

The Implementation of Curriculum Transformation and the Facilitation of Elementary School Pre-service Teachers' Understanding of Mathematics Course

Summary

Introduction

In Taiwan, Grade 1 to 9 Curriculum Reform teachers are empowered to design their own curriculum, but most teachers still adhere to textbooks and teacher's handbooks when teaching. This is also a common phenomenon in mathematics classroom in the United States (Grouws & Smith, 2000; Grouws, Smith, & Sztajn, 2004; Seymour & Davidson, 2003). Clearly, it is an important goal in teacher's education to foster teachers' ability to adopt textbook content into learning activities suitable for students. In the researcher "Elementary School Mathematics Teaching" course, 22 teacher education students underwent mathematics curriculum transformation through experiments, experience sharing, and reflection. The researchers studied the students' understanding of the curriculum, and examined their curriculum concept transition in the process of curriculum transformation.

Method

In this qualitative study, the researcher analyzed the collected data based on the course understanding structure (including the understanding of curriculum development process understanding and curriculum content understanding, and curriculum context. The researcher first used "group discussion," "teaching drill review," and "general discussion videotapes corpus" as the basis to review documents through constant comparison and

induction, and obtain a claim on the curriculum transformation of teacher education students.

Results

1. The Understanding Transformation of “Curriculum Development Process”

- (1) Curriculum revision aspect: in the early stage of curriculum transformation, the teacher education students did not notice the differences between past and current curriculum evolution. However, in the later stage, four students (18.2%) realized that the course contents would change through time.
- (2) Curriculum assessment aspect: in the early stage of curriculum transformation, 12 teacher education students (54.5%) showed an overestimation of their students’ ability. Clearly, they were unable to appropriately assess their students’ prior experience. In the later stage, they were still unable to accurately assess their students’ ability. In addition, in the early stage of the curriculum transformation, some students were unable to accurately predict the length of learning time, which resulted in their falling behind schedule, though later they were able to assess their progress more accurately.

2. The Understanding Transformation of “Curriculum Content”

- (1) Vertical curriculum aspect: in the early stage of curriculum transformation, they would disarrange the order of concept teaching. Later, they gradually grasped the connection between the concepts of each unit and prior concepts.
- (2) Horizontal curriculum aspect: in the early stage of curriculum transformation, the teacher education students attempted to integrate

real-life examples into their teaching materials, but failed to give supplement any explanations, which caused problems for their students to understand the relationship between the examples and curriculum content. In the later stage, they were able to draw on more appropriate examples as their teaching materials.

- (3) Curriculum materials and characteristics aspect: in the early stage of curriculum transformation, 7 teacher education students (32%) tried to simplify the content of the ability indicator in the syllabus. Clearly, they lack the understanding of the importance of the ability indicator. In addition, the other 12 students (54.5%) were aware that they could not fully grasp their students' misconceptions, leading to difficulties in curriculum transformation. But after studying the teachers' manual and receiving guidance of the researchers, they gradually mastered these concepts and later integrated students' misconceptions into their lesson plans.

3. The “Curriculum Environmental Context”

In this aspect, the teacher education students showed a better understanding of “Curriculum Environmental Context.” In relevant teacher education courses, the textbooks they studied helped them to better understand the implications of curriculum environmental context.

Conclusion and Suggestion

1. Conclusion

- (1) In the process of curriculum transformation of the development, the teacher education students accumulated, over the course of time, experiences from practices and reflection; they positively developed their understanding of the mathematics curriculum. Among these, they showed a better understanding toward “curriculum development process” and “curriculum content;” as for the aspect of “curriculum environmental context,” they had previously established relevant

knowledge in other teacher education courses. They, therefore, were able to combine real life experiences, modern digital technology, and DIY learning exercises to design the learning environment and fulfilled the awareness of implementing the curriculum environmental concept.

- (2) The study showed that “peer discussion,” “teacher’s guidance,” “reflection of hand-on experience,” and “teacher assistant feedbacks” are important elements to facilitate teacher education students’ mathematics curriculum understanding. It also confirmed the importance of “reflection in implementations” for fostering teachers’ professional knowledge.

2. Suggestions

- (1) The researcher proposes that research time needs to be longer for the further studies. It may give the teacher education students more opportunities for hands-on experience and dialogue, and therefore have a better understanding of the mathematics curriculum.
- (2) This study only examined the performances of the teacher education students from the perspective of “curriculum understanding,” which cannot be interpreted as the whole picture of their professional development. It is suggested that future studies need to observe from other perspectives to obtain a panorama of the curriculum transformation.

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