

CONCEPT MAPPING AIDED INSTRUCTION AND MATHEMATICAL PERFORMANCE OF FRESHMEN COLLEGE STUDENTS IN ALGEBRA

Rynheart P. Atmosfera

Mae Amalia B. Pilarta

Faculty, Abra State Institute of Sciences and Technology,
Poblacion, Lagangilang, Abra, 2802 Philippines

Abstract: This study aimed to determine the effectiveness of concept mapping-aided instruction on the performance of the first year college students in Algebra at the Abra State Institute of Sciences and Technology for the school year 2014-2015. Two groups were created and matched according to their mental ability test, midterm algebra grade and high school general average grade. Treatment was given to the experimental group using concept mapping-aided instructions while the control group was taught using the conventional method of teaching algebra. Both groups were pre-tested and post-tested on the unit “Operations of Algebraic Expressions.” Descriptive statistics was used to analyse and interpret the results. The performance of the two groups in the pre-test was not significantly different. However, the experimental group performed better than the control group in the post-test. The concept-mapping – aided instruction is an effective tool in enhancing and improving the mathematics performance of the students in Algebra.

Keywords: Concept Mapping, Mathematical Performance, Algebra, Freshmen Students

INTRODUCTION

Curriculum is the focal point for never ending proposals for modification and reform, and educators must remain continually aware of this fact. Occupying a key position in the process of curriculum development is the classroom teacher. Competing philosophies of education, the changing nature of society, the findings of research in teaching and learning keep educators on the alert to carefully assess the great bulk of studies in the field of education are one in expressing that teachers play the most crucial role in effective teaching for the success of a curriculum lies in their hands. It must be pointed out, however, that not all teachers who know more the subjects are effective. Such teachers may exhibit a wide grasp of the subject and may even adopt the most updated styles and techniques. It must be remembered that the quality of learning acquired by the students is very much akin to the quality of teaching performed by teachers. For instance, an effective science teacher must be creative, innovative, ingenious, and knowledgeable of the most recent teaching techniques and strategies in educating his students.

Teaching algebra concepts require strategies that will encourage students to reflect and use their thinking ability in relation to the knowledge and information learned in algebra. One of these strategies is the use of concept mapping, a method confined to meaningful learning because the teacher presents the lesson as a complete and independent unit. Clever and appropriate use of teaching strategies will make teachers more effective and competent since effective teaching signifies academic achievement.

Novak (1998) emphasized the need for educators to take advantage of the available knowledge base of learning, learners, knowledge construction, and instructional tools to improve educational quality, a knowledge base that has not been tapped sufficiently. Meaningful learning happens if learners have relevant previous information and purposeful learning material and area unit willing to grasp and apply the hassle required to realize purposeful understanding.

According to BouJaoude and Attieh (2008) as the problem of improving the teaching-learning process preoccupies educators, concept mapping promises to be useful in enhancing meaningful learning. Concept maps facilitate learners to create evident the key ideas or propositions to be learned and recommend connections between new and former data. Concept maps are utilized in a range of academic contexts. Each context reflects another theory of data acquisition. On the one hand, the rationalist theory of learning suggests that disciplines have inherent structures that should be conveyed to learners. Therefore, idea maps ought to be evaluated by relating them to ideal maps, teacher constructed maps, or expert concept maps.

Concept mapping is one example of a group task in which students can draw upon the knowledge of one another, to help create their work. As they make connections between mathematical concepts, the other group members will be able to verify whether their individual interpretations of the concept is valid, and they will need to come to consensus on how these concepts are connected. This helps check for misconceptions and helped create new understanding of concepts that each member may not have had. Collaborative concept mapping is a great tool to use towards the end of a mathematics unit for students to check their understanding together, and build on what they already know.

Concept mapping is a valuable tool to communicate a variety of knowledge systems. They have been used not only in academic settings, but in disseminating information to increase understanding in a variety of situations. Creating concept maps is an effective method to require students to demonstrate understanding and make connections within their own minds. In the world of mathematics, concepts are very inter-related, and many concepts build on many others, and therefore concept mapping is very useful in the mathematics classroom as a learning tool. Whether the concept maps are made by hand, by computer or as a group, they can be found to be effective tool (Plotnick, 1997).

This study aimed at determining the effectiveness of concept mapping-aided instruction on the performance of the first year college students in Algebra at the Abra State Institute of Sciences and Technology for the school year 2014-2015.

METHODOLOGY

This section presents the procedures and techniques that were used in gathering and analysing the data in the study.

Research Design

This study is experimental in nature. The pretest-posttest control design was employed. The main purpose of this study is to determine the effectiveness of the concept mapping-aided instruction on the algebra performance of the respondents.

Respondents

The respondents of this study were 100 first year college students enrolled in Algebra. They were ranked and distributed to two different groups. Both groups were equated according to the matched-pair group design by randomly assigning pair members, one member to each group.

The two groups were matched according to their mental abilities, midterm algebra grade, and high school general average grade. Each group was composed of 50 students and designated as the experimental or control groups. The experimental group was given the treatment through the use of concept mapping aided instruction while the control group was taught using the conventional method.

RESULTS AND DISCUSSIONS

The control and experimental groups obtained mean scores in the pretest of 16.9 and 16.85, respectively. The mean difference was .05 with the computed t-value of .0172 and not significant at .05 level. This implies that the two groups have the same level of performance before the intervention variable was applied.

The control and experimental groups obtained mean scores in the post test of 24.2 and 30.00, respectively and significant at .05 level. This shows that the experimental group performed better than the control group after the experimental group was taught with Algebra topics through a concept mapping aided instruction.

The mean difference of the control and experimental groups in the posttest was 5.83 with the computed t-value of 8.86 and significant at .05 level. This implies that the concept mapping aided instruction is an effective tool in enhancing and improving the mathematics performance of the students.

CONCLUSIONS AND IMPLICATIONS

There is no significant difference in the pretest scores of the control and the experimental group. It only signifies that before the conduct of the experiment, the knowledge of the two groups of respondents about the topic are almost the same.

Moreover, there is a significant difference in the post test scores of the control and the experimental groups. The experimental group performed good and they have been able to learn an algebra topic using concept mapping.

The findings of the study may inform educators to expose students to concept mapping-aided instructions in their classroom teaching in order to enhance student learning.

References:

- BouJaoude, Saouma., & Attieh , May (2008). The Effect of Using Concept Maps as Study Tools on Achievement in Chemistry. *Eurasia Journal of Mathematics, Science, and Technology Education*, 4(3), 233-246. Retrieved June 2, 2014, from <http://www.ejmste.com/pdf-75345-12127?filename=The%20Effect%20of%20Using.pdf>.
- Novak, J. (1998). *Learning, creating, and using knowledge: concept maps as facilitative tools in schools and corporations*. New Jersey: Erlbaum.
- Plotnick, Eric (1997). Concept Mapping; a graphical System for Understanding the Relationship between Concepts. Retrieved on June 4, 2014, from <http://www.ericdigest.org/1988-1/concept.html>