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高等学校数学科における問題解決型の授業を評価する
枠組みに関する基礎的研究：TRU Math Summary
Rubricを用いた授業分析を通して

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Basic Study on Problem-Solving Lesson Evaluation Frameworks for High School Mathematics:

Analyzing Lessons Using the TRU Math Summary Rubric

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In elementary and junior high school arithmetic and mathematics lessons, students acquire new knowledge, skills, perspectives, and thinking through problem solving and problem-solving-type lessons. In a problem-solving-type lesson, it is essential to pay attention to students' thinking during the problem-solving process. This is because it is necessary to observe varied ideas, decide on the ideas to be taken up, and “*neriage*” them based on these ideas in group discussions. This is not an easy task, and its realization has been permanently oriented through lesson studies. However, it has been pointed out that high school mathematics lessons tend to be based only on knowledge transfer, and therefore, need improvement. Although lesson studies have been conducted in the mathematics departments of high schools, teachers have been reported to focus more on how to instruct rather than on students' thinking. In response to this, the author believes that problem-solving-type lessons are necessary in mathematics departments of high schools, and that they can be realized through lesson studies. For teachers who are inexperienced in problem-solving-type lesson practice and lesson study and who tend to focus on how to teach, as described above, it is important to first enable them to observe and evaluate problem-solving-type lessons by focusing on students' thinking, and to this end, it is effective to present a framework for lesson evaluation. For this purpose, we believe that it is effective to present a framework for lesson evaluation.

To achieve this goal, we focused on the TRU Math Rubric, which scores lessons within the TRU Math (Teaching for Robust Understanding of Mathematics) tool developed by Schoenfeld (2017). TRU Math is a framework for analyzing

and observing mathematics lessons from five perspectives: Mathematics; Cognitive Demand; Equitable Access to Mathematical Content; Agency, Ownership and Identity, and Formative Assessment. We evaluated three high school mathematics lessons using the Summary Rubric, which evaluates the entire lesson in the TRU Math Rubric.

The results showed that differences in scores were generated from lesson to lesson, and that these differences were due to whether the content of the lesson, the teacher's tips, and the structure of the classroom activities influenced the students' thinking in each dimension. By contrast, although the contents of the statement in Summary Rubric Score 3 are a necessary condition for conducting problem-solving-type lessons, they are not a sufficient, suggesting the need for a perspective that organically links each of these perspectives and evaluates whether they are functioning. Japan has a culture of lesson studies, and it is possible to evaluate the organic linkage of the above-mentioned perspectives, which should help focus the issues in the post-lesson study discussions. The future challenge will be to demonstrate this point.

Key words

Lesson Study, Problem-Solving, TRU Math Summary Rubric, Mathematics Education, High School

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