

**A Development of Assessment Framework of
Competencies for Students Teacher' Learning
management and Specific Content Knowledge in
the Field of Technology and Innovation Education**

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ABSTRACT

The purpose of this research was to (1) develop assessment framework for student teachers' learning management and specific content knowledge in the field of Technology and Innovation Education, (2) develop assessment observational record according to the assessment framework with 4 levels of rubric scoring criteria and construct achievement test for assessing specific content knowledge in the field of technology and innovation education according to implement micro-teaching lessons, (3) investigate the Rater Agreement Index (RAI) of the rubric scoring criteria in the assessment observational record assessed by 3 supervisors to evaluate student teachers' teaching performance in technology and innovation education lesson. The population in this research was the fourth year 150 student' teachers in Technology and Innovation Education Program at BuriramRatchabhat University, Faculty of Education. Teacher preparation in micro-teaching instruction was undertaken across 15 weeks during October 2014 through February 2015 for the fourth year 38 student' teachers.

Research and development were employed to develop assessment framework, assessment observational record, and achievement test. Research instruments were synthesized and validated by group of 12 experts with various teaching experience from 3-10 years according to focus group meeting. The experts were asked to consider and recommend on consistency, appropriateness and usability of the 5 essential elements of competencies and rubric criteria in each levels of assessment framework. The assessment framework consists of 5 essential elements including planning (before teaching), classroom environment and classroom management, strategies for engaging the effective learning, feedback and assessment of learning, and self-reflection (after teaching). The rubric scoring assessment observational record was designed for justifying and evaluating levels of teaching competencies in the field of technology and innovation education lesson. These levels werebeginning, approaching proficient, proficient, and distinguished levels.

Research instruments were (1) assessment observational record consisted of 5elements of competencies (33 sub-competencies) with 4 levels of rubric criteria, (2) multiplechoice and short answer response achievement test items designed to measure specificcontent knowledge in the field of technology and innovation education. Index of

Item Objective Congruence of the multiple choice achievement test items was higher than 0.66. The item difficulty was between 0.29-0.76, item discrimination was between 0.26-0.65, and reliability (Lovett Reliability) was 0.8635.

The research findings revealed as follows:

1. The results of analyzing the Rater Agreement Index from 3 during micro – teaching lesson preparation and teaching indicated that the assessment were highly recommended to use for assessing competencies of teaching performance in preparation of Technology and Innovation Education Program.

2. The results of t-test one sample indicated that the students' achievement score after learning using micro-teaching activities was higher than the criterion score of 70% at the 0.05 level of significance.

Keywords: Teaching Competencies Assessment Framework, Specific Content Knowledge of Technology and Innovation Education, Rater Agreement Index, Micro-teaching

Background and the Importance of the Problem

In the reform of teacher development in the new era, there have been various strategic suggestions for the reform of teachers and educational personnel according to the board of the Educational Council, the Ministry of Education. This is to promote the role of modern teachers in developing learners to learn the values of teaching profession systematically, leading to the process of producing and developing teachers to ensure that all teachers and educational personnel meet suitable high professional standards, attracting experienced teachers who devote to education into the system, as well as to meet the appropriate number of teachers and educational personnel that can learn and develop themselves continuously to strengthen the profession (Surasak Pahe, 2014: 1).

Educational researchers and those involved in teaching profession development have attempted to seek for methods to enhance the learners to improve their competencies essential for their career in teaching and learning management. This has led to many studies on the methods of developing student teachers' competencies in their specific courses, teaching and learning, and various teaching techniques such as textbook content analysis assignment (Stump, 2001), giving assignments on instructional planning and critiquing the plan by the learner, peers, and the instructor (Tuan, 1996; Stump, 2001), critiquing micro-teaching by the learner, peers, and the instructional teacher (Tuan, 1996; Tuan & Kaou, 1997; Bell et al., 1998; Veal, 1998; Eick, 2000; Halim & Meerah, 2002), reflecting on teaching concepts and experiences (Tuan, 1996; Bell et al., 1998; Veal 1998; Eick, 2000), as well as organizing seminar workshops during field experience practice (van Driel et al., 2002). However, one of the most common problems is that the teachers lack of suitable methods in transferring their

knowledge through instructional activities to make the learners understand the lesson contents. In other words, the student teachers lack the competence in learning management, resulting in ineffective teaching and learning (Veal, 1998; Bell, Veal & Tippins, 1998; Zembal-Saul, Starr & Krajcik, 1999).

Because competency is a behavioral property, the most relevant measuring and evaluating method is the behavioral observation. There are two assumptions for observing behaviors accurately. 1) The observer (supervising teacher) and the assessor must be straightforward. 2) The observer and the assessor must be close enough to observe the behaviors according to the assessment format. The observer (supervising teacher) will be the evaluator of the learner by understanding the meaning and the level of each competency within the assessment framework. Most related literature show that the behavioral rating level for each item consist five levels of performance scores ranging from very low, low, moderate, high, and very high level of practice, assigned by number 1, 2, 3, 4, and 5, accordingly, based on the Teacher Council' regulations on the 2013 Professional Standards. Therefore, in designing the assessment framework for learning management competencies for student teachers in the Bachelor of Education, the designer needs to be aware of the balance between the coverage and the depth of the assessment, as well as assign appropriate weight on each indicator according to its importance. Another problem was that most assessors usually emphasized on evaluating the contents and teaching methods, but they were unclear about the details of behavioral components or issues in learning management competency not directly related to the implementation in evaluating the student teacher's competency according to the scope of knowledge contents, competencies, and professional experience as teaching profession according to the Teacher Council's regulations. Consequently, challenges would be to develop a framework for assessing specific knowledge on the Educational Technology and Innovation course that can be implemented for assessing student teachers in the field of education, consistent with the teaching and learning contexts at the Faculty of Education, BuriramRajabhat University.

Practicing the micro teaching skills is basic for the real classroom teaching because it helps the trainees or the student teachers gain more expertise, fluency, and confidence, as well as allows opportunity to correct mistakes or make additional practices. In micro teaching, the trainees see the "feedbacks" of the teaching. It also helps the trainees the solve their weakness through the modification of teaching lessons or methods (Tuan, 1996; Tuan & Kaou, 1997; Bell et al., 1998; Veal, 1998; Eick, 2000; Halim & Meerah, 2002).

Another important mission of the Faculty of Education is to take the role of "the teacher of the teachers", producing and developing student teachers with knowledge and ability to effectively manage learning, allowing them to use essential skills and knowledge from the learning process in their real teaching situations. In producing and developing student teachers at the higher educational level, the aim is to provide knowledge and competencies essential for teaching at the basic educational level, such as specific content

knowledge, pedagogical content knowledge, and teaching competency, which is a challenging job because teaching competency and the specific content knowledge in the Educational Technology and Innovation course and teaching methods consist of many inter-related components. However, Baxter & Lederman (1999: 158) suggest that a framework for measuring pedagogical content knowledge should cover three aspects of what the teachers know, what the teachers do, and the reasons for the teachers' practices, using various measuring methods known as Multi-method evaluation. This is because no single method can measure every component of the pedagogical content knowledge (Baxter; & Lederman, 1999: 158-159).

From the investigation of previous studies mentioned above, the researcher was interested in developing a framework for assessing the student teachers' competency and specific content knowledge to be used for evaluating the student teachers' learning management and the specific content knowledge after these students have passed the process of micro teaching. The researcher expected that the learning management process and the micro teaching training would be used for developing the specific content knowledge of the students, and the framework for assessing the learning management competency resulted from this study would be used as a tool for measuring and evaluating learning management competency of the students' knowledge in the Educational Technology and Innovation course, appropriate for the teaching and learning contexts at the Faculty of Education, BuriramRajabhatUniversity, as well as serve as data for preparing the students before taking the field experience practice at the real educational institutions.

Research Objectives

2.1 To develop assessment framework for student teachers' learning management and specific content knowledge in the field of Technology and Innovation Education;

2.2 To develop an achievement test for students' learning management competencies and a knowledge assessment criteria in the Educational Technology and Innovation course for the student teachers in the field of educational technology and innovation; and

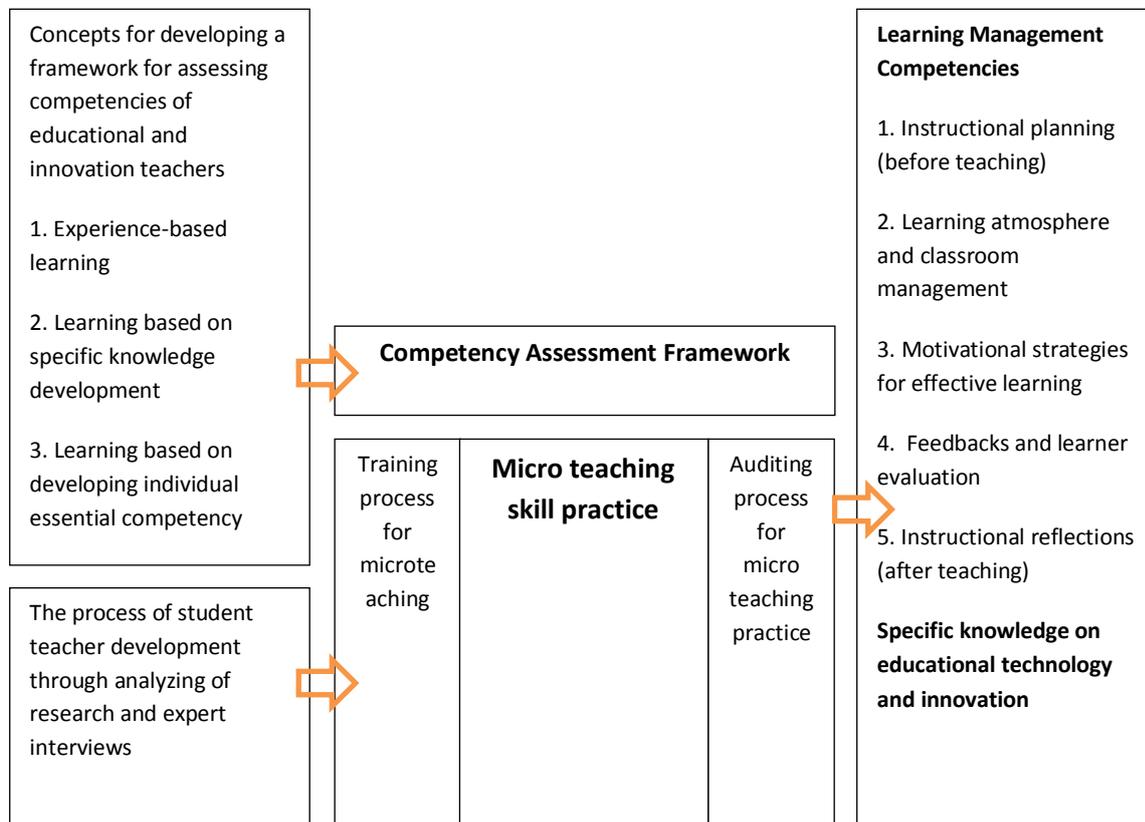
2.3 To investigate the Rater Agreement Index (RAI) of the rubric scoring criteria in the assessment observation record to evaluate student teachers' learning management competencies in the field educational technology and innovation.

Research Hypothesis

The achievement scores of the student teachers in the field of educational technology and innovation after learning is higher than the 70 percent criteria.

Research Conceptual Framework

In this study, the researcher employed the framework for assessing teaching and specific knowledge competencies that influence the student teachers' teaching efficiency. The framework is illustrated in Figure 1.1.



Methodology

This study was conducted to develop assessment framework for student teachers' learning management and specific content knowledge in the field of Technology and Innovation Education through the following steps.

1. Population and sample
2. Research tools
3. Research tool development and evaluation
4. Data collection
5. Data analysis
6. Data analysis statistics

Data Analysis

In this study, the development of an assessment framework for student teachers' learning management and specific content knowledge in the field of Technology and Innovation Education, the researcher performed the following data analysis.

1. Item-objective congruency (IOC) analysis
2. Difficulty index and differentiation index
3. Test reliability
4. Rater Agreement Index (RAI) using evaluation form for micro teaching based on the framework for assessing the student teachers' learning management competencies
5. Comparing differences between mean scores after learning and the standard criteria

Results

The data analysis to fill the research objectives revealed the following results.

1. Rater Agreement Index (RAI) using evaluation form for micro teaching based on the framework for assessing the student teachers' learning management competencies:

The resulted Rater Agreement Index (RAI) indicates the agreement level from the three raters which falls between 0 and 1. The calculated level approaching 1 shows that the raters rated the learning management competencies to be congruent with all the indicators in the assessment framework criteria. The result showed that the RAI was 0.985 for learning plan (before learning), 1.000 for learning atmosphere and classroom management 1.000, 0.980 for motivation strategies for effective learning, 0.995 for student feedbacks and evaluation, and 0.996 for learning reflection (after learning).

2. The analysis for the specific knowledge achievement of the student teachers in the field of educational technology and innovation:

The researcher compared the differences between the achievement scores after learning the Educational Technology and Innovation course and the criteria using one sample t-test statistic at the .05 significance level. The results showed that the posttest score was 60.84 (76.05 percent) which was significantly higher than the criterial score at the .05 level. Therefore, it can be concluded that the knowledge score for the Educational Technology and Innovation course of the educational technology and innovation students was higher than the criteria score of 70.

Discussion

The researcher discusses the results in the following issues.

1. The analysis of the Rater Agreement Index (RAI) based on the components of competency assessment on the development of quality learning evaluation tools and use them correctly, especially learning assessment, has been emphasized on the performance assessment teaching; therefore, the effectiveness of the competency assessment on the learning management depends on the quality of observation forms or other measuring tools which rely more on the consideration of the raters or the assessors.

2. The analysis of the learning achievement in the specific course of the students in the field of educational technology and innovation indicated that the posttest score was 60.84 (76.05 percent) which was significantly higher than the criterial score at the .05 level. Therefore, it can be concluded that the knowledge score for the Educational Technology and Innovation course of the educational technology and innovation students was higher than the criteria score of 70. This might be due to that in the micro teaching training, the supervisors gave prompt correction to the students' mistakes and reported the reflections to the students immediately after they finished the training. Micro teaching is, therefore, considered a suitable method for using with pre-training before the actual practical at the educational institutions.

In this field study, when using the training process with the teaching assessment form which was designed according to the framework for assessing the learning management competency and the knowledge of specific course on the educational technology and innovation provided the student teachers with more experience, fluency, and confident, and helped them improve their mistakes or repeat more practices. The training also supported the trainees with "feedbacks" on the actual teaching practice in the assessment form based on the framework for assessing the learning management competency and the knowledge of specific course on the educational technology and innovation, which helped the student teachers see their mistakes and correct them before the second teaching and the reassessed within the researcher-designed assessment framework. The achievement from the sample of 38 student teachers who passed the micro teaching tests helped the students gained the posttest scores of the Educational Technology and Innovation course significantly higher than the criterion score of 75, which was one of the benefits of providing the preparation before the field practical teaching at the educational institutes.

Recommendations

1. Teachers in the educational curriculum should use the micro teaching training process together with the teaching evaluation form which is designed according to assessment framework for learning management competency and the knowledge on specific course (Educational Technology and Innovation). The training will help the student teachers to gain more expertise, fluency, and confidence as well as the opportunity to improve and correct mistakes.

2. For the performance assessment tools to have suitable scoring rubrics and to be accepted by departments related to the field teaching experience in the bachelor of education course, the assessment tools need to be analyzed for the rater agreement index (according to

components of learning competency assessment) before implementing the tools, as to set standards for learning management competency for all the indicators.

3. Because the specific knowledge (in the Educational Technology and Innovation course) and the learning management competency of the student teachers consist of many components, and all of them are related and support each other, the future study can be on the development of the pedagogical content knowledge (PCK) of the student teachers in the field of educational technology and innovation, which is the in-depth study in the sample of student teachers.

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