

# Attitudes of Preservice Mathematics Teachers towards Modeling and the Graphic Calculator

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In this paper we study the attitudes of a group of eight mathematics students following a preservice teacher training Program, based on the use of the graphic calculator in the process of teaching and learning mathematics. This Program was implemented by means of a course-workshop. We considered it important to elicit the attitudes of the participants involved in the Program both at the beginning and the end of the Program. In order to do so, a Likert-style attitude questionnaire was designed, the aim of which was to record the attitudinal changes in the mathematics students arising from the development of the Program which incorporates modeling and the graphic calculator in the context of linear algebra. This scale was set up from a matrix structure supported on a system of categories taking two variables into account. The first variable was defined by means of the specific objectives stated for the Program: i.e. mastery of the graphic calculator ( $O_1$ ), knowledge of linear algebra and problem-solving strategies ( $O_2$ ), modeling of real-world problems ( $O_3$ ) and the design of teaching units ( $O_4$ ). The second variable was defined by means of the components of the curriculum concept: i.e. student ( $C_1$ ), teacher ( $C_2$ ), mathematical content ( $C_3$ ) and social use ( $C_4$ ). From these two variables, a bidimensional variable  $O_iC_j$  was built with 16 values, from the combinations of the previous variables. The reliability of the instrument was measured, by applying the Spearman rho ( $r_s$ ) coefficient.

The scale of attitudes allows favorable changes to be appreciated in the student's attitude towards modeling ( $O_3C_1$ ), the teacher's attitude towards modeling ( $O_3C_2$ ), the attitude towards solving algebraic problems concerning evaluation ( $O_2C_4$ ), and the student's attitude towards the graphic calculator ( $O_1C_1$ ). However, in view of the log-linear analysis, these were not statistically significant. Similarly, attitudes were detected which did not increase after the application of the Program, as is the case in  $O_4C_1$ ,  $O_4C_4$ ,  $O_3C_4$ , and  $O_4C_2$ , which suggests that some aspects should be revised. These aspects include practical and theoretical activities, teaching tasks and activities which involve evaluation with a calculator and modeling.

## References

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