CONCEPT MAPPING INTERVENTIONS IN TEACHING: AN ATTRIBUTE TO LEARNING EMPOWERMENT

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Abstract
In higher studies, students are expected to take their own learning responsibility. There is a dearth in knowledge among educationists about the myriads ways of facilitating empowered learning. The research was designed to examine the effect of concept mapping teaching strategy on students' Learning empowerment in subject of educational research. Learning empowerment is a newly emerged area in education. It is the status of gaining power and control over learning and the process of learning. Several studies have been conducted to know the effectiveness of concept mapping in early years of schooling in teaching and learning process. While the intent of this study was to know the effect of concept mapping on learning empowerment in higher education. Secondly, the study was aimed to know the retention of the learning empowerment as the result of intervention through concept mapping. Prospective teachers of BS programs were the target population. Sequential exploratory mixed methods design was used to conduct an experiment. In the quantitative part of the study participants of the experiment were exposed to the treatment for one semester wile qualitative part was done with the interviews of the participants.. Learning empowerment scale was adopted for the collection of data. Measurements were compared and recorded at different time intervals. Mean, standard deviation and dependent sample t-test were used to analyze the data. The findings of the study revealed the positive effect of concept mapping on students' learning empowerment. It was recommended to use concept mapping strategy for gaining empowerment in learning.
Keywords: concept mapping, learning empowerment, active learning, retention.

INTRODUCTION

Higher education is expected to produce empowered learner with problem solving skill, greater motivation and decision maker of their own learning. To produce such kind of abilities the teaching learning process should be implemented according to the nature of the content. Teaching approaches help to develop links among the concepts and it leads to better understanding and learning empowerment (Naz et al., 2022). Selection of appropriate teaching approach attribute Learners needs to participate in experiential type of learning (Kastner and Motschilnig, 2022). Teaching methods and learning environment largely matters for building empowering competencies among learners. Future-based learning aims to maximize the exposure of the learners and make them more engaged and responsible for their learning. Modern education shifts responsibility from teachers to students. According to constructive paradigm of learning, students are expected to create knowledge than its acquisition (Callan, 2010). To create powerful instructional settings which help students to gain knowledge and skills, we should take into account the current understanding of instructional design. In the field of learning and instruction research, there is now a broad consensus that effective learning occurs when learning environments are 'powerful' stimulating learning which is "constructive, cumulative, self-regulated, goal-oriented, situated, collaborative' and taking into account 'individually different process of meaning construction and knowledge building.

The implementation of the appropriate teaching strategies is one of the factors affecting the development and empowerment of students' metacognitive skills. This is in line with the results of the research conducted by Prayanti et al. (2014), Tumbel (2011), Bahri (2010), and Jamaludin, (2009) showed that teaching strategies had a significant effect on students' metacognitive skills.

Osman and Hannffn (1992) said that metacognitive teaching strategy could be included or integrated into a learning and can be taught separately. Thus, the empowerment of metacognitive skills can be well planned and adapted with the teaching and learning strategy used.

Student empowerment is a gradual process requiring the educators to ensure that the students undergo the process of empowerment not as a burden (Morris, et al,2014) Learners can also be empowered through a combined innovative and traditional method of assessment of their knowledge and abilities (Arjomandi et al., 2018).

The fundamental concept of active learning is to advance the learning experience of learners and the teaching experience of instructors. When learners are active in the classroom, they are engaged in higher-order thinking (analysis, synthesis, evaluation) and in a variety of activities such as reading, discussing, writing, and problem solving (Kahu, 2013). Such classroom activities put the student at the center of the learning process enabling them to improve their critical thinking skills (Heng, 2014). Active learning can be realized by any method of teaching which actively involves students in the real learning process of (Maskell & Collins, 2017).

Empowered learning is associated with students' ability to actively participate in the learning process, confront challenging opportunities and make positive changes in their lives. Nevertheless, there is a threat of educators developing a pedagogy not fully understanding the elements that result in learner empowerment. The pedagogy framed by educators should consider students' active engagement that facilitates empowered learning within and without the classroom. Since previous researches have seldom reviewed intervention studies on empowered learning, this review can support educationists in implementing school-based intervention programs to promote empowered learning. (Titus & Muttungal, 2023).

Research Objective

To find out the effect of concept mapping interventions in teaching on students' learning empowerment.

Hypotheses of the study

H_{01}: There is no significant difference in the mean score of learning empowerment of prospective teachers before the intervention and mid of the intervention.

H_{02}: There is no significant difference in the mean score of learning empowerment of prospective teachers before the intervention and at end of the intervention.

H_{03}: There is no significant difference in the mean score of learning empowerment of prospective teachers before the intervention and after withdrawal of the intervention.
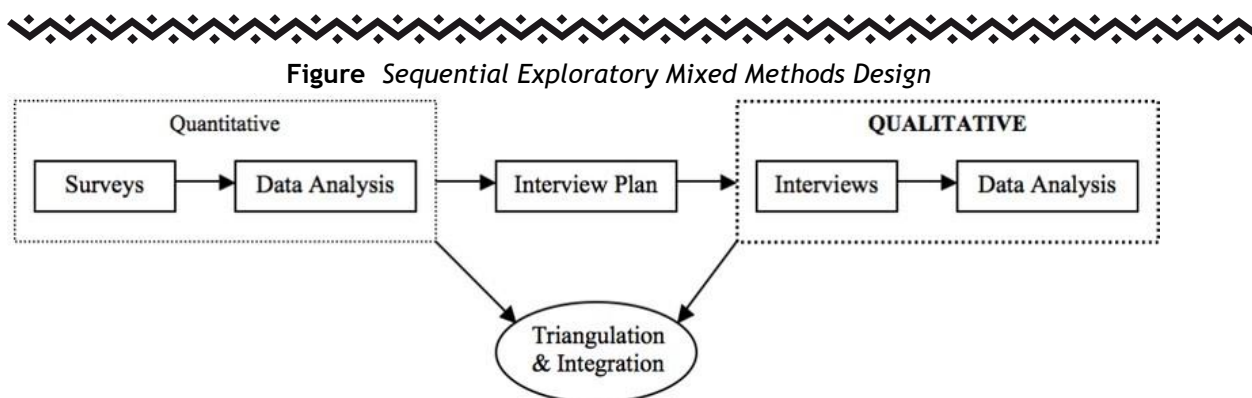
Research Question

How does the students perceived concept learning application in the learning process to enhance learning empowerment?

Research Methodology

Explanatory sequential mixed method was used for carrying out the study. Quantitative data was collected and analyzed first, then qualitative data was collected. Qualitative data is used to explain the quantitative data (Creswell & Creswell, 2018). Quantitative study is the major part of the study and qualitative data was collected for confirmation of the results of quantitative data. In the second part of the data collection, participants were interviewed on what they perceived in their treatment period.

In this study, one class of prospective teachers was exposed to concept mapping. Educational research classes were observed at different time slots after the completion of specific learning units in the educational research subjects. Visual representations of the time series is given in the following diagram. Six students were selected for collection of qualitative data. Two guiding questions followed by sub questions were used as interview form. Sub questions were generated form the participants responses towards two main guiding questions.

Figure *Sequential Exploratory Mixed Methods Design*

Note. Wu, Philip. (2011). A Mixed Methods Approach to Technology Acceptance Research. Journal of the Association for Information Systems. 13. 10.17705/1jais.00287.

Table *Sample and Sampling techniques*

	Sampling Technique	Sample Size
Quantitative Sample	Census Sampling	15
Qualitative Sample	Purposive Sampling	06

Quantitative Data Analysis

Paired sample t test was used to make comparison among the data collected in four time slots. Data collected before the intervention was used as base period/ control group. Three hypotheses were tested and details are given below.

Comparison of Learning Empowerment Before and Mid Intervention

First comparison was made between the data collected before the intervention and mid of intervention

Table *Learning empowerment and effect size before and mid intervention*

	Mean	Standard Deviation	df	t	P value	Effect size
Before intervention	69.53	9.67				
Mid of intervention	73.53	8.13	14	7.61	0.001	0.89

According to table 4.42 the Mean scores of the before intervention and mid of intervention for learning empowerment are 69.53 and 73.53 respectively. Moreover, the values of standard deviation in before intervention and mid of intervention are 9.67 and 8.13 respectively. It indicates that score data of mid intervention is less spread out than before intervention. In addition, the t value is 7.61 and the level of significance is 0.000, which is less than alpha value 0.05. [t (14) = 7.61; p < 0.001; r=0.89]. The magnitude of difference was computed to calculate the effect size. So the value of effect size remained 0.89 and magnitude of the difference was large. In this connection the results imply that there is significant difference in both the results of learning empowerment. Therefore, null hypothesis (H01) is rejected because there is significant difference in the learning empowerment of the prospective teachers before and mid of the intervention.

Comparison of Learning Empowerment Before and at End Of Intervention

Second time comparison was made within before and at end of intervention. Following table sowed details:

Table *Learning empowerment and effect size before and final intervention*

Groups	Mean	Standard Deviation	df	t	P value	Effect size
Before intervention	69.53	9.67				
Final intervention	79.20	6.14	14	9.37	0.001	0.93

According to table 4.43 Mean scores of the before intervention and final intervention for learning empowerment are 69.53 and 79.20 respectively. Moreover, the values of standard deviation in before intervention and final intervention are 9.67 and 6.14 respectively. It indicates that score data of final intervention is less spread out than before intervention. In addition, the t value is 9.37 and the level of significance is 0.000, which is less than alpha value 0.05. [t (14) = 9.37; p < 0.001; r=0.93]. The magnitude of difference was computed to calculate the effect size. So, the value of effect size remained 0.93 and magnitude of the difference was large. In this connection the results imply that there is significant difference in both the results of learning empowerment. Therefore, null hypothesis (H02) is rejected because there is significant difference in the learning empowerment of the teacher educators before and final the intervention.

Comparison of Learning Empowerment Before and after Withdrawal
Third comparison was made before and after withdrawal of intervention.

Table learning empowerment and effect size before intervention and retention

Groups	Mean	Standard Deviation	df	t	P value	Effect size
Before intervention	79.20	6.14				
Retention	93.53	14.94	14	3.90	0.005	0.72

According to table 4.45 Mean scores of the final intervention and mid of the intervention for learning empowerment are 79.20 and 93.53 respectively. Moreover, the values of standard deviation in final intervention and retention are 6.14 and 14.94 respectively. It indicates that score data of final intervention is less spread out than retention. In addition, the t value is 3.90 and the level of significance is 0.002, which is less than alpha value 0.05. [t (14) = 3.90; p < 0.002; r=0.72]. The magnitude of difference was computed to calculate the effect size. So the value of effect size remained 0.72 and magnitude of the difference was large. In this connection the results imply that there is significant difference in both the results of learning empowerment. Therefore, null hypothesis is rejected because there is significant difference in the learning empowerment of the prospective teachers in final intervention and retention.

Qualitative Data Findings
1. Participants' responses indicated that concept mapping was helpful in empowering students in learning the subject of research.
2. Creating links among the concepts enable them to understand the conceptual understanding.
3. It allows to understand the breadth and depth of the concepts. In this process students gain confidence and able to retain concepts for longer time.
4. It was also indicated that concept maps make easy for students to explain in their own words the materials is displayed in pictorial form.
5. Codes under subcategories of the learning empowerment scale indicated the positive influence of concept mapping on overall learning empowerment of the students.

Integration of Quantitative and Qualitative Findings
In the final stage of the data integration, findings of the qualitative and quantitative data was converged. Findings of the quantitative data analysis revealed that concept mapping has positive effect on learning empowerment. While the same findings were forwarded by analysis of qualitative data. It showed the trustworthiness of the quantitative data.

RESULTS AND DISCUSSION
The score on impact was increasing throughout the intervention of concept mapping. While the score on meaningfulness remained same at before and mid of intervention while it showed decrease in final of intervention. At the time of retention the score of meaningfulness increases. It was

observed that the competence domain of the learning empowerment showed improvement throughout the intervention. Intervention through concept mapping showed slight progress from before the intervention to mid of intervention. The comparison of learning empowerment of subscale impact, meaningfulness, and competence before and mid of interaction concluded that the students improved till the mid of the intervention. There was a significant difference of subscale impact before intervention and mid of intervention. There was very less dispersion of marks from the mean value. It was concluded that the sample significantly improved in the scores of meaningfulness before and mid of the intervention. It was concluded that at the end of the instruction students achieved scores in the three subscales of learning empowerment "impact", "meaningfulness" and "competence". Impact scores were maximum and meaningfulness was decrease. It was concluded that the comparison of mean scores "subscale impact" before and mid of intervention showed that, the students significantly achieved in subscale impact before intervention and final intervention. Subcategory of meaningfulness before intervention and final intervention improved significantly. Scores more deviated from the mean scores in before intervention than final intervention. Moreover, it was found that students improved significantly in score of competence before intervention and final intervention. On the other hand participants' interviews revealed the positive effect of concept mapping

It is becoming evident that teaching methods influence learning empowerment of the students. Empowered learning is associated with teaching approaches in the learning process. Educators may develop a pedagogy that develop learners' empowerment through active management approaches. On the basis of findings it is recommended that concept mapping may be adopted as teaching intervention.

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