

# Augmented Proof: Examining Structures to Support Geometric Proof Comprehension

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## Abstract

To understand even a modest geometric proof, students must process an interwoven combination of symbolic, diagrammatic, geometric, and logical information. This amount of information density presents a daunting management task that students are known to perform poorly on. To address this challenge, we propose a two-column proof interface that structures the information management task according to diagram configuration schemas (DCS). We evaluated our design by comparing secondary school students' performance on proof comprehension tasks with DCS augmentation to using a typical two-column proof. Students using the DCS-augmented interface demonstrated improved overall reasoning and accuracy in geometric proof tasks compared to the traditional two-column format. They were also significantly better at identifying and correcting mistakes in proofs. These results suggest that managing complex information by integrating it in a coherent schema-like DCS can support student understanding of proof.