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**LIM-G: Learner-initiating instruction model based on cognitive knowledge for geometry word problem comprehension.**

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Summary: Computer-assisted instruction systems have been broadly applied to help students solve math word problem. The majority of such systems, which are based on an instructor-initiating instruction strategy, provide pre-designed problems for the learners. When learners are asked to solve a word problem, the system will instruct the learners what to do. However, systems employing an instructor-initiating instruction strategy offer little help to advanced learners or to learners encountering problems that are not in the pre-designed database. Therefore, in this study, a learner-initiating instruction model (LIM-G) is proposed to help learners' comprehension of geometry word problems. Geometry word problems are math word problems involving geometric concepts. Many researches indicate that learners encounter difficulties while comprehending math word problems. In this model, a learner can seek help with any geometry word problem he is interested in. Based on a learner-initiating instruction strategy, LIM-G first comprehends the problem and then gives the learner the telegraphic and diagrammatic representations of the problem, which are more intuitive to understand. For LIM-G, the comprehension mechanism plays a critical role in solving word problems. For this study, a system is built based on LIM-G. In this system, the cognitive knowledge needed for comprehending geometry word problem is constructed with an ontology-based tool called InfoMap. Using cognitive knowledge and frame-template structures, the system can extract the relevant concepts in geometry word problems for comprehension.

*Classification:* U50 D50

*Keywords:* intelligent tutoring system; learner-initiating instruction; problem posing; geometry; word problems; problem comprehension; problem solving; modes of representation

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