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Do students really understand what an ordinary differential equation is?

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Summary: Differential equations (DEs) are important in mathematics as well as in science and the social sciences. Thus, the study of DEs has been included in various courses in different departments in higher education. The importance of DEs has attracted the attention of many researchers who have generally focussed on the content and instruction of DEs. However, DEs are complex issues that students may find difficulty to understand. The limited research in this literature points to the need for more studies on students' conceptions, and understanding of DEs and their basic concepts. The objective of this study is to fill this need by revealing the understanding, difficulties and weaknesses of the students who are successful in algebraic solutions, in relation to the concepts of DEs and their solutions. For this purpose, 77 students were asked 13 DE questions (6 of them about algebraic solution, and the rest about interpreting DEs and their solutions). From an analysis of the students' answers, it was concluded that the students who were quite successful in algebraic solutions, indeed did not fully understand the related concepts, and they had serious difficulties in relation to these concepts.

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