

Using Flip-classroom model in the topic of Thyroid disorders in the pharmacotherapeutic class: a pilot study

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ABSTRACT

In the 21st century, the flip-classroom (FC) is considered as an effective teaching method. There are few studies about the application and effectiveness of implement FC in pharmaceutical sciences or pharmacotherapeutic classes. The present study aims to implement the Flip-classroom model and measure the learning outcomes compared to the regular teaching method. FC was implemented to fourth-year pharmacy students who registered the pharmacotherapeutic course in the 2018 academic year. The videos were assigned to study before class and in class, and the discussion of case studies was opened. The examination scores of this topic were compared with the regular teaching class in the 2016 academic year (before the FC implementation) with a significant level = 0.05. Also, students' opinions about FC were recorded by the questionnaire. Data from 167 students (the academic year 2018) and 173 students (the academic year 2016) showed that the FC implement group got higher examination scores in this topic than the regular study group (4.94 ± 1.56 VS 2.95 ± 1.10 , $p = 0.0001$). The major of students think that FC was useful and help to understand cases and get a better score, while the barrier was time to spend for study video. Half of them suggested that the FC model, unlike the rest, should be implied to other topics, due to the limitation of time to spend for self-study. FC may be useful for increasing students' knowledge. However, there are some factors to consider before implementing the FC model in the pharmacotherapeutic class.

Keywords: Flip classroom, Thyroid disorders, Pharmacotherapeutic, Pilot study

Introduction

Learning is an essential challenge in students' education [1, 2]. Flip-classroom (FC) is a teaching model used throughout the 21st century. Defining a flip classroom is "an instructional strategy and a type of blended learning that focuses on engaging students and active learning, and gives the instructor a better opportunity to deal with mixed levels, student difficulties, and distinctive learning styles during the in-class time." The advantages of FC are first when students watch or listen to

lectures at home, and then solve problems and apply new knowledge in class, they get less frustration with their homework. Also, when they do not understand a new concept, they can ask questions and receive immediate targeted responses.

Spending time in the classroom is not enough for all the conversations and collaboration that are inevitably spurred from exploring subjects in a deeper manner [3]. Last but not least, students who are absent due to illness, too long a commute, or for any other reason, can catch up with their peers faster and easier with the flipped classroom model than a standard one [4]. In terms of healthcare professional education especially pharmacy, there have been increasing the use of "flip-classroom" in pharmacotherapy. A recent study [5] showed that the Flip-classroom could be used in pharmacotherapy, and the major of pharmacy students were satisfied. From the information, including the development of the faculty policy, therefore, this study was conducted to implement the Flip-classroom model and measure the learning outcomes in comparison with the regular teaching method.

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Materials and Methods

Learners

The pharmacotherapeutic course (Thyroid disorders) with a flip-classroom model was implemented to the fourth-year pharmacy students who registered this course, at Faculty of Pharmacy, Silpakorn University in the 2018 Academic year.

Process

Video recording for the content was prepared by the Vidyad program [6], and another video was selected by searching from internet resources. These two videos were posted in the Google classroom and all students were announced to study them before- class. Case-studies of Thyroid disorders were discussed in class. All processes were informed to the students and an agreement was conducted between the teacher and the students.

Data collection

The test scores of this topic were recorded and compared with the previous generation who did not implement flip-classroom (the academic year 2016), the statistic of independent- student t-test was used (level of significant = 0.05) to investigate the differences score between two- groups. Satisfaction measurements were performed in the flip-classroom model group and students' suggestions and comments were recorded.

Results and Discussion

Exam scores

The full score of this topic is 7 points. A comparison of the exam score between the 2016 academic year (Regular class) and the 2018 academic year (Flip-classroom) is presented in **Table 1**.

Table 1. Summary of the exam score.

Academic year	2016 (Regular class) N=167	2018 (FC model) N= 173
Average	2.95	4.94
Max	5.00	7.00
Min	1.00	0.00
SD*	1.10	1.56

*SD = Standard deviation p =0.0001

The results showed that the mean score of the FC group test was significantly higher than the regular class group (4.94 ± 1.56 VS 2.95 ± 1.10 , $p = 0.0001$).

Students' pinion

There are eight questions about flip-classroom activities. The results are presented in **Table 2**.

Table 2. Summary of students' opinions

Topic	Comment N= 30 (%)
Did the students study the videos before attending the class?	Several times (6.1) Once (48.7) As a part of the video, not all content (15.4) No, do not have time (30.8) No, cannot access (0)
Did the students understand the case studies that present in class?	Very understand (5.2) Understand (28.2) Partially understand (33.3) Quite do not understand (33.3)
Did the students think the videos were useful for the case study discussion?	Especially useful (10.3) Useful (38.5) Some useful (43.6) A little bit useful (2.2) Un-useful (5.4)
Did the students think that the videos would help them get better scores in the examination?	Extremely helpful (10.3) Helpful (43.6) Some helpful (25.6) A little bit helpful (15.4) No helpful (5.1)
Did the students like this activity?	Genuinely like (7.7) Like (20.5) Neutral (38.5) A little bit like (12.8) Do not like (20.5)
Did the students think the content of the videos is appropriate?	Very appropriate (7.7) Appropriate (61.5) Some appropriate (23.1) A little bit appropriate (2.2) Un-appropriate (4.4)
Did the students think that the time spent watching the video is appropriate?	Very appropriate (4.5) Appropriate (33.3) Some appropriate (35.9) A little bit appropriate (3.2) Un-appropriate (23.1)
Did students recommend using this activity for other topics?	Should be used in other topics (25.6) Should not be used because no time for study (41) Should be used in a topic that has more detail (10.3) Should be used in a topic that has more difficult to understand (15.4) Should not be used in other topics (7.7)

Additional comments: Students would like to see face to face in class more than self- study in the lecture part because they feel comfortable asking questions.

More than half of students respond to studying videos before class and think that these videos will help them get a better score. However, because they are not familiar with the activity, therefore, a few students (28.2%) like the activity. Most students (68.2%) think the content in the videos is appropriate but they think it is spending more time, only 37.8% think it is

appropriate. About 50% of the students' responses think that it should be used FC in another topic. 10.3% of students' responses suggest that it should be used in a topic that has more detail, while 15.4% think that it should be used in a topic that is more difficult to understand. The rest of the answers suggest that FC should not be used in other topics, 41% do not have time to study videos.

The results of this study are similar to many studies, such as Terri H. Wong *et al.* [7] have done the same study but are focusing on cardiac arrhythmia, and the results show that exam scores in the flip-classroom group are significantly higher than regular teaching group. The students were satisfied with flip-classroom activities. However, there is a study that received the opposite results, as in Colleen McCabe *et al.* [8] the regular-class receive higher examination score than the flip-classroom group, and the author suggests that in flip-classroom, students should also receive guidance from teachers as regular teaching.

Also, students' opinions in this study relied on the same trend as other studies [9-11], which is divided into positive and negative thinking. The positive thought was that they were satisfied with the activities, and they knew how useful it was. In contrast, negative thoughts were comments about time-consuming and the impossibility of interaction during self-study time. Therefore, the flip-classroom model is not appropriate in all topics and all students. Many factors may affect the performance of the flip-classroom, such as basic knowledge of students, Students with more basic knowledge will spend time on self-study less than students who lack basic knowledge. For students, it is important to implement a flip-classroom model. Factors that should be considered in this study are the time spent for self-study, the quantity and quality of the content (media), student access, including the quality of electronic devices, the strength of the internet signal. In some studies, such factors have been mentioned [12-16].

Conclusion

According to the results, the flip-class room model can help students in terms of knowledge and significantly increased exam scores. However, for learners' points of view, some factors need to be concerned before implementing the flip-classroom model.

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Ethics statement: This study used an oral informed consent process. All students received all information about the learning process in this topic.

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