



Effect of Flipped Classroom Combined with Learning Management System on Culinary Teaching Skills of 3rd Year College Students in Microteaching and Practical Training of Teaching Skills Course

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Abstract

Background and Aim: The Chinese government attached importance to strengthening and enhancing the educational and teaching abilities of teachers. Microteaching and Practical Training of Teaching Skills Course was one of the core courses to develop students' teaching skills. However, many colleges and universities lacked sufficient attention to the cultivation of teaching skills of students majoring in culinary and nutrition education, and diluted the training of teaching skills in professional teaching, so that the students lagged behind the teacher-training students of other majors obviously in terms of teaching methods and methodologies, teaching ability, and so on. This study focused on the effect of the flipped classroom with learning management systems on the teaching skills of college students in culinary and nutritional education programs by experimental method.

Materials and Methods: The researcher looked at the related literature and came up with a new teaching method that combined a flipped classroom with the learning management system. The effect of this new teaching method was verified by a one-group pretest-posttest designed experiment. The samples were 32 students from 1 Class in the 3rd year of the Culinary and Nutritional Education program at Hanshan Normal University during the 2023-2024 academic year, which were selected by using a cluster sampling method. The research instruments consisted of two parts: lesson plans based on learning through the flipped classroom with LMS were the instruments for the experiment, with a mean of 5-point rating scale of 4.25; The Culinary Teaching Skills Evaluation Form was the instrument for collecting data, with the IOC of 1.00 and inter-rater reliability of .022 ($p=0.004 < .05$). Data was collected before and after learning through flipped classroom with LMS. Dependent sample t-test and one sample t-test were used to analyze the data.

Results: From the study, it was found that: 1) After learning through flipped classroom with LMS, the posttest score of students' culinary teaching skills was higher than the pretest score at .05 level of statistical significance ($t_{31} = 20.705, p=0.000 < .05$). So did every sub-culinary-teaching-skill: posttest score of students' introductory skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 13.372, p=0.000 < .05$); posttest score of students' demonstration skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 15.752, p=0.000 < .05$); posttest score of students' regulation skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 9.043, p=0.000 < .05$); posttest score of students' lesson closure skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 10.849, p=0.000 < .05$). 2) The mean score of



students' culinary teaching skills was 11.56 and the standard deviation was 0.914, which was statistically higher than the criterion of 70% (Full score was 16, criterion score was 11.2).

Conclusion: Learning through a flipped classroom with LMS could significantly improve the students' culinary teaching skills. The experimental data on students' learning results verified the research hypothesis.

Keywords: Culinary Teaching Skills; Flipped Classroom; Learning Management System

Introduction

The Chinese government attached importance to strengthening and enhancing the educational and teaching abilities of teachers and forging a team of high-quality and specialized trainers (Circular of the Ministry of Education and the Ministry of Finance on the Implementation of the Program for Improving the Quality of Teachers in Vocational Colleges and Universities (2021-2025), 2021). Microteaching and Practical Training of Teaching Skills Course was one of the core courses to develop culinary teaching majors' teaching skills (Hanshan Normal University, 2022).

In the actual teaching process, the students majoring in culinary and nutrition education lagged behind the teacher-training students of other majors obviously in terms of teaching methods and methodologies, teaching ability, and so on (Huang, 2020). Specifically, there were the following problems in the four basic teaching skills of students. The introduction paid too much attention to fun and purpose but ignored the pertinence of the introduction and the creation of context. The demonstration steps were not coherent, and the operation demonstration was not clear with the explanation. Lack of regulation skills. The form of conclusion was simple, lack of generalization and systematization (Dai, 2021; Li, 2020; Li & Yan, 2023; Lü, 2020).

Flipped classroom was one of the best choices for Microteaching and Practical Training of Teaching Skills Courses because it changed the roles of teachers and students and improved the effectiveness of teaching skills training (Dong, 2016).

In today's ubiquitous digital environment, Learning Management Systems (LMS) play an important role in enhancing and facilitating teaching and learning (Turnbull et al., 2021). Researchers had tried to utilize the learning management systems to support the flipped classroom to facilitate the teaching and learning effect of the flipped classroom and proved its effect with experiments (Wang, 2017). Such as Dusita & Chatkon (2023) studied *Integrated Learning of STEM Education Concepts with a Flipped Classroom to Improve Students' Chemistry Learning Achievement and Creative Skills in 11th Grade, Pakhampittayakom School* and found that an integrated learning plan on STEM Education concepts with a Flipped Classroom was appropriate for improving students' creative skills. Students' average scores of post-tests were statistically significantly higher than pre-test, and .05 level. Creativity skills were at a good level. Kumhla & Jansawang (2023) studied *The Development of Problem-Solving Ability, Academic Achievement, and Attitude toward Science Using the Flipped Classroom Approach of 10th Grade Students* and found that after learning via the flipped classroom learning management the students showed: 1) problem-solving ability was statistically higher than those before learning; 2) academic achievement was statistically higher than the 70 percent; and 3) the overall attitude toward science was at a high level. Hwang & Chen (2023) studied the *Effects of a collective problem-solving promotion-based flipped classroom on students' learning performances and interactive patterns* and reported that the students in the collective problem-solving promotion-based flipped classroom not only had better learning performances and collective efficacy but also had higher



level of knowledge construction and deeper interactions. Tunggysbay et al. (2023) studied *Flipped Classroom Strategies And Innovative Teaching Approaches in Physics Education: A Systematic Review* by comprehensively analyzing 30 journal publications focusing on flipped classrooms in physics education and found that compared to traditional classroom approaches, implementing flipped classrooms in physics education had a positive impact on student outcomes.

Therefore, this study focused on the effect of the flipped classroom with learning management systems on the teaching skills of college students in culinary and nutritional education programs by experimental method. The research objectives were as follows:

- 1) To compare the students' culinary teaching skills before and after learning through the flipped classroom with LMS;
- 2) To compare the students' culinary teaching skills after learning through the flipped classroom with LMS with the criteria set at 70 percent.

Literature Review

In this research review literature, the researcher studied the main aspects of Microteaching and Practical Training of Teaching Skills Courses, flipped classrooms, learning management systems, culinary teaching skills, and conceptual framework.

Microteaching and Practical Training of Teaching Skills Course

Microteaching and Practical Training of Teaching Skills Course was one of the core courses in the Culinary and Nutritional Education program at Hanshan Normal University to develop students' teaching skills. In this course, after students have already taken the Culinary Professional Pedagogy course and understood various teaching skills theoretically, they will master the comprehensive use and practice of multiple skills through microteaching and practical training, complete simulated teaching, and enhance the professionalism of teachers. The area of content included: (1) Creating teaching situation skill, (2) Introductory skill, (3) Questioning skill, (4) Variation skill, (5) Reinforcement skill, (6) Demonstration skill, (7) Regulation skill, (8) Lesson closure skill (Hanshan Normal University, 2023).

Flipped Classroom

The simplest definition of the flipped classroom from Lage et al. (2000) meant that events that had traditionally taken place inside the classroom now took place outside the classroom and vice versa. Al-Samarraie et al. (2020) referred to a flipped classroom as the full utilization of the model where students were provided with video/digital media lessons before class to gain first exposure to the learning materials. Additionally, the flipped classroom was defined as an educational technique that consists of two parts: interactive group learning activities inside the classroom, and direct computer-based individual instruction outside the classroom by Bishop & Verleger (2013). In summary, a flipped classroom refers to such a teaching model in which students learn on their own organize relevant knowledge outside of class time, and present their learning results to the teacher and other students in the classroom, while the teacher provides opportunities for classmates to present their learning results, organized discussions and evaluations, answered students' questions, and made suggestions for students.

Different scholars had different views on the components of flipped classrooms. Bergmann & Sams (2012) said that the components of a flipped classroom are composed of (1) the Preparation part,



(2) Outside the class, and (3) the Active in-class part. Heinerichs et al. (2016) said that the components of a flipped classroom composed of: (1) Before class: the online class, (2) During class: face-to-face class, and (3) After class: assessment of learning. Lee et al. (2017) said that components of flipped classrooms are composed of: (1) Online course, (2) F2F course, (3) Lesson feedback. Shnai (2017) said that the components of a flipped classroom are composed of (1) the Transfer of knowledge part in a video form, and (2) the In-class problem-based learning part through activities and group work. Although scholars had different expressions on the specific components of the flipped classroom, all scholars agreed that the flipped classroom should be composed of outside-class learning and in-class learning, and most of the scholars believed that the flipped classroom could be divided into three parts: before, in, and after class.

Learning Management System

Jamal et al. (2020) argued that the learning management system was an internet-based software, allowing instructors to manage materials distribution, assignments, communications, and other aspects of instructions for their courses. Foreman (2017) believed that a learning management system was a multiuser software application, usually accessed through a web browser. Bradley (2020) viewed the learning management system as an online classroom provided to teachers and students. In this study, the learning management system referred to an internet-based platform that allowed for curriculum and instructional management, sharing of learning materials, assigning tasks, communication, and evaluation. It was a way and a tool to realize the flipped classroom.

Different scholars had different views on the components of the learning management system. Steiner et al. (2013) said that components of the learning management system are composed of (1) storage of lecture slides for downloading, (2) a self-test, and (3) an online discussion forum. Nguyen (2021) said that components of the learning management system are composed of (1) schooling announcement, (2) lecture delivery, (3) exam revision, (4) report submission, (5) online assignment, and (6) course registration. Prifti (2022) said that components of a learning management system are composed of (1) the content of the system, (2) system accessibility, and (3) system components related to the enhancement of critical thinking. In summary, the components of the learning management system mainly included: materials for learning, online discussions, online assignments, and evaluation.

Learning Management Using The Flipped Classroom Based on LMS

Learning management using the flipped classroom based on LMS was a teaching method that used the teaching steps of the flipped classroom supported by LMS.

There were 3 main steps of a flipped classroom: before class, in class, and after class. The main activities in each step are shown in Table 1.

Table 1 The Main Steps and Activities of Flipped Classroom

Step	Activities
Step 1: Before class	The teacher provided learning materials. Students learned by themselves.
Step2: In class	Students learn through the guidance of the teacher.
Step3: After class	Students review what they had learned, or were evaluated. The teacher gave the feedback.

The teaching process of flipped classrooms with LMS was as follows.

Step 1: Before Class

Sub-step1: upload learning materials

The teacher Uploaded learning materials to the LMS.

Sub-step2: online assignments

Teachers assigned tasks to students on LMS that required students to complete their lesson plans based on specific content and specific requirements

Sub-step3: self-learning

The students had to learn by themselves based on LMS.

Sub-step4: create lesson plan

The students created lesson plans by themselves.

Step 2: In Class

Sub-step1: simulated teaching

The teacher asked students to do the simulated teaching with lesson plans that they had created themselves.

Sub-step2: discussions and evaluations

After simulated teaching, the teacher organized discussions and evaluations.

Step3: After Class

The other students submitted their discussion and evaluation of the simulated teaching that was presented in class on LMS. The teacher gave the students feedback.

The teaching process is shown in Figure 1.

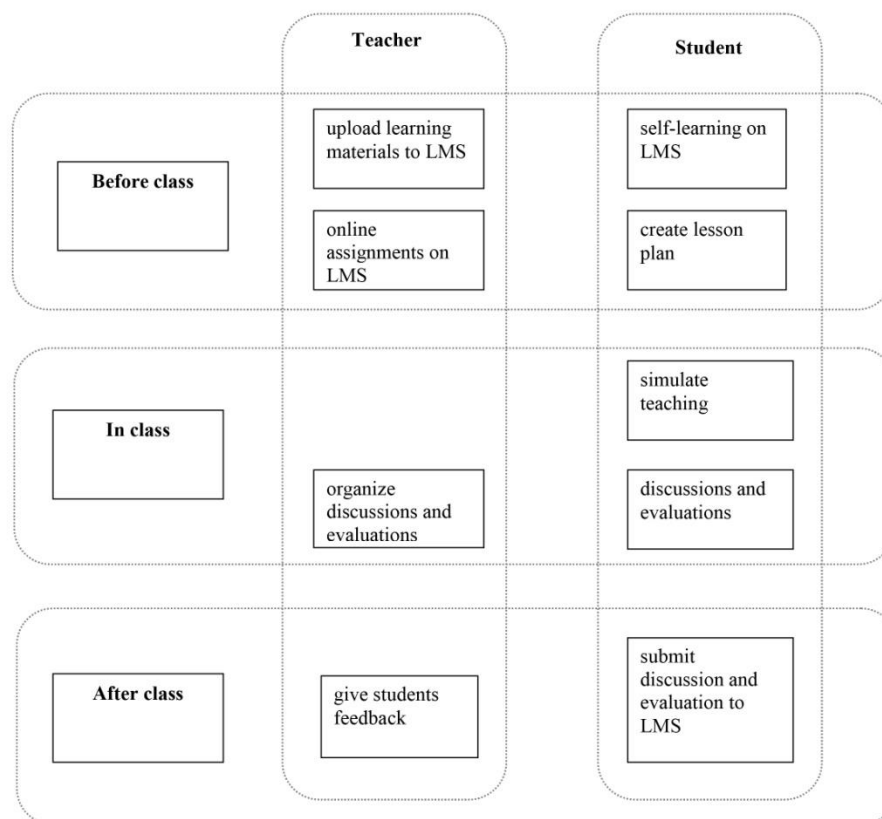


Figure 1 The teaching process



Culinary Teaching Skills

There was no uniform definition of teaching skills in current research (Xia, 2022), and so was the definition of culinary teaching skills. According to the difference in scholars' focus, teaching skills could be classified into the following four categories: activity approach theory, knowledge theory, behavior theory, and ability theory. The activity approach type viewed teaching skills as a series of activities and considered the many ways in which teachers could effectively promote student learning based on the principles and rules of learning to be teaching skills (Zhang, 1997). The knowledge type suggested that teaching skills were knowledge that must be possessed by a teacher to understand the difficulties that would be faced by the students in the process of teaching and learning and compiling the material to be taught (Anwar et al., 2014). The behavior type argued that teaching skills could be defined as a set of interrelated component teaching behaviors for the realization of specific instructional objectives (Banerjee et al., 2015). The ability type treated teaching skills were a teacher's ability to make the learning process well and attractive so that it could foster students' willingness to learn (Sa'ad et al., 2015). In this study, culinary teaching skill was considered as a series of activities and the competencies that teachers demonstrated in the process of teaching, based on the principles and rules of learning, to achieve specific instructional objectives.

Scholars also had different understandings of what were components of teaching skills. Apling & Haryani (2019) said that components of teaching skills are composed of (1) Opening and closing the lesson skill, (2) Asking skills, (3) Explanation skills, (4) Providing reinforcement skills, (5) Classroom management skills, (6) Teaching for small and individual group discussion skill. Zhou et al. (2013) said that components of teaching skills composed of (1) Lesson planning skills, (2) Lecturing skills, (3) Explanation skills, (4) Instructional language skills, (5) Board writing skills, (6) Computer-assisted instruction skills, (7) Evaluation skills, (8) Introductory skills, (9) Questioning skills, (10) Instructional organization skills, (11) Variation skills, (12) Closing the lesson skills, (13) Reinforcement skills. Gultom et al. (2020) said that components of teaching skills composed of: (1) Questioning skills, (2) Reinforcement skills, (3) Variation skills, (4) Explaining skills, (5) Learning skills opening and closing, (6) Small group discussion guiding skills, (7) Small classroom management skills, (8) Small group and individual teaching skills. These 8 skills were exactly the main topics of the Microteaching and Practical Training of Teaching Skills Course. According to the syllabus of the Microteaching and Practical Training of Teaching Skills Course (Hanshan Normal University, 2023), introductory skills, demonstration skills, regulation skills, and lesson closure skills were the basic teaching skills that could make up a complete culinary and nutritional lesson.

Conceptual Framework

Based on the content of this study. The independent variable was a flipped classroom with a learning management system. The dependent variable was culinary teaching skills.



Figures 2 Independent variable and dependent variable

Methodology

Population and Samples

The population in this study was 80 students (2 classrooms) in 3rd year of the Culinary and Nutritional Education program at Hanshan Normal University, China, during the 2023-2024 academic year. And The sample of this study was 32 students (1 classroom) in 3rd year of the Culinary and Nutritional Education program at Hanshan Normal University during the 2023-2024 academic year, which was selected by using the cluster sampling method.

Research Instruments

The research instruments consisted of two parts: 4 lesson plans were the instruments for the experiment and The Culinary Teaching Skills Evaluation Form was the instrument for collecting data. All the research instruments were evaluated by a total of three experts. The mean of the 5-point rating scale of lesson plans was 4.25, which meant the lesson plans had the quality at a high level. The IOC of The Culinary Teaching Skills Evaluation Form was 1.00, and the result of Kendall's W Test was .022 ($p=0.004 < .05$), which indicated that the Culinary Teaching Skills Evaluation Form had very high inter-rater reliability.

After the experts evaluated the research instruments, the researcher implemented the instructional strategy (learning through a flipped classroom with LMS) following the 4 lesson plans. According to the videos of students' simulated teaching, 3 teachers graded the students' culinary teaching skills on the same teaching videos, using the Culinary Teaching Skills Evaluation Form.

Data Collection

The experimental design was a group pretest-posttest design. The procedures of data collection were as follows:

- 1) The samples were given the pre-test by measuring culinary teaching skills by with Culinary Teaching Skills Evaluation Form.
- 2) The samples were taught by using a flipped classroom with LMS.
- 3) After finishing the instruction, the samples received the post-test by using the same Culinary Teaching Skills Evaluation Form that was used in the pre-test.

Data Analysis

In this study, data were analyzed by using the statistical program according to the research objectives.



1) Compare the students' culinary teaching skills before and after learning through the flipped classroom with LMS by using a dependent sample t-test.

2) Compare the students' culinary teaching skills with the criteria set at 70 percent by using one sample t-test.

Results

The findings based on the 2 objectives were summarized in this part.

The results of comparing the students' culinary teaching skills before and after learning through flipped classrooms with LMS are shown in Table 2.

Table 2 The results of comparing the students' culinary teaching skills before and after learning through the flipped classroom with LMS

Skills	n	Pretest scores		Posttest scores		t	P
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Culinary teaching skills	32	6.06	1.413	11.56	0.914	20.705*	0.000
Introductory skill	32	1.56	0.504	3.22	0.491	13.372*	0.000
Demonstration Skill	32	1.19	0.397	2.53	0.507	15.752*	0.000
Regulation skill	32	1.50	0.508	2.66	0.602	9.043*	0.000
Lesson closure Skill	32	1.81	0.471	3.16	0.515	10.849*	0.000

* $P < 0.05$

As presented in Table 2, the mean score of the pretest of students' culinary teaching skills was 6.06 ($SD = 1.413$), and the mean score of the posttest of students' culinary teaching skills was 11.56 ($SD = 0.914$). The result of the students' sub-skills of culinary teaching skill was as follows: the mean score of the pretest of introductory skill was 1.56 ($SD = 0.504$), and the mean score of the posttest of introductory skill was 3.22 ($SD = 0.491$); the mean score of pretest of demonstration skill was 1.19 ($SD = 0.397$), and mean score of posttest of demonstration skill was 2.53 ($SD = 0.507$); the mean score of pretest of regulation skill was 1.50 ($SD = 0.508$), and mean score of posttest of regulation skill was 2.66 ($SD = 0.602$); the mean score of pretest of lesson closure skill was 1.81 ($SD = 0.471$), and mean score of posttest of lesson closure skill was 3.16 ($SD = 0.515$).

Moreover, it aimed to examine the mean score of before- and- after learning through flipped classrooms with LMS to improve students' culinary teaching skills. The results of Table 2 showed that after learning through the flipped classroom with LMS, the posttest score of students' culinary teaching skills was higher than the pretest score at a .05 level of statistical significance ($t_{31} = 20.705, p = 0.000 < .05$). The score of students' culinary teaching skill in this study developed increasingly higher than the pretest. So did every sub-culinary-teaching-skill: posttest score of students' introductory skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 13.372, p = 0.000 < .05$); posttest score of students' demonstration skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 15.752, p = 0.000 < .05$); posttest score of students' regulation skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 9.043, p = 0.000 < .05$); posttest scores of students' lesson closure skill was higher than pretest score at .05 level of statistical significance ($t_{31} = 10.849, p = 0.000 < .05$).



This indicated that after learning through flipped classrooms with LMS, both students' overall culinary teaching skills and each sub-skill had significantly improved compared with before learning. The result of comparing the students' culinary teaching skills with the determined criterion of 70% is shown in Table 3.

Table 3 The result of comparing the students' culinary teaching skills with the criteria set at 70 percent

Group	n	Full score	Criterion score	<i>M</i>	<i>SD</i>	<i>t</i>	<i>P</i>
Experimental group	32	16	11.2	11.56	0.914	2.245*	0.032

* $P < 0.05$

As presented in Table 3, the mean score of students' culinary teaching skills was 11.56 and the standard deviation was 0.914, which was statistically higher than the criterion of 70% (Full score was 16, criterion score was 11.2).

Conclusion and Discussion

By comparing and analyzing the students' culinary teaching skills before and after learning through the flipped classroom with LMS, as well as comparing the students' culinary teaching skills after learning through the flipped classroom with LMS with the criteria set at 70 percent, both students' overall culinary teaching skills and each sub-skill had significantly improved compared with before learning, with a statistical significance of .05. Students had higher scores on the culinary teaching skills than 70 percent, with a statistical significance of 0.05. This demonstrates that after learning through flipped classrooms with LMS, students' culinary teaching skills significantly improved. This is consistent with the findings of the study by Yan et al. (2022), who studied *Smart Teaching Reform and Practice of Flipped Classroom in Culture Geography Course Based on Chaoxing Learning Platform*, found that "Chaoxing Learning Platform(one of the LMS) + Flipped Classroom" played an important role in enhancing teaching quality and promoting the development of students' comprehensive quality. Tiya Wong & Chankit (2024) who studied *Integrating Digital Flipped Classroom with Student Team Achievement Division Approach to Improve English Reading Skills*, reported that the experimental group had higher academic achievement after studying than before studying and the control group had higher academic achievement after studying than before studying. The experimental group outperformed the control group in terms of academic accomplishment at the 0.05 level, according to a comparison of the two groups' academic performance. Moreover, learning through a flipped classroom with LMS can increase learners' learning achievement and performance by using an advanced organizer (Elfeky et al., 2020). Learning through flipped classrooms with LMS can also increase students' engagement and interactions with the course and impacted their academic achievements in a positive way (Wang, 2017). In addition, learning through a flipped classroom with LMS can motivate students to learn in a targeted way by improving students' learning initiative (Agarwal et al., 2019), and providing them with a very large number of learning resources (Zainuddin & Perera, 2018).

Essentially, learning through a flipped classroom with LMS is a teaching method that combines a flipped classroom with the learning management system, using LMS to support a flipped classroom. Before class, students did effective pre-study by studying the learning resources provided by the teacher. In class, students



could communicate and discuss with their classmates and the teacher. After class, the LMS allowed students to continue to communicate in real-time. Students could think deeply and introspect throughout the learning process and take the initiative to learn, thus improving the quality of learning.

Recommendations

1) Other teachers who teach culinary teaching skills could use the method of learning through the flipped classroom with the LMS to improve students' learning effect. Before class, the teacher should provide learning material to LMS, and assign tasks to push students to learn by themselves and create self-learning outcomes. In class, the teacher should ask students to present their self-learning outcomes and organize discussions and evaluations. After class, the teacher should assign students to revise their learning outcomes according to the suggestions they got in class, and submit the discussions and the revised learning outcomes to the LMS. The teacher should give the feedback in LMS.

2) Future research should focus on expanding the scope of the experiment. This study was conducted with undergraduate students in a university culinary program and future studies. Future research should be carried out among different disciplines in different learning stages of different categories in different regions of China. By promoting testing work in a wider range, enriching the teaching practice experience, constantly improving the steps of learning through the flipped classroom with the LMS, enhancing the theory of culinary teaching skills, and providing a practical basis for proposing new teaching theories.

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