

**USING GRAPHICS CALCULATOR (GC) IN THE MATHEMATICS
CLASSROOM: STUDENTS' PERCEPTION**

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Abstract

This study explores students' perception on using graphics calculator (GC) to learn mathematics. The results were obtained from a sample of 244 students enrolled in the local institutes of higher learning. In this study, the term "perception" is conceptualised as a combination of "confidence in using GC to learn mathematics" and "classroom organization and practice" in a GC-enhanced classroom. The "confidence" attribute is presumably influenced by cognitive, affective, values and tool competency. "Classroom organization and practice" is a manifestation of students' actions and behaviour through their interaction with the teachers, peers and the tool in the classroom. "Perception" on the whole comprises skills, knowledge, beliefs, attitudes, feelings and actions that are related to mathematics learning experiences with GC.

Quantitative data from the survey questionnaire and qualitative data from the open-ended questions were collected and analysed. The reliability coefficients for the five variables (MatGC, cognitive, affective, values and tool) in the 45-item questionnaire were $\alpha = .7740, .8480, .7938, .7488$ and $.7505$ respectively. Results from the tests of significance showed that males and females did not show any significant difference in their perception on using GC to learn mathematics and age has no significant influence on the confidence in using GC to learn mathematics at $p < .05$. However, there was a significant difference between the achievement grade in the SPM Additional Mathematics and the confidence in using GC to learn mathematics at $p < .05$. Students in the grade A and C category were reported to acquire a higher confidence in using the tool to learn. Result from the multiple regressions showed that "cognitive", "affective", "values" and "tool competency" contributed significantly to the "confidence" attribute with "values" top the list.

Written remarks from the four open-ended questions showed that there are differences in the "cognitive competence", "affect" and "values" between those who claimed to like GC-technology and those who claimed to dislike GC-technology.

Notably, most of the respondents remarked that using GC to learn mathematics is challenging, exciting, and motivating. In contrast, the group that encountered difficulty using GC to learn mathematics attributed failure to their lack of technical ability or not able to follow instruction to operate GC correctly.

Although limited in generalisability, these findings suggest that the use of GC in learning mathematics is well received by the students. The benefits of inclusion of technology in the mathematics curriculum may need time to be proven. Nonetheless, the results of this study may help to bring awareness to all the mathematics educators about a new way in the learning of mathematics with the graphics calculator.