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## **A collaborative digital pen learning approach to improving students' learning achievement and motivation in mathematics courses**

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### **Abstract**

Mathematics education in contemporary elementary schools is mainly conducted in a conventional way by giving lectures. A teacher would pass on knowledge to students by giving lectures, and this type of one-way teaching method is prone to cause poor learning achievement. Many researchers have suggested the use of a collaborative problem solving to improve the situation. This research proposed the use of a digital pen learning system (DPLS) with collaborative problem solving to improve learning achievement and learning motivation in a conventional mathematics courses. A quasi-experimental design was adopted to set up all of the teaching activities, which involved 64 fourth-grade students for four weeks. The results of the research show that the learning achievement of the two experimental groups was significantly better than control group. There was no significant difference between the two experimental groups and control group in terms of learning motivation. There was no significant difference between the three groups in terms of learning attitude.

*Keywords: Applications in subject areas, Interactive learning environments, Architectures for educational technology system*

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