Author	Lahoylahoy, Myrna E.
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ABSTRACT

The study looked into the relative effects of integrating History of Mathematics in the teaching of Algebra and Trigonometry on the cognitive and affective learnings of fourth year high school students. Furthermore, it tried to find out the relative contribution of ability level and gender on their mathematics achievement, attitude towards mathematics, perception of the usefulness of mathematics, confidence in learning mathematics, mathematics anxiety and beliefs about mathematics.

Some 118 fourth year high school students enrolled in the Secondary Education Development Program of a public high school located in Iligan City were the subjects of this study. These students composed the four sections of Mathematics IV (Algebra and Trigonometry) which were taught by one teacher. Two groups composed of one high ability section and one low ability section, randomly chosen as the experimental group, were taught Algebra and Trigonometry with the integration of History of Mathematics while other two groups were taught Algebra and Trigonometry the traditional way. Fifteen lessons for each group were prepared by the researcher.

At the beginning of the second semester, the learners have given the Otis Lennon School Ability Test the scores of which matched the learners between the experimental and control groups. At the same time, the Mathematics Achievement test, Attitude towards Mathematics Inventory, Perception of the Usefulness of Mathematics Scale, Confidence in learning Mathematics Inventory, Mathematics Anxiety Scale and Inventory on Beliefs about Mathematics were also administered. These instruments were also used as posttests.

As part of the triangulation method, a combination of quantitative and qualitative method of research was used in this study. The quantitative findings revealed no significant difference in the achievement of learners taught Algebra and Trigonometry with history of mathematics and those learners who were not taught with history of mathematics across ability and gender. However, high ability learners exposed to the integration of history of mathematics perceived mathematics more useful than those taught Algebra and Trigonometry without history. The learners; attitude towards mathematics, confidence in learning mathematics, mathematics anxiety and beliefs towards mathematics did not differ among different ability levels and gender before and after the experiment. Furthermore, the integration of history to the teaching of mathematics was more beneficial to high ability students.

The achievement and affective learnings were interrelated such that: A learner who has a high achievement in mathematics has a positive attitude towards mathematics, less anxious,

perceived mathematics to be useful in real-life situation, has improved beliefs about mathematics and is confident to learn mathematics.

The qualitative results yielded improved learners' attitude and views about mathematics, positive perception of the usefulness of and beliefs about mathematics, made students more confident to learn mathematics and lessened anxiety because of the integration of mathematics in the teaching of Algebra and Trigonometry.

High ability learners exposed to the integration of history were motivated to listen to the teacher, enthusiastic in answering the teacher, actively participated in class discussion, showed confidence in answering the teacher and volunteered to solve problems on the board. The atmosphere of teacher – student interaction is active and lively; however, it was teacher dominated.

Students involved in the study, in general, have positive acceptance in the integration of history of mathematics in the teaching of Algebra and Trigonometry.

The findings from the quantitative data did not support the hypotheses and theories drawn from the conceptualization of the study. The study revealed that historical topics in mathematics did not improve students' achievement in mathematics through the students in the experimental group felt the learning process improved their attitudes toward and views about mathematics, perception of the usefulness of mathematics, confidence in learning mathematics and beliefs about mathematics. This indicates the possibility of a gap between what is taught and what is assessed. To bridge the gap, it is recommended that the Achievement Test of this study be modified or improved. The improved achievement test will consist of open-ended questions which will measure concept formation and authentic problem-solving abilities of students.

The results from the qualitative analysis were positive about the effectiveness of the integration of history in enhancing cognitive and affective learning in mathematics. It is also recommended that a deliberate strategy to the measurement of affective behaviors should be adopted, Moreover, it is recommended that a follow-up study employing interpretive methods using participant observational fieldwork be used in order to identify specific casual linkages that were not identified by experimental methods and develop new theories about causes and other influences in the patterns that were identified in the survey data.