

Case Study of the Lesson Study Activity for Primary School Science Supported by Web-based Evaluation Assistance System in the Undergraduate Teacher Training Course (1)

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Abstract: In this paper, we describe an approach to lesson study activity for primary school science instructors supported by a web-based education assistance system; we test it in an undergraduate-level teacher-training course at our university and present its effects on students. Five trial lessons were conducted with one group of student teachers teaching the class and the others acting as schoolchildren; lesson study was held after each trial lesson. After every trial lesson, students input responses to the questionnaire and comments on the lesson using their own mobile phone or computer; results were displayed on a big screen in the classroom and on each student's mobile. Then, the class discussed the science lesson with reference to these results. After that, we administered another questionnaire about the students' views of science lessons before and after a series of lesson studies. As a result, the students' views changed on many points regarding how children learn, for example, "Children change their own ideas", "Children become aware of their own ideas," "Children explain natural events and phenomena in words," and "Children persuade other children holding different ideas." We therefore find that this approach is effective for teacher training, helping student teachers develop metacognitive views of science education.

Keywords: View of science lessons, lesson study, pre-service teacher training, web-based education assistance system

1. Introduction

The authors of this paper educate future primary school teachers, especially in science education. We try to help our students develop constructive views (Duit, 1985; Scott, 1987) of their science lessons, including important concepts such as the recognition that not all knowledge cannot be taught didactically, that children construct new ideas themselves, that helping children change concepts is one of the most important aims of science lessons, and so on. However, we have felt for a long time that a non-negligible portion of our students tends nevertheless to retain conservative views of science lesson. To address this issue, we introduced a web-based education assistance system called REAS ("Realtime Evaluation Assistance System") in the trial lessons conducted in our class. After every lesson, we conducted a web-based questionnaire and collected written answers to questions about science lesson after every trial lesson, and presented the results to the class and discussed them. This approach to lesson study allowed us to focus the class on the intended learning. In this paper, we present the effects on students' thinking.

2. Procedure

2.1 Participants

A total of 59 third-year undergraduate students taking a course called “Elementary School Science Education” in the latter semester of 2012 participated in our study. Pre- and post-responses from 52 students on their views of science lessons were gathered as data

2.2 Design of the Lesson and of the Questionnaire

The schedule is shown as Table 1.

Table 1: Schedule

1	Questionnaire on views of science lessons (pre-); lecture: what is science lesson?
2	(Lecture:) Problem-solving in science classes and the nature of scientific ‘problems’ and ‘questions’
3	Various naïve conceptions in science
4	Effecting conceptual change in learners in science lesson
5	Teaching materials and arranging a teaching plan 1 (in groups)
6	Teaching materials and arranging a teaching plan 2 (in groups)
7	Teaching materials and arranging a teaching plan 3 (in groups)
8	Trial science lesson 1: The character of Magnets (third-grade science)
9	Trial science lesson 2: The function of wind and gum (third-grade science)
10	Lecture by a primary school teacher: Actual primary school science lessons
11	Trial science lesson 3: The nature of bubbles in boiling water (fourth-grade science)
12	Trial science lesson 4: The weight of salt dissolved in water (fifth-grade science)
13	Trial science lesson 5: Why the moon waxes and wanes (sixth-grade science)
14	Questionnaire on views of science lessons (post-); lecture: what is science lesson?

Each trial lesson class consisted of the following components:

- A) The first half of a trial science lesson conducted by a group of student teachers (15 minutes)
- B) Experiment by student teachers acting as schoolchildren, guided by the teacher group (15 minutes)

The latter part of the trial science lesson (15 minutes)

Immediately after the trial lesson, each student input questionnaire responses and comments to the website using their own mobile phone or PC; responses were displayed in a histogram and comments in a table on a big screen and on each student’s mobile.

3. Result

Students’ pre- and post-views of science lessons are shown as Figure 1. If we look at the change in “strongly agree” responses, we see that students’ view of the effectiveness of science lessons for almost all items improved. In particular, “(5) Children change own ideas,” the proportion of students responding “strongly agree” increased by 16% to 28%. Also, for “(9) Children become aware of their own ideas” and “(10) Children become aware of other children’s ideas,” “strongly agree” responses increased 7% and 8% respectively. However, ‘(13) Children become aware of changes in their own ideas’ saw a small decrease in “strongly agree” responses.

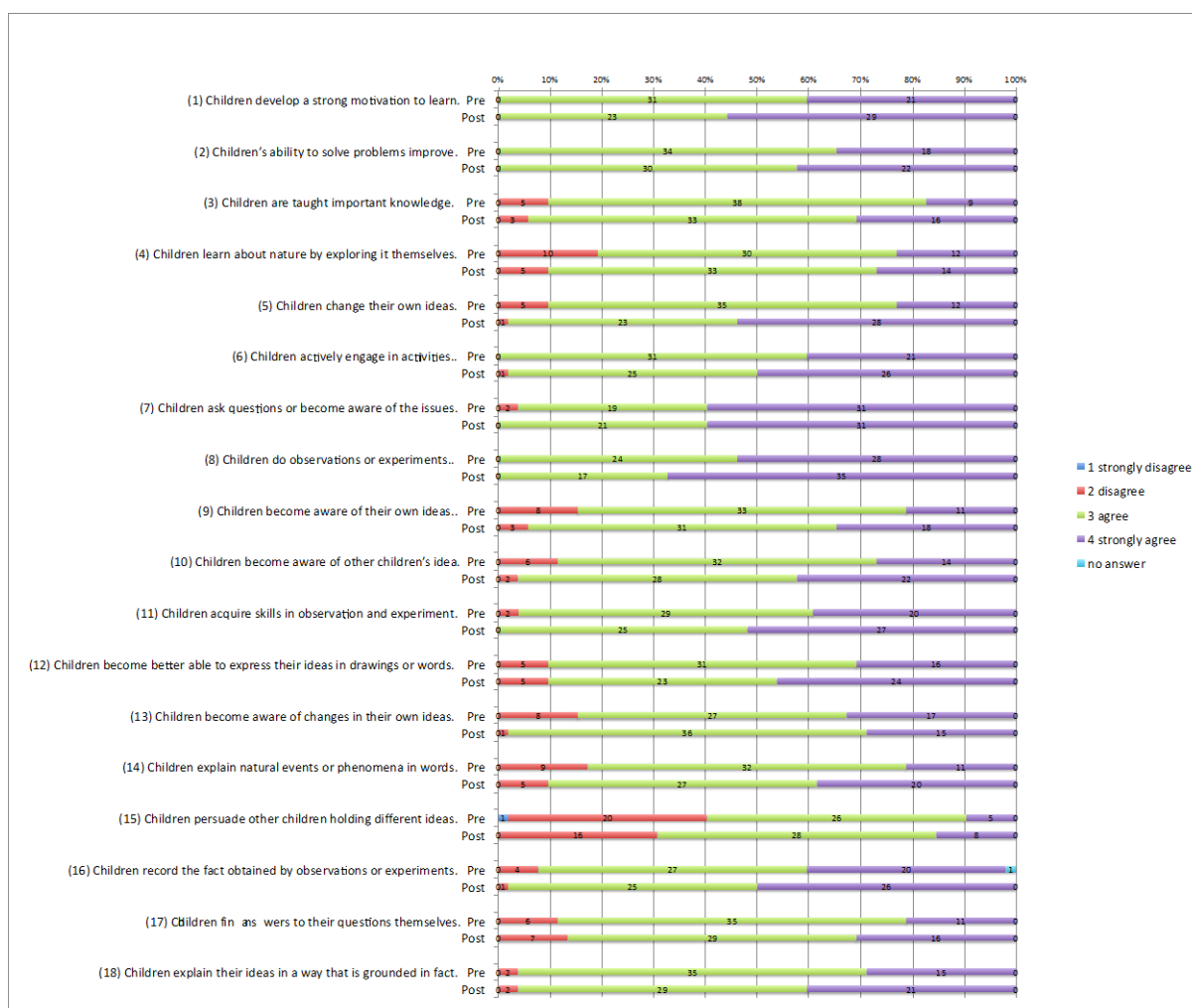


Figure 1: Comparison between Pre- and Post-Views of Science Lessons (N=52)

4. Implication

Our students' view of science lessons improved in many ways. In particular, the students became more conscious of children's ideas and changes in them. However, consciousness of the metacognition behind these changes did not improve sufficiently.

Thus, trial lesson study supported by a web-based feedback system was effective in several ways in the education of student teachers, but can still be improved.

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