

Effects' of Concept Mapping Instructional Strategy on Students' Academic Performance in Economics

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Abstract

This study was carried out to probe the effect of Concept Mapping Instructional Strategy on the Academic Performance of Senior Secondary School Students' in Economics. Quasi-experimental study was adopted because it involves the use of pre-test and post-test designs. The instrument for this study was Economics Achievement Test. Thirty-Nine (39) economics students in SSII were considered for this study, they were categorized into two groups namely; experimental and control group respectively. Analysis of Variance (ANOVA) was used to test the research hypotheses formulated at 0.05 level of significance. Results from this study showed that there is a significant difference in the performance of students taught with Concept Mapping Instructional Strategy and also there was a significant difference in the performance of male and female students when Concept Mapping Instructional Strategy was adopted in teaching. From these findings, it was recommended that economics teachers should endeavour to use Concept Mapping Instructional Strategy for economics lessons in order to motivate students to learn meaningfully for better achievement.

Key words: Concept Mapping, Academic Performance, Economics, Students

Introduction

Knowledge is a human creation, where new ideas are constructed by creative people on the basis of existing concept, theories and search for new patterns or regularities in events or objects they observe (Novak, 2004). From birth to death individuals construct and reconstruct the meaning of events and objects they observe (Kinchin & Hay 2000; Novak & Musonda, 1991). Educational institutions have been exploring ways to improve teaching and learning practices through creative and innovative teaching methods. Specifically, through the use of diverse teaching strategies, which in turn could facilitate the development of argument formation capabilities, increased

written communication skills, enhance complex problem solving abilities and expand opportunities for reflective deliberation.

Teaching is an attempt to assist students in acquiring some skill, knowledge, ideal, attitude (Fontana, Mastropieri & Scruggs, 2007). Teaching is a polymorphic process- that is; it is a phenomenon with many different types of activities occurring at different phases or stages. In teaching, the teacher describes, explains questions and evaluates, he urges, threatens and cajoles like parents and other people. Teaching cannot be done by just anybody because it involves a body of knowledge being imparted to a less experienced or immature person through conscious and deliberate approach. Teaching is carried out for a particular purpose - to generate learning in students in order to change their personality and reasoning, the teacher must employ the best teaching methods that will motivate and encourage students to participate in learning process.

Quality teaching is the use of pedagogical techniques to produce learning outcomes for students. It involves several dimensions, including the effective design of curriculum and course content, a variety of learning contexts (including guided independent study, project-based learning, collaborative learning, experimentation, etc.), soliciting and using feedback, and effective assessment of learning outcomes. It also involves well-adapted learning environments and student support services. Quality teaching is needed to increase the efficiency of the teaching and learning process. Quality teaching helps the students to understand the concept being taught because the teachers is employing different technique's in passing out instruction (Fabrice & Leprince-Ringuet, 2012).

Kanuka (2002) submitted that quality teaching undergoes the following sequence: the teaching process should be a planned and purposeful; *presentation* of abstracted phenomena that includes a *multiplicity of perspectives*; and *information* to be fully apprehended with *relatedness* for meaningful understanding achieved through the use of diverse *instructional methods*; and meaningful *assessment*. Learning involves a complex interactive system which includes environmental, social, motivational, emotional and cognitive factors (Baron & Byrne, 2003; Huffman, 2004; Joyce, Weil & Calhoun, 2004). Quality teaching, then, is understood as a higher order learning, sometimes also referred to as deep learning.

There are different instructional strategies teachers can adopt while teaching such Socratic (questioning), team-teaching, demonstration, discussion, debate, project, role-playing, discovery, inquiry, simulations, critical dialogue and concept mapping. Ndagana and Onifade (2000) considered no method as being the best for every teaching situation. However, that a carefully designed teaching method can make wonders in making learning effective. Furthermore, the success in the use of the strategy depends on an intelligent analysis of the educational purpose, the pupils in the class, the

curriculum content of the moment or the type of subject matter being taught. Concept mapping will be the focus of this study. Concept Mapping will be an innovative classroom tool and technique that will deepen economics curricula as students advance academically.

Concept Mapping is a cognitive tool that was developed by Novak and his team at Cornell University in 1972 and it is an instructional strategy. Concept Mapping is an educational tool which specifically tap into a learner's cognitive structure and to externalize, for both the learner and the teacher to see, what the learner knows already (Novak & Godwin, 1984). Angelo and Cross, (1993) opined that concept mapping helps educators understand what students know by the process of externalizing this knowledge; it provides an observable and assessable record of the students' conceptual schemata and starting knowledge points. Concept Mapping is a visual learning instrument that corresponds to thinking processes, allowing students to organize ideas and read, write, and think better. It makes available a technique to organize knowledge into a progressively more complex conceptual framework (Hyerle, 1996; Jonassen, Beissner & Yacci, 1997).

Concept Mapping has been used for assessment (Ingec, 2009); curriculum planning tools (Kinchin & Alias, 2005; Kane & Trochim, 2007; Ambe & Reid-Griffin, 2009). Teaching programs that assist students to learn by creating and relating previous knowledge with the new learned knowledge aims to breed individuals that can research for information and eventually individuals that can produce new information. Julie and Gary (2013) described concept mapping as a representation of knowledge organized into cognitive structures. Concept mapping enables the enhancement of the development of students' thinking skills through more meaningful learning activities. Furthermore, Mass and Leaby (2005) explained that by "enable" we mean that the skill, once learned, can help students to organize what they know and think in more complex ways.

Adesope (2006) submitted that concept mapping are tools used for meaningful learning, assessment, instructional planning and finding out alternative concepts or misconceptions held by the learners. Concept Mapping are presented in a hierarchical structure. The most general are situated in the superior part of the map while the specific concepts, less general ones are positioned in the lower part of the map (Novak, 2008). Students can aim to reach high levels of cognitive performance when concept mapping is created correctly and thoroughly. It is not just a learning tool, but a useful evaluation tool for educators measuring the students' academic growth. As students create concept maps, they come up with ideas using their own words and help identify incorrect ideas and concepts; educators are able to see what students do not understand, providing an accurate, objective way to evaluate areas in which students do not understand fully.

Concept Mapping is a tool for organizing and representing knowledge in

education. They include concepts usually enclosed in circles or boxes of some type and relationships between concepts or propositions (indicated by a connecting line and linking word) between two concepts. Linking words on the line specify the relationship between the two educational concepts (Prakash, 2014). According to Sandra (1996) Concept Mapping is the arrangement of major concepts from a text or lecture into a visual components. Concept mapping shows the structural pattern in the educational material and provide the larger picture. It is a technique for visualizing the relationships between different concepts. It is connected with arrows that are labelled in a downward-branching hierarchical structure. The relationship between concepts is ascribed in linking phrases (Sandra, 1996). Simply, a concept map is two concepts connected by a linking word (Novak & Godwin, 1984).

Concept Mapping are typically hierarchical in nature, with the subordinate concepts germinating from the main concept or idea. The Rubber Sheet Analogy states that concept positions on a map can continuously change, while always maintaining the same relationship with the other ideas on the map. Concept Mapping helps students organize information and build better frameworks of knowledge, which is critical as new knowledge is acquired (Angelo & Cross, 1993). The teacher must map out the procedure for the introduction and implementation of concept mapping for efficient teaching and learning.

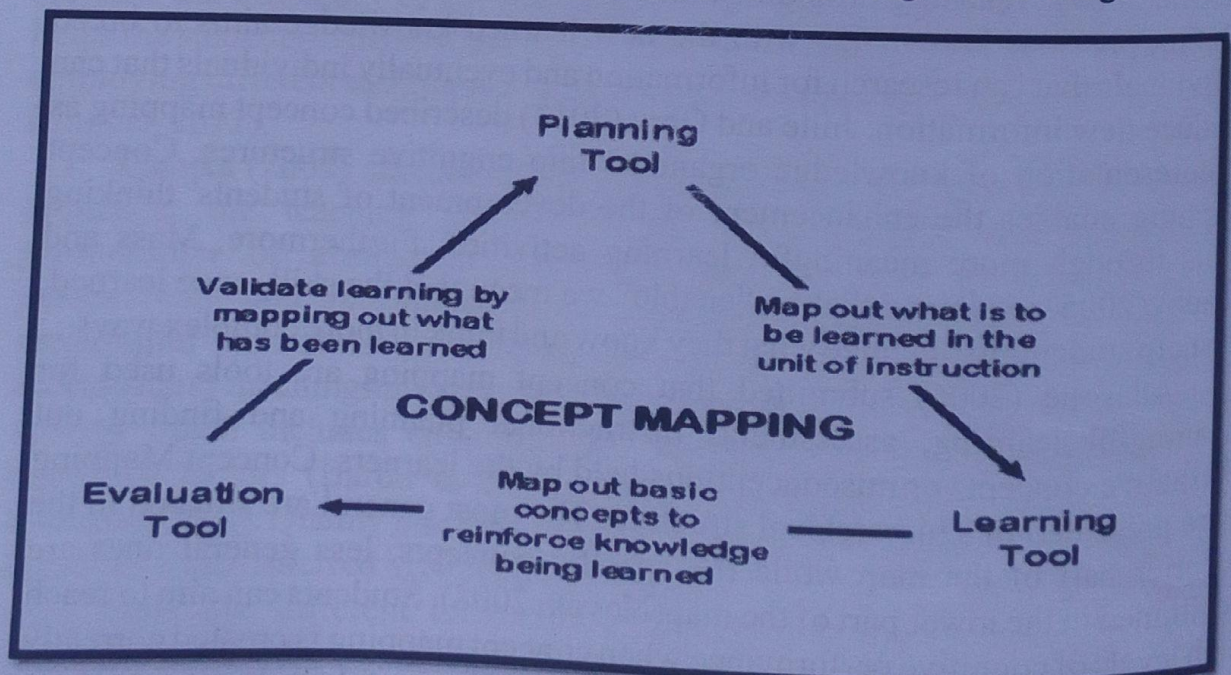


Figure 1: Concept Mapping Classroom Triangle (Mass & Leaubu 2005)

More sophisticated sets of knowledge and skills are expected from students as they grow intellectually and they should demonstrate an ability to successfully think through and apply their knowledge and skills to more difficult situations. Structure is inherent in all knowledge, so having an understanding of

the structural foundation of any content domain improves comprehension. Jonassen (2000) reported that knowledge is essential to problem-solving. Concept mapping instructional strategy can be a powerful learning strategy to make a learner to think actively about the relationship between terms (Mass & Leaby, 2005).

Concept mapping instructional strategy encourages students to brainstorm and generate new ideas. Hallenback (2008) opined that concept mapping helps student communicate complex ideas, thoughts and information clearly. It stimulate the construction of integrated knowledge structures leading students to achieve higher in tests that measure high cognitive levels (Horton, 1993). Concept mapping instructional strategy helps students to assess, understand or diagnose misunderstanding bodies of knowledge (Prakash, 2014). Also, Concept mapping instructional strategy helps to develop students' capacity to learn independently (Chia, 2008).

With the introduction of the new secondary school curriculum in 2011, Nigeria is struggling with an important paradigm shift in education: a teacher-centred method of teaching to learner-centred instructional strategy. Thus, this study was aimed at providing information on the possible effect of concept mapping on students' academic performance in Economics. Concept mapping instructional strategy has been reported to improve students' performance by different researchers. One of the objectives of the new curriculum on Economics is to enable students contribute intelligently to discourse on economic reforms and development as they affect the generality of Nigeria. Economics is the study of how society uses scarce resources to produce valuable commodities and distribute them among different people (Samuelson & Nordhaus, 2000).

The study of Economics is dichotomized into two major parts, namely micro economics and macroeconomics. Micro economics studies the behavior and operations of the individual units (households, firms and government agencies) in the economy while macroeconomics studies the entire economy in aggregates and averages. According to Aromolaran (2006) three major languages are used in teaching and communicating Economic ideas. These languages include theory or verbal, geometric or graphical and algebraic or mathematical language. Economics students are expected to pass at credit level before they can proceeding to any tertiary institution to study relevant courses like Accountancy, Business Administration and Insurance. The importance and technicality of this subject makes it necessary that adequate teaching method should be adopted.

Willerman and Macharg (1992) studied Concept Mapping as a Model in Physics, their result indicated that the use of Concept Mapping produces a significant improvement in the academic performance of students. Boujaoude and Attieh(2003) reported that female students' performed better than their male counterpart in Chemistry when taught with concept mapping. Also, Bilesanmi

(2002) found out that 10th grade female students performance improved significantly when taught with concept mapping in Biology. While studies of longer durations using concept mapping by Ahlberg and Ahoranta (2005) and Keraro, Wachanga and Orora (2007) revealed no gender difference in academic performance of students in science subjects.

The art of teaching is fundamentally concerned with dispensing of information and knowledge from the teacher to the students'. In Nigeria, for example experience has shown that spoken words alone in the communication of ideas are grossly ineffective and inefficient in producing desired learning outcomes. One of the shortcomings of conventional teaching strategy is that there is low creative production of students' knowledge (Novak, 2004). Furthermore, traditional teaching method has been reported to be inadequate to sustain the development of children in economics, especially in secondary school level (Agwagah, 2004). Students' may not be able to take active role in solving economics issues, teachers over-rely on textbooks and poor teaching aids or inadequate resource materials, poor student attention (Bligh, 2000). It is against these problems that this study investigated the effects' of Concept Mapping on the academic performance of Students in Economics.

Purpose of the Study

The main purpose of this study was to investigate the effects of Concept Mapping on academic performance of economics students' in Ilorin Kwara State. Specifically, this study investigated:

- i. difference in the performance of male and female students exposed to concept mapping instructional strategy.

Research Questions

This study provided answers to the following research questions raised:

- i. What effect will the use of concept mapping instrument strategy have on the performance of Senior Secondary School Economics students in Kwara State, Nigeria?
- ii. Is there any difference in the academic performance of students taught with Concept Mapping Instructional strategy on the basis of gender?

Research Hypotheses

- H₀₁:** There is no significant difference in the academic performance of students' taught using concept mapping instructional strategy in Economics.
- H₀₂:** There is no significant difference in the performance of students taught with concept mapping instructional strategy on the basis of gender.

Research Methodology

The study was a quasi-experimental design which employed pre-test and post-test design. The population of this study was made up of all senior secondary schools in Ilorin South, local government area, Kwara State, Nigeria. Two secondary schools were purposively sampled based on the following criteria: Schools that are co-educational (Male & Female), schools that operate the same admission policy and schools that are not situated within the same location. After which the sampled schools were randomly selected and randomly assigned to experimental and control group. Experimental group had a population of 20 students while the control group had a population of 19 students (conventional) making a total of 39 students. The instrument used in this study for data collection was Economics Performance Test (EPT) with 0.63 reliability index after a test re-test pilot was conducted. Analysis of Variance (ANOVA) was used to test all hypotheses formulated at 0.05 significance level.

Hypotheses Testing

H₀₁: There is no significant difference in the academic performance of students taught with Concept Mapping Instructional Strategy in Economics.

To test this hypothesis, Analysis of Variance (ANOVA) was used to test if there is a significant difference in the performance of students exposed to Concept Mapping and those exposed to Conventional Strategy on the basis of gender. The result of the analysis is shown in Table 1.

Table 1

ANOVA on effect of concept mapping on academic performance in Economics

	Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Concept Mapping	Between Groups	5477.3	3	1825.77	184.61	2.84
	Within Groups	356.2	36	9.89		
	Total	5833.5	39			

From Table 1, it was discovered **that there was** significant difference in the performance students exposed to concept mapping instructional strategy, $F(1, 38) = 574.93, p = 4,08$. Hence, the hypothesis was rejected.

H₀₂: There is no significant difference in the performance of students taught with concept mapping and conventional method on the basis of gender.

To test this hypothesis, Analysis of Variance (ANOVA) was used to test if there is a significant difference in the performance of students exposed to Concept Mapping on the basis of gender. The result of the analysis is shown in Table 2.

Table 2

ANOVA on the difference in the performance of student on the basis of gender using concept mapping strategy

	Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Concept mapping	Between Groups	5837.5	1	5475.6	574.93	4.08
	Within Groups	361.9	38	9.524		
	Total	5837.5	39			

From table 2, it was discovered **that there was** significant difference in the performance male and female students exposed to concept mapping instructional strategy, $F(1, 36) = 184.61$, $p = 2.84$. Hence, the hypothesis was rejected.

Discussion of the Findings

Findings of this study revealed that adopting Concept Mapping Instructional strategy improves students' performance in Economics significantly. They indicated that Concept Mapping instructional strategy helped them to understand, integrate and clarify Economics concepts and also enhance their interests in learning. This aligns with the findings of Chularut and DeBacker (2004), Ahlberg, Aanismaa, and Dillon (2005), Chei (2008) they reported that adopting concept mapping strategy in science subject improves students' academic performance.

However, students indicated that they could not quickly adapt to the approach of Concept Mapping instructional strategy. The result points out the importance and difficulty of preparing and training students for Concept Mapping tasks. As McCagg and Dansereau (1991) said, 'studies of Concept Mapping have indicated that a lack of familiarity with the technique can be frustrating for novice map makers. This is also a common problem in other successful examples (Jegade, Alaiymola & Okebujola(1991); McCagg & Dansereau, 1991; Ruiz-Primo & Shavelson, 1996).

Secondly, it was observed that male students perform better than female student when Concept Mapping instructional strategy is used. This result is consistent with the findings of (Lee, Lee & Leu, 2009), it shows that the use of

Concept Mapping has a positive effect on male students and leads to information easy memorized retention and recalled.

Conclusion

Based on the findings of this study, conclusions drawn supported the fact that Concept Mapping instructional strategy has a positive effect on students' academic performance in economics.

All the activities and innovations in Concept Mapping instructional strategy were geared towards the teaching of innovative skills that will correspondingly meet the demands of the 21st century labour market. Having found that Concept Mapping instructional strategy have a positive effect on student's academic performances. Teachers need to adopt this instructional strategy by incorporating the components of Concept Mapping in order to make teaching and learning process effective. Students learn and master skills better when they are allowed to participate actively in the class by interacting freely with teacher and their peers, work in groups and perform innovative and critical thinking projects. Furthermore, mere repetition of information leads to memory improvement.

Recommendations

This study recommends the following:

1. Economics teachers should endeavour to use Concept Mapping strategy for economics lessons in order to motivate students to learn meaningfully for better achievement.
2. Professional organizations like the Ministries of Education should organize workshops and seminars for Economics teacher to update their knowledge on the use of the Concept Mapping strategy for instructional delivery.
3. Students should always be allowed to participate actively in class by interacting freely with the teacher and their colleagues as this can help improve their academic ability and performance in Economics.

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