Exploring The Achievements of Micro-Teaching Series on A TPACK-Integrated MIAP Instructional Approach for Vocational Pre-Service Teachers in Thailand

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Abstract- **Vocational teachers play an essential role in moving vocational education forward. With the advancement of technology, the teaching and learning in the 21st-century era become more challenging. This study aims to promote the vocational pre-service teachers' teaching skill and digital literacy; therefore, a TPACK-integrated MIAP instructional approach was developed. To achieve such issues, a series of micro-teaching activities were created accordingly. The pre-service teachers can practice and reach the goal systematically. Furthermore, a research experiment has been conducted to investigate the effectiveness of the novel approach and introduced activities. Based on the analysis results, it was found that the participants, vocational pre-service teachers could improve their teaching skill continuously by following the micro-teaching activities. Moreover, the teachers can create instructional digital contents for self-reflection and future students. Consequently, the findings of this research could be a useful strategy in assisting teachers to achieve better teaching in many contexts, not only for their professional development but also for their students' learning performance.**

I. INTRODUCTION

Teaching in the 21st century is challenging for the unpredictable changes of technology and information, leading to daily-life lifestyles [1], [2]. Like many levels of education, vocational education has been affected by the current generation of learners, known as Gen Z, which seeks to learn only the interesting topics and issues, and prefers to learn with technology-supported channel [3].

In the past decade, vocational teachers in Thailand mostly taught by the conventional approach, which has been acceptable for times. However, they have faced the changes among learners' styles and interests. Therefore, educating vocational pre-service teachers to tackle these challenges would be invested by taking such emerging devices and technologies into account when preparing for the instruction [4], [5].

Recently, a Technological-Pedagogical-Content Knowledge Approach, TPACK has been introduced as a teaching framework for 21st-century teachers [6]. In the past, teachers were well equipped with the excellence of content matter; however, that was not adequate in this era. The model urges the teacher to be well equipped with pedagogical skill, and technology literacy [7]. Therefore, the association of these components is essential for quality teachers in this generation.

With the challenging issues and the acceptable solution to cope with the vocational education in Thailand; therefore, this study proposed a TPACK-integrated MIAP instructional approach, which could be a direction for practicing vocational pre-service teachers. Moreover, teaching activities in micro-teaching series have been developed as a practical guideline for teachers and pre-service teachers (students) to follow accordingly. By following the activities in the proposed approach, this research study emphasizes on the achievements of teaching performance and the quality of instructional digital media content from the actual teaching.

II. RELATED STUDIES

A MIAP Instructional Framework

Originated as a model for practical-educational counterpart training by Wagener in 1975 with the aim of raising the performance success of the pupils who are to be taught by the instructors, MIAP was then developed after a research study at King Mongkut's University of Technology North Bangkok, Thailand. The teaching framework was originated with four simple steps for teachers to practice [8]. M-motivation: to motivate learners with an engaging introduction to the course, I-Information: to present content knowledge and information to students,

A-application: to help students to apply the learned knowledge with meaningful assignments/tasks, and P-progress: to assess and reflect the learning progress.

MIAP framework has widely been accepted in a wide range of applications from typical school contexts, vocational colleges, to higher education environments. Many research studies have reported that this framework could assist novice teachers to give instruction systematically and professional teachers to serve advanced learning topics and activities effectively; besides, it helps their students learn in an appropriate sequence that makes their learning more meaningfully and successfully [9]–[11].

Therefore, MIAP instructional framework is considered to be a core strategy in this study as it could be effective for preparing vocational pre-service teachers.

B TPACK

Emerged for 21st-century education, TPACK framework is ideal for all educators, especially those who provide knowledge to their learners [7]. TPACK consists of additional core elements to its Content Knowledge (CK) excellence. The first element is Technological Knowledge (TK) for which the teachers should be able to adapt and apply for their teaching contexts, making their teaching more powerful and attractive. The second element is Pedagogical Knowledge (PK) for which the teachers should critically obtain to be professional teachers. PK plays an essential role in teaching as a strategy to transfer content and knowledge to individual students by taking their differences into account. All elements together become essential competence for teachers to be immersed in for future education [6], [12].

In recent years, many researchers have attempted to investigate the effects of employing TPACK to promote professional development for a number of teachers worldwide [13]–[15]. It was found that the teachers can apply available technology tools to enhance their instructions and make their students' learning performance better with greater learning motivation. Moreover, some teachers can construct context-relevant technology-enhanced learning activities, which are even more powerful for their actual teaching contexts, serving a great benefit for education. A significant number of the TPACK-trained teachers can adapt themselves with the right pedagogy that makes their teaching more successfully far beyond only the mastery of content knowledge.

Therefore, TPACK model is appropriate for teachers to be professional with. This study adopts this model as an integration to the MIAP framework to create the enhanced teaching approach for vocational pre-service teachers.

III. DEVELOPMENT OF MICRO-TEACHING SERIES ON A TPACK-INTEGRATED MIAP INSTRUCTIONAL APPROACH

A. Overall Structure

In this study, a novel instructional model has been developed, hereinafter called A TPACK-integrated MIAP instructional approach. As presented in Figure 1, the proposed model mainly integrates the benefits of TPACK model into MIAP model which expects to help improve the teaching literacy for pre-service teachers in 21st century.

The proposed model can be achieved with a series of micro-teaching activities aiming at enhancing teaching skill and instructional digital content creation skill.

B. Micro-Teaching Series

There are six main activities in the micro-teaching series. The detailed explanation for each activity (ACT) is as follows. Note that relevant technology and digital tools/materials are employed to strengthen the quality of teaching.

ACT1: This activity is designed to rehearsal the teachers to be acquainted with the public stage and perform good communication with the audience, specifically students. This covers professional posture and dressing styles.

ACT2: This aims to practice clear speaking to the class in order to transfer the message (content knowledge) effectively. This may involve intonation, pronunciation and verbal language. Moreover, writing the course objective on the blackboard is also practiced in this activity for the confidence in visualizing text, chart, etc. to all seats at a distance perfectly.

ACT3: The teachers learn and perform how to introduce the course effectively. Introductory speech and engaging media/materials can be implied in this earlier stage of the teaching. This state determines the success of the following teaching.

ACT4: Besides mastery in content knowledge, the strategy to teach is essential, widely known as pedagogy. Selecting appropriate pedagogical strategy could make the instruction successful for both teacher and learners. This activity also covers how to transfer knowledge according to the selected pedagogy.
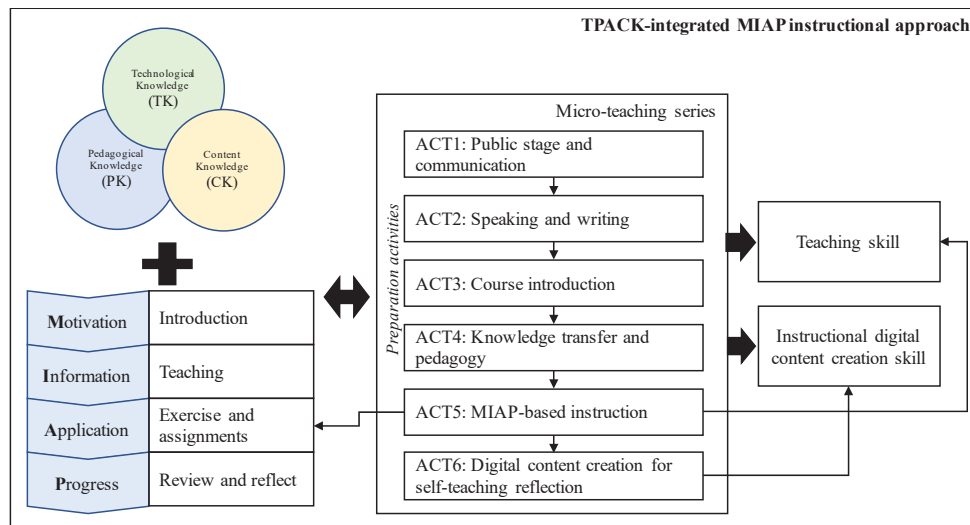
Figure 1. An illustration of overall structure.

ACT5: After complete series of rehearsal, it comes to the actual teaching based on MIAP. Starting from motivating students with an engaging introduction, followed by teaching as the means to transferring information. Students then are required to apply the learned knowledge through assigned tasks and activities. Finally, review and reflect what they have learned, debriefing is considerable at this point.

ACT6: While performing the teaching, the video recording is operated for later self-reflection of the teaching. Moreover, after video editing, the edited video can be used as an instructional digital content for future students as well.

All six micro-teaching activities have been cross-validated for the sequence, logic, and quality of the practical teaching contexts. This was done by several experienced vocational in-service teachers, as shown in Figure 2.

Figure 2. Experienced teachers validating the proposed teaching activities.

IV. METHODS

A. Participants

To examine the effectiveness of the proposed approach, the authors recruited 25 pre-service teachers as research participants (12 from electrical engineering program and 13 from computer education program).

B. Research Instruments

There were two research instruments used in this study.

First, a teaching achievement evaluation form, which had 17 scoring items assessing the teaching performance in six aspects, including personality, speech, presentation, media literacy, blackboard usage, and classroom management. The total score for each activity was ten, and evaluated by the teachers.

Second, an evaluation form to assess the quality of pre-service teachers created instructional digital media which had 17 scoring items covering appropriate techniques used in the media, presentation and transition style and additional information. The total score of each round as 20, and evaluated by the teachers.

Both instruments have been examined and validated by experts for the appropriateness and reliability to use in this research (IOC ranged from 0.917 to 1.000).

C. Research Design

In this study, the quasi experimental design has been conducted with one group of participants by random selection upon convenience and availability. All participants followed the series of teaching stated in the proposed approach, as shown in Figure 3. In the meantime, their teaching performance was assessed following the questionnaire items. Moreover, the instructional digital media recorded during the teaching, as shown in Figure 4,

was not only to reflect their teaching performance but also to be examined for its quality and effectiveness.

Figure 3. Pre-service teachers performing micro-teaching activities.

Figure 4. Video recording for self-teaching reflection and instructional digital content

V. RESULTS

A. Teaching Achievement

Based on the data collected from the participants through the evaluation form with maximum score of ten for each activity (ACT), the authors have found the increment in teaching performance in all teaching series activities, as shown in Table I.

TABLE I
Teaching Performance from Micro-Teaching Series

Activity	Teaching Performance Score (M ± SD)		
	Elec.Eng. (N = 12)	Com.Ed. (N = 13)	Total (N = 25)
ACT001	5.10	5.14	5.08
ACT002	5.13	5.44	5.29
ACT003	7.02	7.40	7.22
ACT004	7.31	7.51	7.42
ACT005	8.24	8.58	8.42

To better understanding the result, the comparison charts are presented in Figure 5.
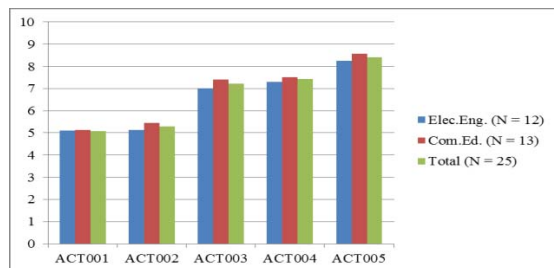

Figure 5. Comparison chart of teaching performance result.

This result indicated that the pre-service teachers could help improve the pre-service teachers' teaching skills continuously upon the micro-teaching series proposed in the developed approach effectively.

B. Instructional Digital Content Achievement

With two rounds of the creation of instructional digital content assessed by the teachers through the evaluation form, the authors have found the improvement of its quality from both groups of students, as shown in Table II.

TABLE II
Quality of Instructional Digital Content

Round	Instructional Digital Content Score (M ± SD)		
	Elec.Eng. (N = 12)	Com.Ed. (N = 13)	Total (N = 25)
First	14.33	15.00	14.68
Second	18.67	19.62	19.16

Figure 6 visualizes the instructional digital content result for better perception of readers.

This result can be implied that the pre-service teachers could escalate the quality of the created instructional digital contents, which could be effectively used as self-teaching reflections and instructional media for future students.
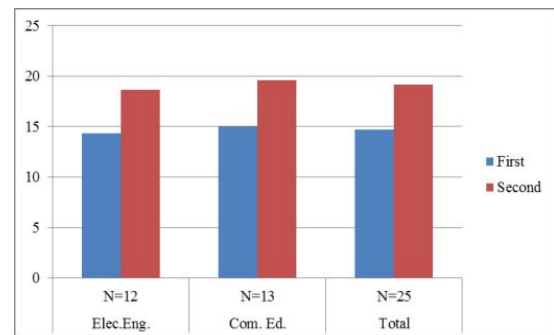

Figure 6. Comparison chart of instructional digital content result.

VI. CONCLUSION AND SUGGESTIONS

A. Conclusion

This research study developed a teaching approach for vocational pre-service teachers in Thailand. The approach integrated the TPACK framework into the conventional MIAP model to provide the enhanced instructional strategy for the teachers. In the meantime, a series of micro-teaching activities were developed accordingly as a practical guideline to perform effective teaching. Based on the research findings, the vocational pre-service teachers could improve teaching skills continuously after experiencing a series of introduced micro-teaching activities. In addition to that, the teacher could create an instructional digital media content upon their teaching

topics effectively, which could be used as a self-teaching reflection and for future students.

B. Practical Guideline

This proposed model approach can be applied in different contexts of vocational pre-service teaching courses. The guideline for the teachers includes the reconsideration of some activities depending on the actual teaching and learning environments, e.g. time, classroom, infrastructure, resources, etc. In addition, the different course requirements may affect some activities.

C. Suggestions for Future Study

Based on the research findings, the authors would suggest conducting further studies as follows. First, the experiment with the conventional approach could be challenging to study to investigate the in-depth analysis and effects of this approach, more participants. Second, different teaching contexts and different teachers/students background could be considered as variables that affects the study. Lastly, it would be possible to develop the digital tool to record the teaching and learning logs for improving instruction and even this approach.

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