Scholars Journal of Arts, Humanities and Social Sciences OPEN ACCESS
Abbreviated Key Title: Sch J Arts Humanit Soc Sci
ISSN 2347-9493 (Print) | ISSN 2347-5374 (Online)
Journal homepage: https://saspublishers.com

The Flipped Classroom Model in Teaching the Primary School Mathematics Teaching Methods Course for Primary Education Students at Tan Trao University

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DOI: 10.36347/sjahss.2024.v12i04.006 | **Received:** 22.03.2024 | **Accepted:** 26.04.2024 | **Published:** 30.04.2024

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Abstract **Original Research Article**

Teaching according to the "flipped classroom" model is one of the blended learning methods. In this article, we discuss some research results from authors both domestically and internationally on the flipped classroom model, thereby proposing a process and implementation of organizing teaching according to this model in teaching the primary school mathematics teaching methods course for Primary Education students at Tan Trao University. Applying the "flipped classroom" model in online teaching contributes to: 1/ fostering active engagement and interest in learning for students; 2/ innovating teaching methods, enhancing learning effectiveness, and fostering the development of critical thinking and other skills for students.

Keywords: method, flipped classroom, mathematics, primary education, Tan Trao University.

1. INTRODUCTION

The Flipped Classroom is a model that combines face-to-face and online classes Teachers utilize information technology to organize teaching before, during, and after class, enabling students to self-study and absorb knowledge and experiences through teacher guidance and peer interaction. This model is widely implemented and has shown positive results, fostering student autonomy and ensuring teaching objectives [1].

In the context of the Fourth Industrial Revolution and the ongoing digital transformation, integrating information technology into teaching to enhance the learning process has become a common trend across educational levels, especially at the university level.

To address the societal challenges, Tan Trao University has issued directives for lecturers to enhance their capacity in using information technology and innovate teaching methods by incorporating technology into instruction to bring about fundamental and comprehensive changes in teaching, aiming to promote student self-directed learning. Accordingly, teaching through the flipped classroom model is implemented as one of the organizational forms with many advantages and high effectiveness in teaching organization.

This article focuses on researching ways to enhance the effectiveness of using the flipped classroom model in teaching the Mathematics Teaching Methods course for Primary Education students at Tan Trao University. The aim is to innovate teaching methods, improve teaching effectiveness, and meet training requirements.

2. RESEARCH METHODS

In this study, we employed theoretical research methods (selecting, collecting, and analyzing, synthesizing literature on the flipped classroom). Based on the analysis of these documents to clarify the theoretical basis and characteristics of the flipped classroom model, we propose the application of the flipped classroom model in model in teaching the primary school mathematics teaching methods course with an appropriate implementation process.

3. RESEARCH RESULTS AND DISCUSSION

3.1. The Flipped Classroom Model

3.1.1. Introduction to the Flipped Classroom Model

The flipped classroom model is an advanced teaching method that utilizes a combination of approaches. This method harnesses the strengths of information technology and addresses the limitations of traditional teaching models by "flipping" the teaching process compared to the traditional model. "Flipping" here refers to a change in the approach and teaching strategy, in the deployment of content, objectives, and other teaching activities compared to the traditional approach of both lecturers and students [4].

In the flipped classroom model, traditional activities of "Learning in class, doing homework at home" are transformed into self-study activities at home through lecture videos, online learning, and researching lesson materials via the Internet. When in class, students engage in activities such as exercises, discussions, sharing academic content, solving problems, and situations provided by the lecturer. Students access lecture content beforehand by reading materials, summarizing content, listening to lectures through supportive means such as video clips, presentations, as well as searching for and exploiting materials for studying lessons.

Lecturers' lectures are sent to students in advance and become homework assignments that students must prepare before class. Class time is allocated to instructional activities with guidance from the lecturer, including listening to student reports, discussions, sharing prepared knowledge before the lecturer reinforces and formally reorganizes lesson content. This method aligns well with the organizational requirements of credit-based education at the university level.

3.1.2. The Flipped Classroom Model and the Development of Learners' Thinking

The flipped classroom model is built on the theoretical foundation of active learning. This is an approach to teaching that allows learners to actively explore and access knowledge through the interactive process [13]. This teaching method creates conditions for self-directed learning for students, as they can independently seek out and prepare necessary knowledge for the lesson as well as tackle related issues, rather than solely relying on knowledge transmission from the lecturer during class.

According to Marks, D.B. [9], implementing the flipped classroom model also contributes to training and developing learners' cognition. Based on Bloom's cognitive domain, it can be observed that in traditional classrooms, lecturers often guide students at the first three levels of cognition: remembering, understanding, and applying. To reach higher levels, students need to engage in self-study and research at home, which is often a significant challenge for most students. In the flipped classroom model, these first three levels are typically completed by students at home under the guidance of the lecturer, while class time is spent on collaborative work between the lecturer and students to help them achieve higher levels of cognition. This is a challenging requirement but can be achieved with support from lecturers and peers.

3.1.3. The Essence of the Flipped Classroom Model

According to Lage, M.J.P.G [6], "Flipping the classroom is transferring classroom activities outside the classroom and vice versa". The flipped classroom marks a significant change in the roles of lecturers and students. This model focuses on activating students' learning processes, particularly by facilitating positive interaction between students and the learning environment, to update and enhance knowledge from existing to new knowledge.

The flipped classroom creates a self-learning environment where students are autonomous and instructors serve as guides. Students need to create an interactive and collaborative environment, develop skills and thinking, while lecturers promote self-learning and creativity.

3.1.4. Advantages of the Flipped Classroom Model

The flipped classroom model is a teaching method that has demonstrated its suitability and numerous advantages in educational settings [5]. In my opinion, some key advantages of this teaching method are as follows:

* For learners: 1/ Manage their own study time; 2/ Access diverse learning materials; 3/ Actively participate in interactive activities and discussions in class; 4/ Encourage students to develop self-learning and research skills. Thus, the flipped classroom model brings many benefits to students by creating a flexible, interactive, and engaging learning environment, helping them develop skills and knowledge comprehensively.
* For instructors: 1/ Increase interaction capabilities; 2/ Focus on guidance and support; 3/ Create opportunities for developing creative teaching skills; 4/ Personalized assessment and feedback; 5/ Promote professional development. It can be said that the flipped classroom model brings many benefits to instructors by creating opportunities for deeper interaction with students, focusing on personalized guidance and support, and promoting professional development and creativity in teaching.

3.2. Online Teaching Model and Online Teaching at Tan Trao University

3.2.1. Advantages

In Vietnam, the implementation of online teaching has been carried out relatively early, especially for distance learning classes. The Ministry of Education and Training issued Circular 10/2017/TT-BGDĐT on the Regulation on Distance Education at the University Level, which stipulates the method of organizing teaching through the Internet (MOET, 2017). In the context of the complex COVID-19 pandemic, many schools have had to close to ensure the safety of both lecturers and students. Some schools have switched to online teaching methods. Tan Trao University is one of the institutions that have adopted this method to continue organizing teaching.

To implement this, the university issued Plan 111/KH-DDHTTr on March 27, 2020, regarding the Implementation of Distance Education in response to the COVID-19 pandemic; Decision No. 127/QD-DDHTTr on February 22, 2021, on the Issuance of Regulations on Online Teaching at Tan Trao University; etc. The university actively provides guidance to lecturers and conducts training on software usage for both lecturers and students. The university has chosen Microsoft Teams software to organize and manage online teaching. The organization of online teaching has been implemented department by department, subject by subject, and lecturers are required to adhere strictly to the guidelines. Lecturers follow these steps:

Step 1: Lecturers provide course outlines and electronic materials from the early days to help students gain initial awareness of the course and plan their studies accordingly.

Step 2: Lecturers provide electronic lectures on the university's E-Learning portal before the teaching days. Students access the materials, read, and prepare before class.

Step 3: Lecturers use Microsoft Teams or Microsoft 365 software to conduct teaching, directly interact with learners, or teach directly in class to clarify and expand on the content presented in electronic lectures.

Step 4: Lecturers assign homework. Students complete the assignments and submit results to lecturers through channels such as email, Zalo, etc.

3.2.2. Challenges

During the initial implementation, lecturers and students encountered several challenges such as:

- Limited infrastructure and technological facilities.
- Limited IT skills of both lecturers and students.

3.2.3. Causes

Insufficient infrastructure and facilities to support technology-enhanced teaching.

Some lecturers and students lack proactive efforts to enhance their IT skills for teaching and learning.

In summary, the online teaching model has provided opportunities for students to access materials, attend lectures, and engage in discussions flexibly. However, many lecturers still face difficulties in using devices, methods, and organizing online teaching effectively, and have not fully utilized the potential of this method.

Online teaching is not only a temporary measure during the COVID-19 pandemic but is also being considered by the Ministry of Education and Training for official adoption in schools. This indicates the development and potential of this teaching method in Vietnamese education.

4. Enhancing the Effectiveness of Implementing the Flipped Classroom Model in the Mathematics Teaching Methods Course for Primary Education Students at Tan Trao University

4.1. Enhancing the Quality of Electronic Lectures in the Mathematics Teaching Methods Course

4.1.1. For lecturers:

Develop electronic lectures that are close to the goals, content and realistically linked to the content and teaching objectives of the Primary School Mathematics Teaching Methods course. Lecturers share electronic materials or guide students to access electronic libraries or connect with students from other schools to increase opportunities for accessing study materials to meet the purposes and requirements when developing electronic lectures.

Use vivid language and imagery to make lectures more engaging and understandable for students.

Integrate multimedia: Utilize teaching support software and tools such as PowerPoint, Google Slides, Prezi, or applications for electronic lesson planning to create high-quality lectures. Combine the use of video, audio, images, and text to create diverse and rich lectures.

For example: When teaching the content "2.7 Organizing teaching games activities" lecturers provide links, websites, and learning software introducing teaching games in mathematics education. Through these links, students can actively explore theory, analyze constructions, and organize appropriate teaching games according to the lesson content. From their research, students can create instructional game videos and exchange teaching games during practical teaching sessions in class.

4.1.2. For students

- Students are required to watch/study lectures, materials, and videos at home.
- Complete study tasks assigned by lecturers before participating in online classes.

4.2. Enhancing Classroom Interaction Effectiveness

4.2.1. For lecturers

Creating a positive learning environment and encouraging students to engage in the learning process by using diverse and appropriate teaching methods, such as: assigning presentation tasks and content critique in pairs or small groups of students.

Providing opportunities for students to engage with lecture content by asking questions, soliciting feedback, or completing exercises on the online platform. Instructors lead activities for opinion sharing, discussions, and exchanges of lesson content among students, then conclude the main issues of the lesson during class time.

For example: For the content "4.3. Introduction to Some Teaching Aids for Mathematics in Primary School" in *Chapter 4. Using Primary School Mathematics Teaching Aids*, the lecturer divides the class into 4 pairs of student groups. Each pair of groups will research and present on 1 task such as: 1/ Researching and introducing number charts, group charts, or counting boards; 2/ Studying and presenting various geometric aids, such as spatial geometry, plane geometry, or object geometry; 3/ Exploring and presenting the use of basic arithmetic teaching aids, such as number balls, counting sticks, or counting aids; 4/ Researching and discussing the application of teaching aids such as computers, tablets, or educational software in teaching and learning mathematics in primary school. Each pair of groups can conduct research, discussions, and prepare their presentations, then share with the whole class for mutual learning and exchange of opinions. This helps create a positive learning environment and encourages collaboration between students and lecturers.

4.2.2. For students

Students need to listen carefully to lectures, discussions, and guidance from lecturers and classmates. They also need to actively participate in class activities, including answering questions, group discussions, and completing assignments.

Students should ask questions when they do not understand or need clarification on certain issues. They should also participate in discussions and share personal opinions to expand their knowledge and perspectives.

Students need to take notes of important information and opinions in class to support their learning later on. Taking notes helps them focus and remember important content more easily.

If any group assignments or activities are assigned in class, students should complete them seriously and actively participate in the learning process.

Finally, students can provide feedback on the learning process and propose improvements to enhance the quality of the class and their learning experience. This helps create a more flexible and effective learning environment.

Conduct direct assessment of the teaching and learning process of lecturers and students immediately after the class.

4.3. Enhancing students' assignment completion effectiveness and lecturers' post-class evaluation efficiency

4.3.1. For lecturers

Lecturers continue to support, exchange, and address students' questions about the content learned in the classroom through class groups created on the Zalo platform.

Monitor the completion of assigned tasks in the Zalo group by encoding the sequence of groups. Results of submitted assignments recorded in the group are publicly displayed and transparent.

Publicly assess and transparently evaluate assignments in the Zalo group or in the classroom.

For example: When students complete group assignments, they agree on an upload schedule and upload in sequence. This avoids difficulties in tracking assignments from groups and fosters a collective consciousness when carrying out tasks. This approach is also implemented with individual assignments.

Propose topics, research directions related to lesson content, and provide seminar announcements for students to choose (if applicable) to carry out research tasks.

4.3.2. For students

- Students complete assignments and perform tasks assigned by lecturers after each class.
- Actively propose questions surrounding lesson content.

5. CONCLUSION

In the flipped classroom model, lecturers regulate support and provide problem situations to guide learners in problem-solving. When students encounter difficulties, lecturers guide and support them in problem-solving, thereby saving time and creating opportunities for students' cognitive development. This fosters positivity and creativity in students' learning process.

Applying the flipped classroom model in teaching the Primary School Mathematics Teaching

Methods course will create higher learning motivation, develop skills, and provide opportunities for interaction between students and lecturers, as well as expand research. This also helps enhance students' self-learning ability through information technology.

Acknowledgement: This research is funded by Tan Trao University in Tuyen Quang, Viet Nam.

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