Classroom Action Research Journal

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Concept Mapping Strategy in Teaching Learning Economic Concepts and Perception of Students on Teaching Learning Economic Concepts Through Concept Mapping

Tshewang Dorji[1], Mohd Izwan Mahmud [2]

DOI: 10.17977/um013v6i22024p1-11

[1]Faculty of Economics, Universitas Negeri Malang, Indonesia
[1]Faculty of Education,UniversitiKebangsaan Malays, Malaysia

History Article

Received 15 Juni 2024
Accepted 27 Juli 2024
Published 9 Agustus 2024

Keywords
Concepts, Concept Mapping, Test, Teacher, Teaching Learning

Abstract

The key role of the teacher is to help students learn better. Economics can be taught and learned better using different teaching strategies. Concept mapping is one among others in teaching learning economic concepts. This study aims to investigate the effect of concept mapping on teachers' and students' teaching-learning processes. The study was conducted in XI Arts at Dechencholing Higher Secondary School under Thimphu Tromde, Bhutan, with 35 students. The study was a mixed method. The quantitative data collected through class (pretest and post-test) tests were analyzed and interpreted using descriptive statistics such as mean and standard deviation and inferential statistics such as t-test and level of confidence and statistical significance. The qualitative data collected through observation of group works and presentation and group reflective journal were analyzed by coding, and thematic analysis was drawn to analyze the data. The findings showed concept mapping plays an important role in the teaching-learning process and has a positive opinion towards concept mapping usage. It enhances descriptive ability, helps understand and remember concepts, builds confidence, and enhances participation in the classroom. However, not all concepts can be taught through concept mapping. It is also not always easy to construct all concept maps. Teachers should encourage students to continue with concept mapping before they master the technique.

How to Cite

Dorji, Tshewang. Mahmud, Moch Idzwan(2024). Concept Mapping Strategy in Teaching Learning Economic Concepts and Perception of Students on Teaching Learning Economic Concepts Through Concept Mapping. *Classroom Action Research Journal*. 6(2), 1-11

Correspondent Email:
tshewangtshewang@gmail.com

e-ISSN 2598-4195

INTRODUCTION

Various studies on Bhutanese education have pointed out the need to address issues related tothe quality of education (GNHC, 2019). The diagnostic standardized test conducted by the Royal Education Council & Education Initiatives Private Limited (2008) in 18 schools for classes V, VII, and IX in Science, Mathematics, and English revealed that students were unable to perform basic numeracy and literacy tasks and their learning outcomes were below the minimum expectations of their grade levels. Most students could not understand core concepts and apply knowledge in real-life situations. Students are found to make simple mistakes related to procedural learning and application. Most students fail to relate their learning to their environment (Namgay, 2006). The Education Sector Review Commission (2008) revealed high primary school grade repetition. Students are not able to master their curriculum within the prescribed time. The World Bank (2007), as cited in (the Ministry of Education, 2014), found that the overall learning rate was low in grade level II and IV of primary schools in Bhutan. Similarly, the Program for International Student Assessment for Development (2018) in Bhutan revealed that students generally have higher success rates in items requiring lower cognitive skills. There is a significant gap in performance in more demanding tasks. Bhutanese students have performed at par with top PISA-D countries but significantly below the OECD average. I strongly believe that the lower learning rate in lower classes directly impacts the higher class. The Ministry of Education (2014, p. 29) shows that "the overall performance of Bhutanese children is challenged in meeting not only the international standards but also of the national standards". Several studies reveal shortcomings in learning outcomes, skills, and teaching-learning practice (GNHC, 2019). Therefore, teachers need to use child-centered teaching and learning, assessment approaches, and classroom practices to promote understanding in all learners (Ministry of Education, 2014; Dorji, 2018). Over the years, there has been a change in the delivery of lectures from mere talk or one-way teacher transmission to learner or child-centered teaching and learning. Teaching focuses more on students. Collaboration, reflection, and group discussion make students think critically. Teaching become more interactive and rewarding (EFA Global Monitoring Report, 2013). The same issues have been discussed and validated in the Bhutan Education Blueprint 2014-2024 (Ministry of Education, 2014). Providing quality education is critical for furthering the progress of human development in the country (Planning Commission of Bhutan, 2007).

This action research intended to try concept mapping as an intervention program in teaching and learning economic concepts and understanding the relationship between abstract concepts and how such practices helped students improve their learning and academic achievements. The literature shows concept mapping is used to teach concepts, facts, and ideas in the context of cross-cultural teaching and learning. Concept mapping is more valuable than the traditional lecture teaching strategy (Alhomaidan, 2015) and makes teaching learning more interesting and meaningful. I hope teachers are aware and familiar with concept

mapping. Even if teachers are aware and familiar with concept mapping, brushing up their knowledge to pay more attention to concept mapping strategy in teaching would be useful. The findings from this study might help other teachers design appropriate methodologies or strategies to teach a concept to the students or learners.

Aim and Objective of the Action Research

The aim and objective of the action research were to:

1. Try out and examine concept mapping in teaching and learning economic concepts.
2. Investigate the academic performance of students by incorporating concept mapping.
3. Assess the views and opinions on learning economics concepts by incorporating concept mapping.

Situation Analysis

Dechencholing Higher Secondary School is located in Thimphu Thromde. There are 74 regular teachers (21 male and d53 female, 6 contract teachers (5 male and 1 female), 1 male substitute teacher, 8 student teachers (4 male and 4 female), 9 non-teaching staff (4 male and 5 female) and 6 supporting staff (63male and 3 female). The school is a co-educational day school with an enrolment of 1813 students (850 boys and 863 girls) ranging from classes PP to XII. The school offers science, commerce, and arts streams. The management, teachers, and students are striving for academic excellence. However, the outcome of the class XII board examinations was not encouraging and satisfactory despite collective commitment, hard work, and efforts initiated by the school.

Currently, I teach Economics in classes X, XI, and XII. Economics requiresmuch effort to understand and remember concepts, facts, and ideas (Dorji, 2018). I have encountered many economics students who fail to understand and remember economic concepts. I believe an effective teaching strategy is the bedrock of effective learning. The quality of teaching strategy directly relates to the quality of student performance. The teacher should adopt the right teaching strategy to make students learn effectively (Yadav, 2006). After reviewing the literature, I felt I must conduct action research on teaching economic concepts through concept mapping. Concept mapping enables students and teachers to use visual perception in learning and remembering economic concepts (Tenzin, 2005).

Competence

I have attended a three-day professional development program on Action Research organized by Dechencholing Higher Secondary School in collaboration with REC and Thimphu Thromde. The Research Division facilitated the action research under the Royal Education Council. I also received support from the school management and my colleagues and teachers. I have been a faculty in the teaching profession for the last 14 years, teaching economics for classes X, XI, and XII. During the last 14 years, I got a good opportunity to re-examine and reflect on the trend of teacher-centered teaching and learning approaches in the school.

Critical friend

Mr. Tshering Wangchuk, a history teacher, has accepted the role of critical friend in action research. My critical friend possesses good research knowledge. He

has attended a research module during his graduate studies at Paro College of Education. He has also attended a three-day professional development program on Action Research organized by Dechencholing Higher Secondary School in collaboration with REC and Thimphu Thromde. The purpose of having a critical friend is to overcome narrow or biased interpretations of data made by the researcher. Critical friend acted as another bigger lens who gave advice and suggestions and asked provocative questions (Royal Education Council, 2018)

The literature for this action research was divided into the meaning of concept mapping, psychological foundations of concept mapping, use of concept mapping in teaching learning economics, how to develop a concept map, types of concept maps, the difference between concept map and follow chart, advantages of concept mapping, use of computer in constructing map as follows:

What is concept mapping?

The concept of mapping was first explored by Joseph Novok and his research team at Cornell University in 1970. Joseph Novok and his research team describe concept mapping as a graphic means of expressing scientific concepts to students. According to NCERT (n.d., p.181),"Concept mapping links different concepts to visualize their relationship. Here, different concepts are shown using suitable figures, which are joined with arrows or lines. The lines can also be associated with suitable phrases like 'goes to', 'comes out', 'added to', etc. However, it is not compulsory to associate the lines with such phrases. The main idea is to make the reader understand a particular line". The concepts linked by their connection through an arrow are called propositions. Similarly, Alhomaidan (2015) describesa concept map as a visual representation of knowledge in which concepts, relationships, and propositions exist. Concept mapping is a kind of visual road map connecting the meaning of concepts. "Concept mapping is organizing ideas" (Bybee, Powell, and Trowbridge, 2008. P. 135). The concept mapping is based on the approach of constructivism. The constructivists strongly believe that students actively construct knowledge. It is a good way of learning by doing (Esler & Esler, 1989) and learning with understanding. Similarly, Bybee, Powell, and Trowbridge (2008) outlined that concept mapping can be used in assessment and lesson planning, note-taking, assessing student misconceptions, means of self-reflection on student learning, and self-study (Cliburn, 1990). After the completion of the lesson, a schematic summary of what was learned and understood can be outlined through concept mapping.

Psychological foundations of concept mapping

Instruments are tools or facilities researchers useto collect data, and the results are better, more accurate, complete, and systematic. The assessment instrument used in this study was compiled based on the basic competencies contained in the Business Negotiation material in Business Communication learning. The assessment instrument used by the researcher is *Class Based Assessment,*with the type of assessment of test questions using Google Form, which contains 15 multiple choice questions and 5 questions regarding psychomotor. The Basic Competencies (KD) used are Activity 5.1: Prevention of Business Negotiations that Occur in the Surrounding Environment and Activity 5.2 Title of Activity Analyzing How to Conduct Effective Business Negotiations.

> …if a person is presented with a list of 10-12 letters or numbers to memorize in a few seconds, most will recall only 5 to 9. However, if the letters can be

grouped to form a known word or word-like unit, or the numbers can be related to a phone number or something known, then 10 or more letters or numbers can be recalled. In a related test, if we give learners 10- 12 familiar but unrelated words to memorize in a few seconds, most will recall only 5-9 words. If the words are unfamiliar, such as technical terms introduced, the learner may do well to recall correctly two or three of these. Conversely, if the words are familiar and can be related to knowledge, the learner has in her/ his cognitive structure, e.g., months of the year, 12 or more may be easily recalled (Novak & Canas, 2008. p. 5-6).

Use of concept mapping in teaching Economics

I found that economics is a subject in which students must understand the relationship between abstract concepts. Since many students are studying the subject for the first time in class XI as an optional subject, it becomes very difficult to learn abstract concepts and understand their relationships. Concept mapping is one of the good tools in learning abstract concepts and also to understand the relationship between abstract concepts (NCERT, n.d; Tenzin, 2005)

How do you develop a concept map?

The following are the important steps involved in concept mapping:

I. The first step to developing a good concept map is deciding the domain. One has to decide what the subject matter of the concept map that will be created should be.
II. The next step is to set a good focus question. Here, it should be decided what one will establish or show using the concept map.
III. After this, it is better to have a rough sketch showing how the key concepts are placed and related.
IV. Then, the different key concepts are labeled in different places with different symbols or figures.
V. Those concepts are then linked with arrows and/or linking words or phrases.
VI. For a good understanding of the relationships between the sub-domains of the map, it may be necessary to crosslink different concepts.
VII. Finally, the concept map should be revised to give a better look and to be made more meaningful. Selectingthe proper color combination and figure is also a very important aspect. It is better to give different colors for the concepts of different categories but the same color for the same category (NCERT, n.d., p.183).

Similarly, Bybee, Powell, and Trowbridge (2008) have also outlined developing a concept map as follows:

I. Students should identify major and minor concepts of a topic under study
II. Students will organize concepts in hierarchical relationships
III. While analyzingthe concept map produced by students, the teacher needs to look at the concepts related to the topic.
IV. The concept map should show a hierarchical relationship from simple to complex.
V. Assessment should be subjective. A bigger picture of students' understanding of the topic should be ascertained.

Types of concept map

According to NCERT (n.d). There are different types of concept maps.

i) Hierarchical
ii) Cyclical
iii) Chain and
iv) Spider map or network.

There are different opinion tools on what concept map is more beneficial for teaching learning (NCERT, n.d). In the initial stage, Novak (1998), Hibberd, Jones, and Morris (2002), as cited in NCERT(n.d.), strongly supported hierarchical concept maps for teaching concept abstracts. On the other hand, Safayeni, Derbentseba, and Canas (2003), as cited in NCERT (n.d), supported the idea of a cyclical concept map. However, the type of concept map doesn't matter as the choice of concept map solely depends on the comfort of teachers and students in learning concepts.

Difference between the concept map and follow chart

Unlike flow charts, concepts are expressed in propositions using linking words or arrows in concept mapping. The linking words or arrows describe the concept's relationship with other concepts through hierarchical and crosslinking arrows or lines (Cliburn, 1990; Novak, Gowin & Johansen, 1983; Tenzin, 2005). The arrowhead bringsa sense of direction to relationships.

Advantages of concept mapping

Concept mapping isa valuable tool in teaching learning concepts. A concept map communicates complex ideas, summarizes information, and facilitates learning (Alhomaidan, 2015). A study of 23 EFL students (as cited in Alhomaidan, 2015) found that students who were taught economics concepts using concept mapping learn better and perform better than those who were taught concepts using concept mapping. Cliburn (1990) outlined retention of concepts is higher when learning is done with understanding. Students understand and remember concepts for a longer period. Similarly, Fahim and Hiedar (2006) found a positive relationship between concept mapping and students' listening comprehension. Students construct concept maps and relate new knowledge with existing or prior knowledge. Marriott and Torress (2008), as cited in as (cited in Alhomaidan, 2015), argue that concept mapping is useful for the development of oral, reading, and writing skills. Students tend to learn more, better, and retain longer when students see or write concepts rather than concepts taught through rote learning (NCERT, n.d). Using concept mapping in the teaching process breaks the monotony of lectures, and lessons become lively, interesting, and insightful. Some of the advantages of concept mapping are as follows:

I. A well-constructed concept map with a good color combination in meaningful figures attracts a new learner, at the first instance, towards the concept map and, for that matter, to understand its relation.
II. Concept mapping organizes the knowledge systematically. The learner can define and explain different concepts or their relationship without rote learning. The whole subject matter becomes like a picture to her. As a result, retention of learning is also easy for a longer period.
III. As the learner gets the joy of creativity, learning no longer becomes boring to her. She has an immense interest in the subject matter.
IV. Concept maps also help the teacher identify where her student's concept is unclear. A wrong arrow or phrase easily reflects the problem area of the learner.

V. According to some researchers, concept maps also help evaluate a learner's level of learning. However, research is still required before it can be utilized as a powerful tool of evaluation that is free from subjectivity (NCERT, n.d, p. 184-185).

Use of computer in constructing a concept map

The construction of a concept map never ends. Computer software, like Excel and PowerPoint, is important in constructing concept maps, according to NCERT (n.d). There are a few cautionary notes for the teacher when using concept mapping. The teacher shares the expectations with students. Teachers remain vigilant in the class to guide and facilitate students. Teachers need to remember the lesson objectives so that the right objectives are achieved within the specified time. While constructing the concept map, most students forget the objective of the lesson or activity. As a result, students end up drawing useless diagrams and graphs and lose their path. The development of flow charts of concept mapping needs necessary discussion with teachers to teach and also with students to learn some difficult topics better. The teachers should prepare concept maps in chart papers and PowerPoint presentations and show them to students as references. The teacher should give hands-on instruction to students, preparing charts on a computer or in newspaper newspapers with clear concepts. Such activities will trigger and arouse more interest in the subject. Different groups are encouraged to draw concept maps using different colors. A better map looks more interesting and fascinating to learn concepts (NCERT, n.d).

Research Question

Based on the aim and objective of the action research, the following questions were asked:

1. Does the use of a concept mapping strategy promote the teaching-learning process?
2. How does the concept taught by concept mapping improve students' academic performance in economics?
3. Is there a statistically significant difference between the pretest (autumn test) and post-test (class test) mean score after incorporating the concept mapping strategy?
4. What are the views and ideas of students towards teaching economics concepts through concept mapping?

Research Methodology

A mixed method was used, using quantitative and qualitative data to conduct this action research. The qualitative data was collected by observing group work, group presentations, and students' reflective journals. The quantitative data was collected through the Autumn Test (pretest) and class test (post-test) to evaluate the effects of the intervention program. The qualitative analytic method used was thematic analysis.

Population and Sample

This action research was carried out with 11 Arts students. Students age ranged from 18 to 20 years. There were 35 students (11 Boys and 24 Girls in the class. Out of 35 students, all boys (11 students) and 19 girls had not taken Economics in classes IX and X. They were studying economics for the first time in class XI. All students were not familiar with learning and remembering concepts through concept mapping. The chapter 'Demand' was chosen because demand is an

important concept of market forces. 20 Periods of 45 minutes were allocated for the study. I briefed the XI Arts on the purpose of my action research. Study approval was obtained from the school management. Consent was also obtained from all students, and confidentiality was ensured. All students agreed and participated in the action research. The data collected through pretest and post-test were as follows:

Baseline (Pretest) data collection

Autumn Test

The baseline data was collected through the Autumn Test on September 25, 2019. The objective of the Autumn Test was to determine the level of knowledge that students owned beforeimplementing concept mapping as an intervention program. The twenty marks of short essay-type questions were covered after the midterm paper was prepared. The 20 marks were later converted into 100 marks for easier tabulation. The writing time of the Autumn Test was 40 minutes. The first chapter,'Demand' in class XII, was taught by incorporating a concept mapping strategy because the class XI economic syllabus was completed.

Post data collection

i. Class Test

After completingthe demand chapter, the class test was conducted on November 15, 2019, to assess the student's academic performance in economics after using concept mapping as an intervention program. The class test consists of similar questionswith the same marks and Autumn Test's writing time. The class test was also used to examine and compare the students' level of academic performance between the Autumn Test and the class test.

ii. Group Work and Group Presentation

During the lesson, group work and group presentations were assigned to each group. There were seven groups consisting of 5 members each. The objective for administrating group work and group presentation was to investigate and examine students' interest and participation in group activities and their level of understanding during the three-week intervention program.

iii. Student Group Reflective Journal

The seven groups of 5 members were also asked to write a reflective journal about how they felt, experienced, and learned demand concepts, facts, and ideas through concept mapping. The purpose of writing a reflective journal was to discover the views and opinions towards economic concepts, academic performance, and learning satisfaction after incorporating concept mapping as a teaching strategy. The group reflective journal also informed the teachers how students have progressed with concept mapping. Journalism promotes reflective thinking and generates further questions (Bybee, Powell & Trowbridge 2008).

DATA ANALYSIS

The quantitative data collected through pretest and post-test, Autumn Test, and class test were analyzed using SPSS version 24. Descriptive statistics, such as mean and standard deviation, and inferential statistics, such as t-tests, statistical significance, and confidence level, were determined. Similarly, qualitative data collected through group work and group presentation and students' group reflective journals were analyzed using a coding system. After coding, themes were generated (REC, 2018). Data collected through different methods were triangulated to confirm results and findings.

RESULT AND DISCUSSION

The analysis of the pretest and post-test revealed a significant difference between the two means, the mean of the post-test being higher. The findings from Table 1 support the previous findings mentioned in the literature that concepts taught through concept mapping have a positive impact, and using them systematically could improve the teaching-learning process. There is a statistically significant difference between pretest and post-test. As seen from Table 1, the pretest scores revealed that most students had a weak understanding of concepts. The improvement of the post-test score proves that concept mapping has positively affected learning economic concepts.

Test	N	Mean	Std. Deviation	Test Value=0				
				T	Df	Sig.(2-tailed)	95% Confidence Interval of the Difference	
							Lower	Upper
Autumn Test (Pretest)	35	45.79	16.536	16.381	34	.000	40.11	51.47
Class Test (Posttest)	35	62.97	14.460	25.763	34	.000	58.00	67.94

Table 1. Descriptive and inferential statistics of pretest and post-test

Similarly, the analysis of the group work shows that initially, students were not aware of concept mapping. All group members were confused with the flow diagram and concept mapping. After three classes, students were cleared about the concept mapping strategy. It was observed that all students in the group participated in the group work and showed keen interest in group presentations. Students clarified their doubts. Overall, I found that students enjoyed the concepts taught through concept mapping.

Similarly, the analysis of students' group reflective journals showed five themes. The students were in favor of learning economic concepts through concept mapping.

1. Descriptive ability

Concept mapping strategy helps students in the improvement of their descriptive ability. One group mentioned,"Concept mapping is mainly done by mentioning all the important points about a particular concept or topic, and later students can supplement with points by detailing information. In other words, it helps students describe the topic more, enhancing analytical thinking power".

2. Understand and remember the concept

Concept maps are important in promoting learning with understanding. A concept map helps students understand and remember concepts for a longer time. Memory retention becomes higher when learning is done with understanding. One group mentioned,"Concept mapping helps students improve sentence structures and grammar skills by describing the key points. Through concept mapping, students

found that they could understand more onparticular topics or concepts". As students construct concept maps, students attempt to relate new knowledge to their existing knowledge.

3. Build confidence

Students gain confidence through group work and presentation as they present their group findings to the class. Concept mapping providesa platform for brainstorming. Learning economic concepts through concept mapping enhances students' communicationof new ideas. Two groups mentioned concept mapping as a great way to build upon previous knowledge by connecting new information. The students were passionate about learning new concepts,which broadened their knowledge.

4. Active participation

Students agree that there was active participation among the group members. The group discussed and asked questions related to concepts taught in the class. All group members didn't feel bored and monotonous during the lesson. All groups mentioned,"We enjoyed learning concepts, facts, and ideas through concept mapping. It makes us active, and the learning became somewhat fun". All students agree that all concepts, facts, and ideas cannot be taught through concept mapping.

5. Test score

Concept mapping helps students revise lessons and prepare for examinations. During revision, students read text linking concepts or draw and study links between concepts. Three group members mentioned concept maps make it easier to recall the lesson or topic and review the information presented in the class. The findings go along with what was mentioned in the literature and agree with the results mentioned by Tenzin (2005), Fahim &Hiedari (2006), Alhomaidan (2015) & NCERT. (n.d.).

CONCLUSION

Based on the findings and triangulation of data from different, I conclude that concept mapping positively affects higher secondary students' learning of economic concepts and improves test scores. From my experience, I recommend that other economics teachers use concept mapping in their teaching-learning process. Although teaching economics in higher secondary classes is challenging, teachers can modify own teaching strategies by incorporating concept mapping strategy to suit students' diverse learning needs and interests. The instructional role played by teachers has a positive impact on students learning (Yadav, 2006).

However, in concept mapping teaching strategy, teachers should discourage students from copying concept mapping or memorizing concept maps for examination. It should be a strategy to 'de-emphasize rote learning' or to promote 'learning through understanding' (Cliburn, 1990). There is also a note of caution for all teachers while using concept mapping in teaching concepts. According to NCERT (n.d., p. 185),"while constructing the concept map, a student can easily forget the objective of such an activity and as a result by losing the path the student may get involved in useless drawings. The teacher should, therefore, develop an idea beforehand about what the teacher expects from students and remain vigilant in the class to guide and facilitate students so that the right objective is achieved within the stipulated time".

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