

Creating a multimedia worked example for learning equivalency proof

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ABSTRACT

Mathematics proof often requires many simultaneous steps. For an instance, proof that two shapes are equivalent are presented by analysing the corresponding angles and sides. Presenting a worked example for learning mathematics proof might be challenging when split-attention and redundancy are considered to avoid extraneous cognitive load. This paper aims to describe how to transform a written worked example into a multimedia worked example for learning mathematics multi-step proof. The procedure follows three steps: Analyse, Design, and Develop. Firstly, analyse the elements in equivalency proof, and effects of multimedia that is when verbal and visual information is combined. Secondly, design a paper based worked example that is validated by experts that the extraneous cognitive load is minimum. Then, transform it in a visual (picture) – verbal (written steps) presentation. After validation on the possible multimedia effects caused by the presentation of the worked example, lastly, develop the worked example pairs consisting of a worked example for the knowledge base acquisition, and an isomorphic problem for the practice of knowledge automation. This study offers a lesson that applying the twelve principles to take into account: (1) Coherence, (2) Signaling, (3) Redundancy, (4) Spatial Proximity, (5) Temporal Proximity, (6) Segmentation, (7) Pre-Training, (8) Modality (text is read, not written), (9) Multimedia (picture is visualized adding to words), (10) Personalization of wordings, (11) Voice, and (12) Image of instructors, is important. Therefore, involving experts of cognitive load theory in validating the transformation of worked examples from a written format to multimedia is vital.

Kata Kunci: *cognitive load; mathematics; multimedia; proof; worked example*