# Textual and Media-Based Self-Learning Modules:
## Support for Achievement in Algebra and Geometry

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## ABSTRACT

Owing to the importance of a subject like mathematics in the teaching and learning of science, self-learning often poses a challenge to the educator. The objective of this study is to analyse the enhancement of the textual and the media form of self-learning modules to teach algebra and geometry to eighth graders considering their retention levels. A pre-test post-test single-group quasi experimental design was tested and tried out on 49 participants of a school. The 20 modules of self-learning material covering content in the topics of algebra and geometry in the textual and media-assisted forms of self-learning were administered over three months. The findings of the study revealed the ability of media-assisted self-learning modules to enhance achievement in the post-test when compared to the pre-test. The textual-assisted learning modules were able to enhance significant difference in the achievements in geometry, but not of algebra. The delayed post-test results were found to indicate an improved achievement in mathematics.

## KEYWORDS

Achievement, Algebra, Geometry, Individualised Learning, Media Form, Self-Learning Modules, Textual Form

## INTRODUCTION

Mathematics underlies the structure of the world, and we can trace its influence in diverse patterns, shapes, quantities, while making intelligent guesses of its impact on everything. All our lives are governed by time and to understand it, we need Mathematics. Its fingerprint is seen in our daily lives, in diverse fields such as business, art, music, dance, banking and taxation. However, the very thought of this subject instils a sense of phobia and anxiety in many as it is able to confound and baffle learners of all ages (Bledsoe & Baskin, 2014). Mathematics anxiety is a phenomenon that looms large. Mathematics avoidance leads to some loss in competency, exposure and practice, leaving students more unprepared and worried (Mahapatra, 2020). The conventional system of teaching Mathematics makes it a dull and boring subject. Students are unable to visualise the concepts taught by the teacher. Therefore, children lose their interest in the subject, start to develop a disassociation with it and gradually begin to hate it. Researchers and mathematics teachers suggest that students should be more actively involved in learning the subject, developing concepts and finding solutions for problems (Klein, 2000). Mathematics teachers are instrumental in constructing mathematical

power in engaging students to reason out the processes they use to reach solutions. To promote this mathematical power, teachers need to provide classroom disclosure a learning environment and make students believe that they can. Teachers should be knowledgeable, using good mathematical tasks and tools. Berry and Larson (2019), emphasising on rethinking the curriculum of high school Mathematics in the United States, have indicated that in the past four decades, there have been no major revisions in the Mathematics curriculum. "Besides ensuring that Mathematics curricula include the right content, we must also address and dismantle the structures that stand as barriers to positive mathematical experiences for students". They have laid emphasis on improving instruction, using strategies, self-paced and experiential learning. When taught effectively, critical thinking, reasoning and problem-solving will become a way of life for learners (Berry & Larson, 2019).

New innovations and technologies are helping instructors and learners in dispersing data, which is typically not conceivable through whatever other means (Office of Educational Technology, 2017). Instructive developments and educational technologies lay more stress on different ways to deal with Mathematics. Instructive innovation suggests the utilisation of all present-day media, methods, materials, practices, theories and standards for augmenting the learning outcome. Its offices are learning by control of the environment, media and technique. The latest intuitive implementation of interactivity through the Internet and instructional systems such as self-learning modules and computer-based realising frameworks open doors for better understanding of Mathematics in one's life. Westera (2019) in a study has analysed the pedagogical principles and models that are commonly used in games for learning. The study has evidenced that most games for learning use the multimedia design, self-learning principles, intrinsic motivation and the scoring system, which lead to assessment of learning. Further, the study implies that if there are no pedagogical flaws, then achievement is inevitable.

The constructivist theory of learning posits that learners construct knowledge by understanding and assimilating new and building on previously obtained information. It is an active process. Individual learning is a large part of the constructivist model. Individuals within the group are exercising their own learning models and are also contributing what they learn to the group. Constructivists suggest that learning is more effective when a student is active in the learning process, rather than just receiving knowledge by sitting passively in class. According to Rennie, Goodrum, and Hackling (2001), teachers are the most important factors who improve students' learning. A Mathematics teacher should adapt different strategies, teaching methods and individual plans to meet each student's requirements. The existing method of teaching in schools is more conservative, less activity-based, and depends upon the efficiency of the teacher. The objective of this research is to explore the effectiveness of using two different approaches of self–learning modules, namely the textual form and media form, for achievement in Algebra and Geometry. The current paper introduces and reviews literature on self-learning modules with special reference to textual and media-based forms, along with achievement in Algebra and Geometry. The analyses that helped us to arrive at the need for the study, enabling the formulation of research questions and variables of the study have been operationally defined. The procedure and the results of the study have been reported with implications in the discussion.

## REVIEW OF LITERATURE

### Individualised Learning

Individualised learning takes into consideration the differences between learners. It is defined as the capacity to build knowledge through individual learning and with the help of external sources, such as self–instructional modules. Individual learning requires cognitive skills, such as focusing on memory, attention and problem–solving, metacognitive skills associated with an understanding of how learning occurs and affective skills related to emotions. In the process, the trainer or the instructor takes on an active and supportive role. Individual learning takes place according to a student's interest and pace

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