Enhancing Student Practical Skills using the Modified Flipped Classroom (MFC) Approach

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Abstract: *This research aimed to investigate the effectiveness of a modified flipped classroom (MFC) approach in enhancing multimedia practical skills among undergraduate students. Traditional flipped classroom approaches were merged with learning contents created and shared with students prior to the classroom time; and classroom hands-on sessions tailored for multimedia skill acquisition. In the MFC approach, the classroom time is converted to synchronous online classes and problem-solving activities. A cohort of 42 undergraduate students enrolled in a multimedia computing course was divided into two groups: a control group (21) receiving traditional lectures and lab sessions, and an experimental group (21 students) exposed to the modified flipped classroom approach. The study spanned 14 weeks, with pre and post-assessments used to evaluate students' practical skills using assignment evaluations. The effectiveness of the modified flipped classroom approach was based on two indicators (i) the student's assignment performance and (ii) the student's learning experience. The experimental group demonstrated an improvement in multimedia practical skills compared to the control group. There was an 8.25% increase in students' performance in designing, develop, and implementing multimedia assignments. Quantitative learning experience feedback indicated that students in the modified flipped classroom liked*

the approach and helped to understanding of the content and practical approach better. Implementing a modified flipped classroom approach not only prepares students for the professional world but also accommodates diverse learning styles, promoting holistic learning and pratical skill development in the multimedia domain.

Keywords: *Conceptual Framework, Modified Flipped Classroom (MFC), Practical Skills*

1. INTRODUCTION

Over the years, the methods and approaches in education have undergone significant transformations, adapting to the changing needs of learners and the broader societal context (Akour & Alenezi, 2022). One of the most notable shifts in pedagogical strategies has been the introduction of the Flipped Classroom approach, which essentially reversed the traditional learning (Hardison et al., 2022). The students would get their first exposure of new content at home through videos or readings; classroom time, then, was dedicated to deepening that knowledge through interactive activities (Jensen et al., 2018). Yet, as the educational landscape continues to progress, so does the need for more refined and adaptive teaching methods.

Emerging as a response to this need is the Modified Flipped Classroom (MFC) approach. The MFC approach maintains the foundational aspects of the flipped classroon but integrates synchronous and asynchronous online learning components. Instead of physical classroom sessions, MFC utilizes online real-time classes for demonstrations and problem-solving, thereby catering to remote or hybrid learning environments. The MFC seamlessly blends elements of self-paced online learning with synchronous, real-time online interactions. This approach personalizes the learning experience and strengthens relationships within a remote learning context (McClure & Williams, 2021).

2. DESIGNING TEACHING INSTRUCTIONS FOR MFC

The MFC approach seeks to create a robust and flexible learning environment by integrating both synchronous and asynchronous online components. While synchronous activities involve real-time interactions, asynchronous activities allow students to engage with the content at their convenience, without the constraints of fixed schedules. The 5 steps for designing modified flipped classroom instructions are: (1) Identify the instructional components, (2) Plan course structure and instructional strategies, (3) Develop the course instructions and material, (4) Implemention of MFC approach, (5) Assess the effectiveness of the course instructions.

2.1 STEP 1: IDENTIFY THE INSTRUCTIONAL COMPONENT

The instructional components for modified flipped classroom approach are based on the synchronous online class and asynchronous online learning activities. The instructional components based on the student learning time (SLT) in hours for a 3 credit undergraduate course discussed in Table 1.

<table>
<tr><td colspan="2">Online Guided Learning
(F2F: 0%, Online: 100%)
SLT: 56
synchronous online class</td><td>Self-Learning
(Class Preparation)
SLT: 34
asynchronous online learning activities</td><td colspan="3">Assessment
(Cont.Assessment: 60%, Final: 40%)
SLT: 30</td></tr>
<tr><td>Student Centered Learning (SCL) Online Activities</td><td>Online Lab Activities</td><td></td><td>Continuous Assessment</td><td>Exam Preparation</td><td>Final Assessment</td></tr>
<tr><td>28</td><td>28</td><td>34</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">56</td><td>34</td><td>18</td><td>9</td><td>3</td></tr>
<tr><td colspan="3">90</td><td colspan="3">30</td></tr>
<tr><td colspan="6">TOTAL SLT: 120 HOURS</td></tr>
</table>

Table 1. SLT based instructional components

The SCL online activities / online lab activities for a course is designed for a 2 hours session. The
detail component for each sessions were describe as below.

- Online learning activities (45 minutes)
- Online reflection activity (15 minutes)
- Online individual or group exercises (60 minutes)

While the self-learning instructional components were planned as below for the remaining 34 contact hours.

- Online self-paced asynchronous learning activities (2 hours x 8 topics = 16 hours)
- Online self-paced learning to develop practical skills (2 hours x 9 practical = 18 hours)

2.2 STEP 2: PLAN COURSE STRUCTURE AND INSTRUCTIONAL STRATEGIES

The course structure was outlined based on the identified instructional strategies, i.e. synchronous online class (SLT: 56 hours) and asynchronous online learning activities (SLT: 34 hours). Some changes are required in student-instructor, student-content, and student-student interactions for online classroom transitioning.

Student-instructor interaction: the changes in learning schedule, assignment due dates and assessment dates communicated clearly to the students. The method used to communicate with the students was the What's App group message. Separate individual messages also send to those students who are not active in their online learning to understand their constraints. Below are some of the interactions done with the students:

- Communicate with students using the same method that is What's App.
- Students will be notified in the system and WhatsApp message when a new assessment is added.
- The i-Discuss (discussion board) feature in UiTM Learning Management System (UFUTURE) is utilized to respond to students' doubts on the topic of learning. Students will be always encouraged to check the i-Discuss before What's App for any doubts.

Student-content interaction: Additional course materials were shared as students must self-learn remotely. Below instructions were given to students when new course material was posted.

- Students were notified of the availability of course materials.
- Suggest students to identify and share additional learning material that meets their learning outcomes.
- Course materials were converted to PDF format to allow the students to access those materials using mobile devices.
- Copy of course materials always shared in class What's App group for easy content accessibility.

Student-student interaction: Communication between the students is fostered using UFUTURE and other learning technology tools. Below are some of the activities used to foster student-to-student interactions.

- Students always engaged in live discussion during the online synchronous session.
- Students also always engaged in discussion among other students in i-Discuss during the online asynchronous session.
- A set of online collaboration tools (Padlet and Jamboard) was introduced to facilitate students' online group assignments and collaboration tasks.

2.3 STEP 3: DEVELOP THE COURSE INSTRUCTIONS AND MATERIAL

In developing the course instructions and materials, 5 components of the self-developed model (DeLCAD: Teaching Delivery (De), Learning Activities (L), Course Content (C), Assessment (A) and Discussion (D)) were used as a guide (Ramakrisnan et al., 2020). The online classroom instructions were developed for the synchronous online class and online learning instructions were developed for asynchronous online learning activities.

The online classroom instructions were designed in a facilitated and fun mode so that the students will be motivated to participate. Take note that designing online class instructions are limited to time. Thus, a combination of some activities from learning activities / course content / assessment / discussion can be used to design the online class instructions.

While the online learning instructions were designed in facilitated and self-paced engaging mode so that the students will participate online. Parts of the lessons were delivered online using pre-recorded video. Online assessment tools like quizzes, tests and assignment rubrics were used to assess student's understanding and quality of their project. Students also use the online discussion tools to discuss project development matters asynchronously between other students and the lecturer.

The instructional course materials were designed using digital education tools like google slides, canva, sway, h5p, TOGlic and etc. Then, all the developed instructional course materials are delivered to students using platforms such as the UFUTURE.

2.4 STEP 4: IMPLEMENTATION OF MFC APPROACH

The implementation of MFC approach is divided into three main parts. In the first part, called "Pre-Class Preparation", students get materials like videos and notes ahead of time. They watch and read these before the class, and if they have questions or find something hard, they note it down. Next, in the "Synchronous Online Class" part, everyone meets online for a live class. The intructor starts by answering common questions. After that, the instructor shows some live practical examples. The end of this live class is for group activities and talking about the practical skills. Finally, in the "Post-Class Activities" part, students get tasks or small projects to do. These tasks help them use what they just learned. They can also chat with other students online to discuss more and clear up any doubts.

2.5 STEP 5: ASSESS THE EFFECTIVENESS OF THE COURSE INSTRUCTION

There is a range of models that can be used to obtain reflection on student learning experience in their course instructions. The course instructions were assessed using an online feedback form and student performance in the skill-based task given.

3. METHOD AND RESULT

Qualitative assessment based on student online feedback regarding the course delivery. This feedback is on student perception toward a course delivered using the MFC approach. Five questions were asked on this feedback to gather student's thoughts on how the MFC approach affected their learning.

42 students enrolled in the Fundamentals to Multimedia Computing course have participated in this study. The students were divided into 2 groups: 21 students in the experiment group (MFC approach) and another 21 students in the control group (teacher-centered approach). The same 5 questions were distributed in an online feedback form and the data was collected as shown in Table 2.

Questions	Experiment Group Mean	Control Group Mean
You like this approach to learning.	4.45	3.85
This approach helped you to understand the topics better.	4.40	3.95
This approach required more work.	4.45	3.70
You would like more of the topics in the course taught this way.	4.35	3.80
You would like other courses to use this approach to learning.	4.20	3.75

Table 2. Data collection from student online feedback form

The overall finding from both the case study indicated the students mostly said that they like the approach and that they also understand better although this approach requires more of their effort. They also indicated that they prefer this approach for remaining of the course topics and to be applied in other courses too.

Table 3 below are the details of courses that used the MFC approach, the targeted learning outcome (LO) related to practical skills, student's tasks used to measure the LO, and methods used to measure the LO.

Course Name	Targeted Learning Outcome	Assessment Method	Measurement
Fundamental to Multimedia Computing	Construct practical skills in fundamental of multimedia computing	Group assignment	Group assignment rubric

Table 3. Course learning outcome, assessment method, and measurement

The performance-based task in the form of assignments assigned to assess student practical skill learning. Performance-based assignments used rubrics to evaluate the series of criteria that were needed to complete the assigned task. A well-written rubric will provide a clear expectation of the assignment. Fig. 1 shows the steps designed to construct the rubrics for the assignments.

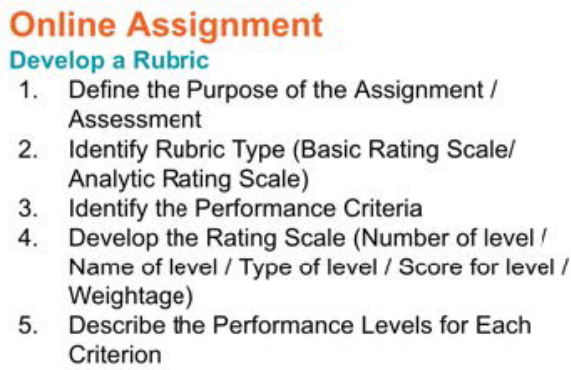

Fig. 1 The steps to construct a rubric

The learning outcome in Table 3 is measured using group assignment. The group assignment is assigned to the students in UFUTURE. The entire process of assigning, rubric-based marking, and student feedback for the assignment were design into UFUTURE. The detailed analysis of the rubric for each of the assignments will reveal the overall performance of students in attaining the desired learning outcome. The analysis can be used to improve the teaching process for better achievement of the learning outcome. The rubric analysis provides the performance gap; the difference between the intended and actual performance of each criterion. The criteria with bigger gaps were paid attention and extra materials were given to the student to

close or minimize the gap. The students in experimental group scored a lower performance gap (<30%). Additionally, the control group's average score for the assignment was 14.91 out of 20, while the experimental group scored 16.56. There was an 8.25% increase in students' performance in designing, developing, and implementing multimedia assignments. The relatively modest rise might be attributed to the sample size used. Thus, the teaching delivery using the MFC approach can be used to teach practical skill-based courses.

4. CONCLUSION

This study discusses the 5 steps for designing a course using the MFC approach. The summary of the 5 steps is given in Figure 2.

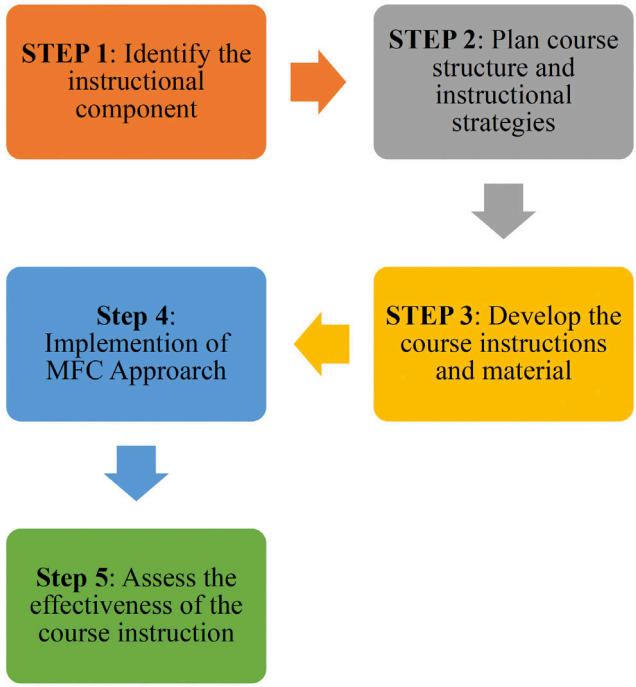

Fig. 1 The 5 steps to design a course using modified flipped classroom (MFC) approach

These five steps can also be applied when designing instructional content for traditional or blended learning-based courses. Courses crafted using the MFC approach offer enhanced flexibility in student learning and lead to improved achievements. This method further elevates the student learning experience by offering chances for self-paced comprehension enhancement. Moving forward, there is a plan to offer more training and raise awareness among instructors regarding the MFC approach's implementation in course delivery. Additionally, future studies aim to examine the MFC approach's impact on various facets of student learning experiences across different courses.

5. ACKNOWLEDGEMENTS

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