

DUDAMATH The Digital Environment For Demonstrating Mathematical Ideas and Problem Solving

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Abstract

DUDAMATH is a digital environment for demonstrating mathematical ideas and problem solving. This environment grew from tools that were developed by the first presenter of this talk for school classes in order to provide a solution for needs that existing tools could not address. The main components of this environment are interactive arithmetic and algebraic expressions that can be manipulated in dynamic and diverse ways. These manipulations can then be documented and saved. Other highlights of the environment are diversity of representations, integrality that stresses the relation and connection between different subjects and aspects, and convenience of use and implementation in classrooms.

The use of technology can offer a lot to school math education. The interactivity and dynamics that technology can supply allow the creation of "virtual manipulatives": virtual objects that allow teachers to present and demonstrate mathematical principles. It allows students to explore these objects and reach conclusions about their properties and relations between them by considering the effect of the manipulations performed on them [1].

The symbolic expressions in DUDAMATH are interactive virtual manipulatives. Dynamic manipulations of these expressions are done by dragging or clicking them. Students can learn about the properties and behaviors of these expressions by trial and error, similar to how we learn about our physical environment. Students can observe dynamically how manipulations occur from stage to stage, and go back to cancel previous manipulations, lessening the common fear that results from making mistakes on paper. The way expressions react to manipulations is designed using the hierarchical structure of the expressions, in a way that is meant to strengthen the understanding of the relation between the structure of the expressions and the manipulations that were performed on them.

In the conference we will demonstrate the environment, an example of practical use, and will discuss its possible implications on mathematics education in school.

References

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- [2] ARCAVI, A. (2003) The role of visual representations in the learning of mathematics. *Educational studies in mathematics*, 52(3), 215-241.