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Exploring how prospective teachers would promote students' reflective learning on decimals

Shin-Yi Lee

Department of Education, University of Taipei
1 Ai-Guo West Road, Taipei 10048, Taiwan (R.O.C.)
sylee@utaipei.edu.tw

Abstract

The purpose of the study was to explore how prospective elementary teachers would promote their students' reflective learning on introduction to decimals. Data for this study consisted of twenty-two prospective elementary teachers' lesson plans on introduction to decimals, designed reflective learning activities in the lesson plans, and explanations about how they thought their designed reflective learning activities would promote students' reflection. The findings showed that the first rank of the designed reflective learning activities was mathematical problem solving.

Key words: decimals, mathematical problem solving, prospective teachers, reflective learning

Introduction

Reflection enhanced students' mathematical understanding [1, 2]. Reflection invited students to look back and make meaning from their experiences. It was important for teachers to promote students' reflection in mathematics classrooms [3]. Teachers who promoted reflective mathematics classrooms helped students not only reflect on their mathematics learning but also learn from their learning experiences.

Although reflection could contribute to students' mathematics learning, it was usually overlooked in mathematics classrooms [4]. Little was done to promote students' reflection in school mathematics, and even less was known about how teachers would promote their students' reflection in school mathematics. Decimal was a mathematics topic that engaged students in reflective learning, and it was important because people used it in everyday life when counting money, measuring length, reading a price tag, and so on. The purpose of the study was to explore how prospective elementary-school teachers would promote their students' reflective learning on introduction to decimals.

Literature Review

Reflection played an essential role in students' highly intellectual thinking and learning [5]. Dewey [6] indicated that true learning required reflection. Rogers [7] claimed that reflection was deliberate and often resulted in new insights. Reflective students took time to think through where they have been and derived rich meaning from it. Although there was no doubt about the significance of reflection in education, little was done to promote students' reflection in school instruction [8], especially in school mathematics [4].

Dewey [6] claimed that reflective thinking must be taught. Kolb [9] advocated that reflection had to be integrated into students' learning. In learning decimals, studies have been conducted on students' difficulty of learning decimal numbers [10, 11, 12]. Decimal was an important mathematics topic that engaged students in reflective learning. As students developed their conceptual understanding of decimals, they usually needed to reflect on whole numbers or fractions to make sense of the decimal number system [13]. Therefore, reflection played a key part in students' successful learning of decimals. Little, however, was known about how teachers would promote their students' reflective learning on decimals. The purpose of the study was to explore how prospective elementary-school teachers would promote their students' reflective learning on introduction to decimals.

Methods

Twenty-two prospective elementary-school teachers participated in the study. Data for this study consisted of the participants' forty-minute lesson plans developed for third-grade students on introduction to decimals, designed reflective learning activities included in the lesson plans, and explanations about how they thought their designed reflective learning activities would promote their students' reflection. There were no limits to the number of each participant's designed reflective learning activities included in the lesson plans. Two coders independently coded the data. The inter-coder reliability was 91%. Codings of disagreement were discussed until consensus was reached between both coders.

Results

The purpose of the study was to explore how prospective elementary-school teachers would promote their students' reflective learning on introduction to decimals. A total of 31 reflective learning activities were developed by all of the twenty-two prospective elementary-school teachers in their lesson plans on introduction to decimals. On average, 1.41 reflective learning activities were developed by each prospective elementary-school teacher in their lesson plans on introduction to decimals.

Moreover, 16, 12, and 3 out of the 31 reflective learning activities were included in the sections of concluding activities, developmental activities, and introductory activities of the lesson plans. It indicated that most (16/31, 51.61%) of the designed reflective learning activities were included in the sections of concluding activities of the lesson plans.

In addition, the 31 reflective learning activities were categorized into five categories, including mathematical problem solving, manipulating, summarizing, presenting, and mathematical cooperative problem posing. The frequencies of each of the categories were 10 for mathematical problem solving, 9 for manipulating, 8 for summarizing, 3 for presenting, and 1 for mathematical cooperative problem posing. It showed that the highest (10/31, 32.26%) and lowest (1/31, 3.23%) proportions of the designed reflective learning activities were mathematical problem solving and mathematical cooperative problem posing, respectively.

Conclusions and Suggestions

This study explored how prospective elementary-school teachers would promote their students' reflective learning on introduction to decimals. The participants of the study consisted of twenty-two prospective elementary-school teachers. Data for this study comprised the participants' forty-minute lesson plans developed for third-grade students on introduction to decimals, designed reflective learning activities included in the lesson plans, and explanations about how they thought their designed reflective learning activities would promote their students' reflection.

The findings of the study indicated that each prospective elementary-school teacher developed an average of 1.41 reflective learning activities in their lesson plans on introduction to decimals. Most (51.61%) of the designed reflective learning activities were included in the sections of concluding activities of the lesson plans. The first (32.26%) and last (3.23%) ranks of the designed reflective learning activities were mathematical problem solving and mathematical cooperative problem posing, respectively.

More studies are needed with a larger group of participants to understand better how prospective elementary-school teachers would promote their students' reflective learning on introduction to decimals or other content areas. It also would be beneficial to research how to improve prospective elementary-school teachers' ability to promote their students' reflective learning on introduction to decimals or other content areas.

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