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Study on the Role of Scholastic Achievement on the Eighth Graders Cross Domain Concept Mapping Ability

Sonia Sthapak

Department of Continuing Education & Extension, Barkatullah University, Bhopal, Madhya Pradesh, India
Telephone: 9826089699, E-mail: soniasthapak@gmail.com

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ABSTRACT The present study was undertaken with the aim to find out the effect of concept mapping on the academic success of students. This study was conducted by survey method on 99 students of eighth grade with the objective to find the relationship between scholastic achievement and cross domain concept mapping ability for which the researcher used a self- made inventory. Concept mapping is a way of meaningful learning so it will definitely have an impact on the academic/scholastic achievement of students. The investigator here has operationalised cross-domain as interdisciplinary knowledge.

INTRODUCTION

According to Novak (1983), new concepts are acquired either by discovery, which is mainly the way young children acquire their first concept and language, or by reception learning, which is the way school children and adults acquire most of their meanings. Creating a concept map of a particular domain makes learning an active process rather than a passive one. Concept mapping supports the visualization of such conceptual frameworks and stimulates prior knowledge by making in explicit and requiring the learner to pay attention to the relationship between concepts (Jensen 1998).

Concept mapping helps students understand, integrate and clarify concepts. It is the process which improves the understanding of the concepts (Chiou chi-Chang 2008; Candan Ay 2006). It is also a learning experience tool to realize the objectives of the different curricular area and there is tremendous attitudinal gain in students if they use concept mapping as a technique to adopt instructions (Bhaduri 2003).Concept maps can be used as a tool to improve achievement. These are particularly useful for representing network of concepts and they enhance the problem solving phases of generating alternative solutions and options. It also has a noticeable impact on student achievement and student attitudes (Asan 2007). It is a technique which drastically improves the performance of the low achievers as it simplifies the content and visually represent it .It is also seen that the high achievers construct better concept maps (Lian 1998). This further paves the way to adapt concept mapping as an instructional procedure as it simplifies the content and enables the students to retain and remember the content for longer duration.

Cross-domain Concept Mapping and Academic Achievement

In cross-domain concept mapping, the information is derived from both domain knowledge and cross-domain knowledge. The most significant difference between a cross-domain concept map and domain-specific is obviously in the "cross-domain knowledge" components. Cross-domain concept mapping necessitates the use of interdisciplinary knowledge.

To avoid rigidity and to be better equipped to come with novel ideas, it is necessary that one should think creatively and collaboratively. (Amabile 1988; Feldhusen 1995; Runco and Walberg 1998) claimed that inputs from different domains are essential to problem identification and that the synthesis of such inputs will further influence insight formation. It follows that forming cross-domain map requires the optimal functioning of the brain and this further improves learning outcomes. Study conducted by Horten and associates (1993) indicated that concept mapping raised student's achievement on the average as well as there was a strong improvement in student's attitude. Cross-domain concept mapping, which fosters cross-domain information integration and connections between learning and life experiences can be an efficient mental tool in understanding stu-

dents creative thinking and academic learning (Yu-chu Yeh 2004).

This study, therefore, tries to suggest a way in which the connections among academic competencies and cross domain concept mapping abilities are identified.

The objective of the present study is to study the relationship between scholastic achievement and cross-domain concept mapping ability of eighth graders and for this the investigator took into consideration the null hypothesis (Ho1) which states that there is no significant relationship between scholastic achievement and cross domain concept mapping ability of eighth graders.

METHODOLOGY

The study proceeded with the selection of 99 students of eighth grade and the data have been collected through following tools and techniques: general information of students regarding age, sex family-background, parental background have been collected using information schedule as a tool which has been prepared for this purpose only.

The techniques of concept mapping, developed by Novak (1983) are used for the present study. For assessing cross-domain concept mapping ability, a self- made inventory was used by the researcher which had 25 questions from different disciplines, five questions under each discipline and altogether five disciplines were taken, ten questions were there to assess the attitude of the students on the given topic , a concept map was given which was to be labeled and also a topic was given on which the students were asked to draw a concept map.. For scholastic achievement previous year's annual examination marks were collected.

RESULTS AND DISCUSSION

Results show that there exists a positive significant relationship between cross-domain concept mapping ability and academic achievement. This is evident by the value of 'r' given in the Table 1 and also followed by Figure 1, scatter diagram depicting a positive relationship between academic achievement and cross-domain mapping ability. The value of 'r' is found to be highly significant (Table 1) as also in the case of Lian's study (1998) on concept mapping. It further supports Anu Haapala et al. (2002) view which says that concept mapping raised students achievement, at the same time it is beneficial in attitudinal gain, as also proved by Bhaduri (2003) who reported significant difference in attitudinal gain with respect to concept mapping ability. This study also supports the view of Yu-Chu Yeh's (2004) study who found that high achievers are good at constructing cross domain concept map. (Candan Ay 2006; Esiobuog and Soyibok 2006; Boujaoudasa and Attieh 2008; and Chiou,Chi-Chang 2008) found that concept mapping can help students understand, integrate and clarify concepts and also enhance their interests in learning accounting. They also thought that concept mapping could be usefully used in different curricular areas. The positive relationship in the present study also proves the point indicated by Runco and Walberg (1998) that cross-domain map requires the optimal functioning of the brain which improves learning outcome and hence, the null hypothesis which states that there is no significant relationship between academic achievement and cross-domain concept mapping ability of students, (Ho1) is rejected. From this it may be inferred that there exists a significant positive relationship between academic achievement and cross-domain concept mapping. This shows that students who score more in academic achievement are found to have better ability in cross-domain concept mapping.

Table 1: Significance of 'r' between academic achievement and cross-domain concept mapping

Variables	*N*	*df*	*r*	*Significance*
Academic achievement Cross domain concept mapping ability	99	97	0.615	0.00

Besides testing the hypothesis the researcher intends to find out the intra relationship between the components of cross-domain concept map and intra relationship between the components of academic achievement and the interrelationship between the components of both the variables. The results are presented in Tables 2, 3 and 4 respectively.

The results show that nearly all the different components of cross domain concept map have significant relationship with one another except the relationship between language and attitude, and social studies and attitude, which are found to be not significant.

This also shows that interdisciplinary knowl-

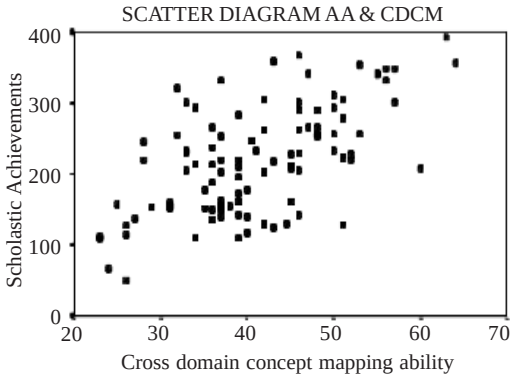

Fig. 1. Significance of 'r' between scholastic/academic achievement and cross- domain concept mapping ability

edge is a must for constructing cross domain concept map.

But at the same time it is strange to know that social studies and environmental attitude share an insignificant relationship whereas social studies (S. St.) is considered as a subject which generates the environmental attitude of a child (Table 2).

The results show that all the values of 'r' are significant between all the components of a.a. This further indicates that achievement in Science and S.St. play a significant role in a child's a.a (Table 3).

The above results show that except one, that is, S.St. and Math all the components of a.a. and c.d.c.m. share a highly significant relationship between themselves. Almost all the values are significant at .01 level (Table 4).

Therefore, we can say the students who are good at academic achievement are good at cross domain concept mapping ability also.

Table 2: Intra correlation between different components of cross-domain concept map (taken values of 'r')

	Language (Lang)	*Mathematics (Maths)*	*Science*	*Social Studies (S. St.)*	*Culture*	*Represen-tation (Reptn.)*	*Concept Map (Con. Map)*	*Attitude*
Lang	1.00	.296**	.297**	.219*	.211*	.437*	.444**	.137
Maths		1.00	.224*	.211*	.401**	.307*	.435**	.207*
Science			1.00	.258**	.273**	.405**	.568**	.347**
S.St.				1.00	.249*	.151	.217*	.194
Culture.					1.00	.290**	.341**	.378**
Reptn.						1.00	.503**	.259**
Con.Map.							1.00	.335**
Attitude.								1.00

* Significant at .05 Level. ** Significant at .01 Level.
Lang-Language, Maths- Mathematics, S. St.- Social Studies, Reptn – Representation, Con. Map - Concept Map

Table 3: Intra correlation between different components of a.a. (taken values of 'r')

	Lang.	*Math.*	*Sci.*	*S. St.*	*Total Score*
Lang.	1.00	.593**	.771**	.755**	.857**
Math		1.00	.728**	.698**	.869**
Sci.			1.00	.772**	.919**
S.St.				1.00	.906**
Total Score					1.00

* Significant at .05 Level. ** Significant at .01 Level.

Table 4: Interrelationship between the components of a.a. and c.d.c.m. (taken value of 'r')

	S. Lang.	*S. Math.*	*S.Sci.*	*S.St.*	*Total Score*
Lang.	.456**	.402**	.346**	.325**	.427**
Math	.465**	.333**	.350**	.434**	.438**
Sci.	.448**	.223*	.344**	.387**	.384**
S.St.	.198*	.189	.261**	.275**	.260**
Culture.	.566**	.426**	.436**	.490**	.533**
Reptn.	.543**	.252*	.424**	.406**	.443**
Concept.Map.	.525**	.385**	.470**	.461**	.511**
Attitude.	.382**	.306**	.301**	.289**	.355**

* Significant at .05 Level. ** Significant at .01 Level.

CONCLUSION

This study further strengthens that concept mapping is one way to make knowledge relatively permanent, to store it in more organized manner and is easy to retrieve the same when required and this is one reason that the students who are good at cross-domain concept mapping ability are able to score better in academics. Thus, it can be said that if the teachers and the students want to learn things better and for longer duration they should adopt cross domain concept mapping ability.

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