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# Flow of Mental Activity in Developing Dominant Representations for Solving Convergent Sequence Problems: Supporting Quality Education (SDG 4)

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## ABSTRACT

**Objective:** To investigate the flow of mental activities involved in developing dominant representations when solving convergent sequence problems and to understand how students transform dominant representations into alternative forms to support mathematical understanding. **Method:** Employing a qualitative case study approach involving 12 Mathematics Education students from the Faculty of Education and Teacher Training, Datokarama State Islamic University, Palu, who had completed real analysis courses and understood the concept of convergent sequences. Data were collected through validated tests and semi-structured interviews. The research procedure followed the stages proposed by Fraenkel et al., including phenomenon identification, participant selection, data collection, analysis, and interpretation. **Results:** The findings revealed that the flow of mental activities in developing dominant representations consists of five stages: understanding the problem, identifying dominant representations, converting dominant representations into alternative representations, evaluating and revising solutions, and reflecting on the effectiveness of the chosen representations. Students with verbal, visual, and symbolic dominant representations demonstrated different approaches in solving convergent sequence problems but followed a similar cognitive flow when transforming representations. **Novelty:** A systematic flow of mental activities for developing dominant representations in mathematical problem-solving. The findings contribute to mathematics education literature by explaining how representation transformation supports conceptual understanding of convergent sequences and promotes more effective learning practices aligned with the goals of quality education (SDG 4).

## INTRODUCTION

The development of students' mathematical understanding is closely related to the achievement of Sustainable Development Goal (SDG) 4, which emphasizes inclusive and equitable quality education and the promotion of lifelong learning opportunities for all. In mathematics education, quality learning is reflected not only in students' ability to obtain correct answers but also in their capacity to construct meaning, use multiple representations, and engage in higher-order thinking processes. Understanding how students develop and transform mathematical representations is therefore essential for designing learning environments that foster conceptual understanding, critical thinking, and problem-solving skills, which are key competencies promoted under SDG 4.

Sequence limits are crucial in real analysis, describing infinite sequences' behavior as their elements approach certain values (Bartle & Sherbert, 2000; Royden & Fitzpatrick, 2010). Students must understand real number sequences, definitions, and related theorems to apply them in problem-solving (Çetin, 2009). Competencies include understanding form, notation, and connecting sequence limits with other concepts (Isnani et al., 2020). Complex and