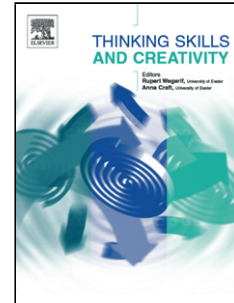


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## Title page

# Students' creative thinking process stages: implementation of realistic mathematics education

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### Highlights

Student's math cognitive knowledge at every creative thinking process stage

- Reading, understanding, searching information
- Collecting information; representing/manipulating problems; formulating model/strategies
- Recalling prior knowledge; imagining math connection; bringing rudimentary mathematics ideas
- Analyzing and synthesizing part of mathematic ideas; finding, connecting main mathematics ideas; solving the math problem
- verifying mathematics solutions; revising invalid mathematics idea, and finding innovative mathematics

### Abstract

The study aims at finding the students' cognitive knowledge in each creative thinking process stage by implementing Realistic Mathematics Education (RME) based on the perspective theory. This type of research is qualitative with grounded theory approach, which is conducted in several steps, namely research initiation; data collection; data analysis; synthesis and research generation; and theory validation. The result shows that the creative thinking process by implementing RME occur within 5 stages: orientation, preparation, incubation, illumination, and verification. Students' cognitive knowledge at orientation stage are reading and understanding the contextual problem and searching information from contextual problems. At the preparation stage, the students do activities such as collecting data and information; representing/manipulating contextual problems into mathematics objects; and formulating model/strategies. At the incubation stage, the students obtain cognitive knowledge by rereading and understanding preparation stage process; recalling prior knowledge and learning experiences; imagining the connection of each mathematic objects, and bringing out rudimentary mathematics ideas. At the illumination stage, students analyze part of mathematic ideas and synthesize them; finding the main mathematics ideas; connecting mathematics ideas with others, and solving the contextual problems. At verification stage, students verify mathematics solutions; revise invalid mathematics idea, and find innovative mathematics solutions.

**Keywords:** Orientation, Preparation, Incubation, Illumination, Verification

## 1 Background

According to the perspective of Wallas's theory in his book "The Art of Thought", Wallas (1926) develops a four-stage-model of creativity, namely: preparation, incubation, illumination, and verification. However, it

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