

Developing Mathematics Aids based on Cognitive Load Theory: Advances in Anticipated Curriculum Instructional Design

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ABSTRACT

Hierarchical mathematics learning planning needs to be structured according to how knowledge schemes are constructed in students' cognitive structures and in accordance with the characteristics of mathematics content. The implication, learning design needs to consider students' working capacity, in terms of intrinsic cognitive load, extraneous cognitive load, and germane cognitive load. This paper reviews the validity and effect of developing a prototype learning model based on cognitive load theory to promote academic learning in Anticipated Curriculum. The procedure follows ADDIE step: (1) Analyse: identifying competencies that are problems for students in the learning process using the Anticipated Curriculum; (2) Design: designing product: learning module and instruments measuring transferability; (3) Develop: The product was expanded for one phase and continuously validated via expert review and cognitive interviews, and refinements were made based on the comments. (4) Implementation: carry out learning using developed learning media, simultaneously obtaining qualitative and quantitative data; and (5) Evaluate: improve the prototype based on analysis of the results of implementing the prototype. The results obtained a prototype mathematics learning model in the Anticipated Curriculum based on cognitive load theory. Managing the intrinsic cognitive load, reducing extraneous cognitive load (i.e., cognitive processing that is unrelated to the instructional objective) include coherence, signaling, redundancy, split-attention), and optimizing germane cognitive load. Although all three create an extra load on working memory, they did this in different ways.

Kata Kunci: Cognitive load theory, Anticipated Curriculum, Mathematics Aids