 evaluation results are illustrated in Figures 1 and 2.



**Figure 1. Students' perception of their learning readiness compared between traditional anatomy and flipped classroom with pre-lecturing video on physiology course**

Figure 1 shows that in conventional anatomy lectures, 44% of students perceive that conventional method lectures do not encourage their readiness for lecture sessions, even 34% say they strongly disagree. These results are very different from the perceptions of students who show that providing pre-class physiology video teaching materials increases readiness in the lecture process. As many as 34% of students agreed, and 54% strongly agreed that giving video teaching materials before lectures and the flipped classroom method increased their activity during lessons.



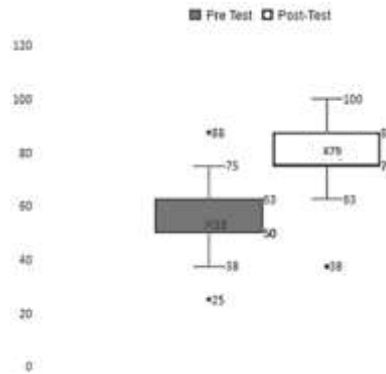
**Figure 2. Students' perception of the learning engagement compared between traditional anatomy course and flipped classroom with pre-lecturing video on physiology course**

Figure 2 shows that in conventional lectures, 43% of students perceive that conventional method lectures in anatomy lectures do not encourage their activeness in lecture sessions. Even 27% say they strongly disagree. These results are far different from students' perceptions, which show that providing pre-class physiology teaching video videos increases activity in the lecture process. As many as 37% of students agreed, and 39% strongly agreed that giving video teaching materials before lectures and the flipped classroom method increased their engagement during lessons.

**Table 1. Pre and post-test scores of the physiology course**

	Minimum score	Maximum score	Median	Average	SD	P value (one group paired t-test)
Pre-test	25	88	50	<b>53</b>	16	< 0.0001
Post-test	38	100	75	<b>79</b>	16	

The quantitative phase results (Table 1) showed that the paired t-test results showed significant results with  $p < 0.0001$  and an increase in the average score of 49% for the physiology course.



**Figure 3. Comparison between pre and post-test scores of the online flipped classroom with additional pre-lecturing learning materials video of the physiology course**

The findings in figure 3 visualize the results of the pre and post-test scores. Figure 3 shown that modified classroom increased the average score from 53 to 79, minimum score from 38 to 63, and maximum score from 75 to 88 based on the pre and post-test results. The figure also shown that the outlier data was increased from 25 to 38. The changes in skewness, median, and dispersion of the post test data including the outlier shown the effectiveness of the modified flipped classroom in increasing the cognitive aspect of the students in basic science course.

**Table 2. Students' perceptions regarding strengths and weaknesses of the traditional online classroom**

	Category	Subcategory
<b>Traditional online classroom</b>	Strengths of the traditional online classroom	Increase the motivation to ask
		Promote the autonomy of the literature searching
	Weaknesses of the traditional online classroom	Learning resources efficiency
		Lack of student readiness
<b>Modified flipped classroom</b>	Weaknesses of the modified flipped classroom method	difficulties in determining the expected learning outcomes
		Lack of post-lecturing understanding of the learning material
		Inhibits active learning
		Decrease the learning materials delivery quality from the teacher-to-peer explanation
		Influenced by the quality of the learning materials
	Strengths of the modified flipped classroom method	Reduced time allocation for asking a question to the lecturer
		Needed additional learning resources
		Cultural barriers to active learning
		Enhance active learning and engagement
		Fostering reflective learning practice
		Increase the learning outcome acquisition
		Possibility for repetition of the learning materials
		Increase student readiness before class
		More effective classroom session
		Facilitating learning pace equity between students

Table 2 lists several themes emerged from the content analysis of the open-ended question answer of the students. The deductive content analysis identifies the advantages and disadvantages of the conventional and flipped classroom methods based on the student perception. The comparison of the findings between these two teaching methods from the qualitative data highlight more complex issues in weaknesses and strengths of the modified flipped classroom method. Overall perception of the students regarding the strengths of the modified flipped classroom revealed its effectiveness to facilitate the student-centred learning which consist of active learning, reflective practice, student-self learning regulation, and facilitating active two-way lecturing session.

## **DISCUSSION**

According to the purpose of this study, an effective teaching-learning process is ensured when students interact and actively participate in the learning process. Student participation is divided into four forms: full integration, involvement in circumstances, marginal interaction, and silent observation (Tesema et al., 2020). In this study, students' perceptions of their activeness increased in the flipped classroom method treatment with exposure to pre-class video teaching materials. The flipped classroom method is an approach that can improve student engagement in the learning process. The flipped classroom concept includes active learning, student engagement, and podcasting. A flipped classroom is a learning model that "reverses" the traditional way, where lecturers usually provide the material in class and students work on assignments after lectures (Devi et al., 2019; Kolifah et al., 2017).

Good qualifications are needed from midwifery graduates to facilitate standardised midwifery practices. These standardised practices can be achieved through understanding the material, appropriate delivery methods, and lecturers who actively involve students even though they are not separated from the student's learning styles. Active learning methods like flipped classroom learning are needed to give students broader insights and increase their motivation for learning (Jian, 2019; Kolifah et al., 2017; Xuto et al., 2022).

In the context of this research, there was a change in lecture methods due to the Covid-19 pandemic. Giving lectures through video conferencing tends to cause students to become more passive and inactive in the learning process. This passiveness is due to a cultural transition, especially in the physical existence of face-to-face lecturers and students, which is replaced by 'virtual face-to-face'. The Covid-19 pandemic in the last two years has prompted various efforts to increase student engagement in online lectures (Luyben et al., 2020). The transition from offline to online classes during the pandemic has raised challenges to academic

integrity and a lack of student focus. The use of flipped classrooms is one method that can increase the effectiveness of online lectures (Nerantzi, 2020).

The results of the descriptive analysis illustrate that most students perceive that the flipped classroom can increase their activeness and readiness in the learning process. This finding aligns with the results of research by Tang (2017), which shows that the flipped classroom can stimulate student motivation, improve their performance in final exams, and help improve clinical thinking and communication skills. Other literature states that with a flipped classroom, students can gain knowledge online and discuss and socialise during class time (Sarsar & Yilmaz, 2018; Tang et al., 2017).

In this study, a modified flipped classroom used a method in which lecture podcasts are distributed for students to watch before class. The meeting then becomes a time for facilitated discussion around questions or concerns raised by students and deep dives into recorded lecture content, such as analysis of clinical scenarios or other real problems in the domain. As well as enhancing independent learning, this method allows lecture sessions to be used for active experimentation, exploration, and dialogue (Luscombe & Montgomery, 2016; Swanwick, 2014).

These findings also correspond with the qualitative results. The students perceived that the modified flipped learning could enhance active learning and engagement, foster reflective learning practice, increase learning outcome acquisition, enhance the possibility for repetition of the learning materials, increase student readiness before class, and create more effective classroom sessions. These advantages stated by the participants:

*"I have an overview of the material before lectures so that I can actively discuss with the lecturer during the lesson."* (F8)

Even so, it is necessary to pay attention to student learning load, considering that flipped classrooms require more study time allocation than traditional methods. One of the participants stated this additional learning resource requirements problem (Sinaga, 2017). Extra study time was needed to complete the instructions given in the flipped classroom, as mentioned by the participant:

*"I need to allocate more time to learn the video first"* (F13)

Thus, the flipped classroom method must be combined with other methods to maintain student well-being during the learning process. The phenomenon was stated in research by Xuto (2022), which shows low student acceptance of the flipped classroom method during the Covid-19 pandemic, allegedly caused by increased learning load in flipped classrooms and the contribution of external factors such as isolation during the pandemic.

One of the contextual findings from this study is the perception that with a flipped classroom, students perceived that they could achieve the same pace of learning as their peers. This pace equity issue was stated by one of the following participants:

*"I became aware of what was going to be discussed in full and didn't feel left out from the others."* (F16)

Cultural barriers also become one of the contextual challenges in this study. The power distance between learners and teachers in many Asian countries and the habits of questioning and expressing thoughts become obstacles in fostering active engagement, as stated by the participant:

*"I became so nervous if I suddenly appointed or given a question"* (F4)

In the end, the active learning method with the flipped classroom and the presentation of multimedia teaching videos in this study increased students' understanding of the Physiology course, this is in accordance with previous research Sari (2023) the t-test result showing significant results between pre and post-test scores. This quantitative finding aligns with a quasi-experimental research with a controlled pre-post-test design conducted by Halasa et al, about the flipped classroom (Halasa et al., 2020).

The qualitative data also supported the findings that the modified flipped classroom fosters their understanding of the acquisition of learning outcomes, as mentioned by the participants responding to the open-ended questions.

*"The topic was easier to understand, and I can absorb the lesson adequately so that I can have a better understanding"* (F21)

The possibility for repetition of learning materials, learning deficiencies, self-reflection, and the higher effectiveness of the classroom session could be the causes of the positive effect of the modified flipped classroom on the students' competencies acquisition (Pivač et al., 2021; Sarsar & Yilmaz, 2018).

This study was limited only to one institution, involved only first-year undergraduate midwifery students, and was limited to the learning of basic science and cognitive domain of learning. These limitations were covered by a quasi-experimental design, which involved total sampling and a class-action research approach. Thus, further research should be conducted with different learning domain contexts, grades, and true experimental methods with a control group to increase the impact of the research findings on future educational practices.



## CONCLUSIONS

This study concluded that flipped learning could positively impact the student's readiness, increase active engagement during the class, and improve understanding of difficult learning topics such as physiology. The quantitative and qualitative findings supported these results. There were significant differences between pre and post-test scores, with the higher average post-test score on the physiology course. The qualitative analysis emerged themes that revealed the positive impact of the modified flipped classroom on the readiness, activeness, and understanding of the learning outcomes. Suggestions for future researchers are to add additional variables in the study to measure the impact of modified flipped classroom, such as learning motivation, student satisfaction, and academic outcomes. This will provide a more comprehensive picture of the effects of using this method on learning outcomes and student experience.

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