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Assessing The Effectiveness Of Concept Mapping As Problem-Based Learning In Teaching-Learning Processes

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ABSTRACT
Individuals who are successful in medicine possess knowledge structures that are composed of extensive, integrated frameworks of interconnected subjects. This is true whether they are students or working-level physicians. The development of this knowledge base has the potential to provide a wide range of outcomes, one of which is the enhancement of clinical problem-solving abilities, in addition to other higher-level cognitive processes. It is possible to examine how pupils conceptualise the concepts that provide the foundation of the knowledge that they have been taught via the use of a method known as concept mapping. Students may use concept maps as a support tool while they are working on problem-based learning (PBL) assignments. Concept maps are based on ideas that are derived from the academic area of learning theory. Within the context of problem-based learning (PBL) classrooms, students can create concept maps that include key scientific and social ideas within the context of PBL situations. There are several potential benefits associated with the use of concept maps in project-based learning (PBL) sessions. These benefits include the promotion of communication, the identification of knowledge gaps, the generation of ideas for learning objectives, the stimulation of application across disciplinary boundaries, and the evaluation of each student's progress. Students may also find concept mapping to be effective in other types of project-based learning (PBL) settings, such as large-scale seminar discussions and settings that emphasise team-based learning. Using these types of Problem-Based Learning (PBL) situations, students have the potential to acquire a more profound comprehension of the connections that exist between various ideas and the PBL case that is being investigated. The development of instruments that are dependable and supported by evidence of validity is one of the obstacles that prevent concept mapping from being extensively used in the field of medical education.

Keywords: *Knowledge structure, Conceptual mapping, Problem-based instruction, Student evaluation.*

INTRODUCTION

The development of abilities, the modification of attitudes, and the understanding of fundamental scientific principles within the framework of the classroom are all ways in which educators play a crucial role in easing this transition. Students in higher education who want to be an active part of their education should be regarded like adults and given certain privileges according to the nature of their learning environment. For the simple reason that teachers expect students to put forth their best effort when they say they want to be an active participant in class. The possibility to ask follow-up inquiries and get clarification on any issues that the receiver still doesn't understand is one of these benefits. The pupils anticipate the instructor taking the lead and guiding the class throughout the lesson in this scenario. Students have also said that they would like it if their instructor could be humorous, collaborative, and able to provide clear instruction with relevant examples. Most people agree that these traits are crucial for today's teachers to have to help their pupils grasp the material. The study was conducted with the idea of meeting the professional development goal (Abbasi et al., 2021).

In turn, the researcher's current academic practises were profoundly affected by the topic of interest. Researchers have engaged in ongoing discussions as university instructors to improve the quality of their day-to-day educational processes and practises. The researcher’s group concluded after these conversations that inclusive education is an area that requires a tremendous amount of research. In the context of universities, the term "inclusive education" is often employed in a manner that suggests it means the same thing as specialised instruction for students with special needs. Regardless, upon further examination of the learning environment inside higher education, they have discovered that many students with greater life experience see obstacles hindering their academic success. Numerous studies on the topic of diversity, equity, and inclusion in higher education curricula and classrooms have been undertaken. Academics and government officials have discussed the need of expanding access to higher education extensively as a direct result of this. Given this, they argue that efforts to promote inclusive teaching and learning should go beyond just using a range of instructional strategies. Developing curriculum and deciding how students graded should prioritise providing inclusive education. Because of this, they need new approaches to education that can help us reach all children by improving the quality of instruction and removing barriers to learning. To welcome every student, several tactics could be used. The primary goal of the research was to identify the factors that contribute to the development of a methodical plan to improve the effectiveness of classroom instruction. Examining educational and pedagogical practices helped establish their efficacy, which is the

driving force for this study. Consequently, the following question has been put out as a research inquiry: How can they ensure that classroom instruction and student learning occur in an atmosphere that supports these endeavours? Several studies have shown that today's kids lack the necessary knowledge and skills in science and technology to successfully navigate the contemporary environment. This is a major concern since there is a growing need for individuals with scientific literacy, who can analyse current problems and predict future ones, rather than relying just on memorization of unrelated information. Not only that, but these people also need creative and adaptive skills to handle the ever-changing environment. Students' declining grades and lack of interest in science might be due to a combination of factors, including inadequate laboratory work and the frequency of misconceptions. Several factors are highlighted in the relevant scholarly literature as potential explanations. The availability of several notation systems and the absence of well-established ideas are two of these factors. Furthermore, educational curricula are often disjointed and linear, with little focus on idea definition and interconnection, as well as the development of connections between phenomena and concepts. Also, scientific classes don't always include synthesis opportunities, which is training students to make connections between distinct concepts and how to visualise various methods. Developing these opportunities further would benefit everyone. There is a lot of pressure on pupils to do well in school since it is often believed that grades indicate how well they will do in the future. Admission to elementary, middle, and high schools, universities, and specialist occupational fields is all based on these achievement-based standards. One of the most noteworthy facts brought to light by the study is the consistent decrease in the number of pupils enrolling in high school science programmes after the completion of mandatory science courses. As they near the end of their secondary school careers, pupils show little interest in taking science classes, particularly those pertaining to the physical sciences (Soleymani et al., 2022).

BACKGROUND OF THE STUDY

People with lesser salaries were able to participate in the economy on an equal footing with those with higher incomes thanks to this development. Quotas are one kind of affirmative action that colleges may use to help underrepresented groups. It is a place where individuals from disadvantaged origins have a chance to get an education that may help them catch up to those from more privileged backgrounds. Private, non-profit educational institutions as a percentage of all educational institutions are projected to rise from 42.6% to 78.6% between 2001 and 2020, according to statistics analysed. It is estimated that about 50% of China's educational institutions are financed or owned by private individuals. Educational possibilities are spreading, even to the most inconvenient places. Savings accrue to both the federal and state levels of government. Foreign direct investment (FDI) rises, company operations improve, and product growth rates increase because of more youth employment prospects and more college student financial aid (Khrais, 2020).

One of the unforeseen effects of privatisation and liberalisation is that the region and its inhabitants have become increasingly stratified along socioeconomic lines. Private entities, such as for-profit corporations, religious groups, and non-governmental organisations, have been able to buy educational facilities thanks to teachers' understanding of the education system, which has allowed them to meet the nation's increasingly high demand for education. Numerous good developments have occurred on a global scale as a direct outcome of educators' professional development. The first thing it has done is to bring down the national debt. Additionally, the load on the state has been reduced. There has been a marked improvement in the quality of these services as well. The area of higher education has been the subject of a great deal of research, both at home and abroad. Much of the research reviewed here focuses on how different socioeconomic factors influence people's decisions and outcomes in relation to their pursuit of higher education. Researchers have carried out several studies of education and human resource development. There is also a lot of literature that delves into how education relates to economic growth. Nevertheless, studies examining the consequences of educator professional development on the education industry, particularly considering the ever-changing dynamics of the demand and supply for education, are few. If researchers want to know the pros and cons of district-level teacher professional development, this research is a good place to start. The educational priorities of China have changed significantly since the introduction of the country's open-door policy and economic reforms in the late 1970s. Current market-oriented reforms and rapid economic expansion in a globalised economy have had a major impact on China's educational policy and system development. Following Mao Zedong's passing, a more realistic perspective on the value of education arose, leading to the decentralisation and commercialization of the country's educational system. This development is in line with the expansion of a market-based economy and its tightening ties to international marketplaces. The present tendency in China's educational system is for teachers to learn and have more freedom of choice; this essay was analysed and investigate this trend. The first part of the article includes a brief overview of China's educational programmes before to and throughout the country's financial revolutions. After that, they moved on to the political and economic shifts that prompted deregulation of schools and professional development opportunities for educators. Recent years have seen a great deal of discourse about the ways in which decentralisation and professional development for educators have impacted educational policy. Rumor has it that the economic reforms of China and open-door policy, which has diminished the role of the state in education delivery, has contributed to a widening of the educational gap between urban and rural areas. According to the statement, re-establishing the role of the state in the educational system in China is vital for achieving more equal and balanced development in the sector. That much was made plain in the paper (Dhawo, 2019).

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PURPOSE OF THE STUDY

Investigate the ways in which students may get a more thorough comprehension of complex ideas via the use of concept mapping. In a project-based learning (PBL) setting, evaluate how idea mapping influences students' ability to think critically and solve problems. Find out how idea mapping facilitates group work and dialogue in the classroom. Determine whether the process of idea mapping helps with memorization and practical application of information. Find out how to make idea mapping a part of project-based learning (PBL) so that students are more involved and get more out of it. Come up with ideas that might help teachers and curriculum makers understand the pros and cons of adopting concept mapping in project-based learning settings. The end goal of this evaluation is to improve educational methods and the teaching-learning processes.

LITERATURE REVIEW

A literature review formed the basis of the study on the difficulties and potential benefits of teacher education. A lot of recent research has compared different perspectives on the issue. Researchers investigated and reported on the factors related to parents' origins that were associated with their choices to send their children to private schools. Many parents choose to register their children in private schools because they are dissatisfied with the public school alternatives available to them. Parents in China are considering private schools for their children based on their academic success. Their choice to register their children there was heavily influenced by the school's reputation, which in turn was shaped by the school's academic successes, as they all agreed. Because they wanted their children to have solid groundwork for the future, the parents were concerned about the school's academic performance. When asked why they enrolled their children in a private school, most parents (61.7% to be exact) cited the superior educational opportunities offered by such institutions. The benefits of having private corporations run public schools (Machado, 2020).

There are four levels to China's educational system: elementary, vocational, regular, and adult. From the late 1970s forward, China's educational system has undergone dramatic changes, most notably with the 1985 presentation of the first central policy document on educational reform and the subsequent implementation of the policy framework. The 1985 Decision officially began China's educational reform. By embracing a decentralisation plan and using market forces in the educational arena, more and more social forces are being incentivized to provide educational services. Simultaneously, educational institutions and municipal governments have been encouraged to step up their efforts. Because of this, the scope and variety of educational opportunities have grown substantially. Concerning elementary education, at the end of 2005, more than 99% of school-aged children were enrolled in these programmes, and more than 95% of elementary school graduates were given the chance to attend junior high schools. With more than 23 million students registered in different kinds of higher education institutions in 2005, the gross enrollment ratio of higher education reached 21%. The 1985 Decision laid forth the requirements for a mandatory nine-year education programme throughout the country. Researchers had basically achieved their goal by the beginning of the new century. After six years, it is clear that they have succeeded in making primary school attendance mandatory. By 2005, almost all students (99.15 percent) had enrolled in school. The enrollment ratio for females is 99.14% and for boys it is 99.16%. According to the Ministry of Education, the gender gap is narrowing at this level. Despite several attempts, the aim of universal primary school attendance up to sixth grade has been impossible to achieve. Contrarily, options for junior high participation are currently open to more than 98% of elementary school graduates. A gross enrollment ratio of 95% was recorded at the country's junior secondary level in 2005. Be mindful that 2.62 percent of students at this level drop out in the same year, which is a sad reality to consider. From the data that is available, they may infer that the three-year dropout rate in junior high school is around 8%. In 2006, China's Ministry of Education said that about half of the country's teachers are able to pursue further education beyond senior high school (Chen, 2022).

RESEARCH QUESTION

i. When it comes to education, how might a concept map be useful?
ii. When it comes to teaching, what are the pros and cons of using idea maps?

METHODOLOGY

Quantitative research: Research that wants to answer the research topic uses quantitative research methods. A more thorough comprehension of the subject at hand may be achieved via the use of mixed methods research, which is the best feature of quantitative approaches. In complex situational or societal investigations, as well as collaborative situations, mixed methods research is often used in the health and medical disciplines, behavioural and social science sectors, and the medical sciences. Researchers using quantitative research methodologies use some quantitative research processes in their study. This kind of study is referred to as "quantitative research."

Sampling: The study's data was gathered using a specific technique. Using the Rao-soft programme, researchers determined a sample size of 600. Researchers sent out 775 questionnaires, got 662 back, and discarded 13 due to incompleteness. A total of 649 questionnaires were used for the investigation, including 297 females and 392 men.

Data Analysis Software– The researcher may use SPSS version 25 to analyse the data.

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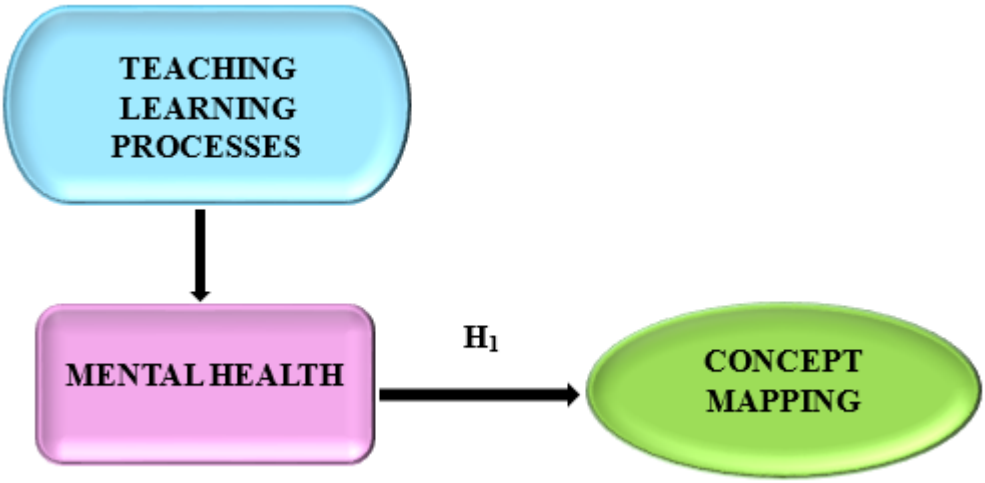
Statistical Tools- To comprehend the fundamental character of the data, descriptive analysis was used. Factor analysis was used to assess validity.
One-way Analysis of variance (ANOVA)- An unrelated group one-way ANOVA is conducted if there are two or more statistically significant independent variables. In this research, they used one-way ANOVA to see whether there was a correlation between gender, age, and occupational level and different aspects of brand equity awareness and surveillance. Researchers use the statistical significance threshold to determine statistical significance at 5% and 95% confidence intervals. To accept the null hypothesis, the p-value must be larger than 0.05. Despite being an all-encompassing test statistic, one-way ANOVA only tells the researcher that there were at least two groups that were different, not which ones were statistically significantly different. Post hoc tests are therefore required when the significance level is less than 0.05 and the data is shown to have an aberrant distribution according to the accepted alternative hypothesis. Utilising a post-hoc test allowed for the identification of groups that were statistically different from one another.

CONCEPTUAL FRAMEWORK



RESULT

❖ **Response**

600 questionnaires were sent out to anyone interested in participating. 775 sets of questionnaires were returned, and 649 of them were evaluated with the use of SPSS version 25.0.

❖ **Factor analysis**

The concealed component composition of a collection of measurement items may be confirmed via commonly used factor analysis (FA). The assessments of the measurable variables are thought to be due to latent, or invisible, components. Reliability analysis (FA) is a model-based method. Its primary goal is to model the interplay between observable events, hidden variables, and measurement errors. To ascertain if the data is appropriate for factor analysis, one may use the Kaiser-Meyer-Olkin (KMO) Methodology. Researchers evaluate the whole model and each model variable separately to find out whether they sampled them enough. According to statistical analysis, the potential common variation among many variables may be quantified. The smaller the proportion, the more suitable the data is for factor analysis.
Values between zero and one are returned by KMO. A sufficient sample is one with a KMO value between 0.8 and 1.
If the sample size is too little and the KMO is below 0.6, then action has to be taken to rectify the situation. This is where writers' discretion is required, because some use 0.5 and others 0.6.
• KMOs It is indicative of bigger magnitude component correlations when the total value of a correlation is near zero. A major challenge of component analysis, in other words, is large-scale correlations.
Here are the cutoffs for acceptability according to Kaiser:
Here are the cutoffs for acceptability according to Kaiser:
as low as 0.059 to 0.050.
Relative to the mean, it is 0.60 to 0.69 Average for a student in middle school:
The quality point count falls somewhere between 0.80 and 0.89, and the range is 0.70-0.79.
It is remarkable that the range is between 0.90 and 1.00.

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Table 1: KMO

KMO and Bartlett's Test[a]		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.935
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6850.175
	df	190
	Sig.	.000
a. Based on correlations		

Claims made for the sake of sampling are thus shown to be valid. The significance of the correlation matrices was further confirmed by using Bartlett's Test of Sphericity. The sampling adequacy value according to Kaiser-Meyer-Olkin is 0.935. There was a 0.00 p-value for Bartlett's sphericity test. A significant test result from Bartlett's sphericity test demonstrated that the correlation matrix is not an identity matrix.

❖ **Hypothesis testing**

Concept mapping: In the same way that a visual sketch or flowchart may be used to represent or arrange learning, so can an idea map. In contrast to the conventional outline, concept maps show not only one-way but also two-way interactions between ideas. Nodes and connections are the building blocks of an idea map. Concepts are shown as nodes, which are often circles, and the relationships between them are shown as lines. The author can see the relationships between the nodes since the link labels are words. When complete, an idea map provides a visual representation of the author's (or writers') reasoning behind a given point. It reveals the individual's knowledge of the organisation system. "Concept mappings are two-dimensional models of cognitive processes showing organisational structures and interactions of concepts that comprise a field of study or a subdiscipline," basically says it. Concept maps weren't used before. The idea of concept maps originated in the constructivist pedagogical movement. Concept maps demonstrate how the mind operates by showing the relationships between various domains of knowledge. Teachers use concept maps to help students do more than just "know" the material; they want them to understand how different ideas relate to one another.

Teaching learning processes: The process is all-encompassing and includes checking the student's understanding, setting clear learning objectives, developing strategies for instruction and memorising, creating a work plan, and finally, checking the student's progress. When you teach, you take into account the needs, experiences, and emotions of your students while simultaneously interfering with their learning process to transfer knowledge. Imparting meaning and value onto the educational experience is the main goal of learning. This process would logically culminate because of instruction.

Mental health:

The ability to handle adversity, hone one's skills, succeed academically and professionally, and have a good impact on one's community are all signs of mental health. It is an essential component of researchers general health and wellbeing and is foundational to their decision-making, connection-making, and environmental-influencing abilities. Mental health services are a fundamental human right that should be accessible to everybody. For that reason, it is crucial to the development of people, communities, and nations. Having no mental health disorders is just one aspect of mental wellness. The social and therapeutic ramifications, the level of difficulty and suffering it causes, and the degree to which it varies from person to person along a complex continuum. Mental health concerns range from psychosocial impairments to actual mental diseases. These mental states are defined by extreme distress, decreased functioning, and even suicidal thoughts or actions. Mental health concerns are associated with worse mental health, however this is not always the case.

Relationship between mental health and Concept mapping:

Developing new and improved therapies was one of the goals of the strategic plan, which also aimed to promote and share evidence-based approaches to mental health. People with mental health issues have varied requirements and situations, and the National Institute of Mental Health (NIMH) emphasised that these treatments should reflect that.1 Indeed, NIMH, similar to previous research, emphasised the need of creating robust intervention designs.1–3 In an ideal design, each mental health driver would be defined and identified, along with their complimentary impacts and the ways in which they

interact to produce an undesirable mental health result. The drivers whose interactions lead to an appropriate cycle of treatment would also be defined. To address the gaps in health professionals' capacity to accomplish the patient-driven intervention design necessary to alter provider and patient behaviour, this article offers a case study abstracting the use of a concept mapping technique as a research methodology. The purpose of concept mapping (CM) is to visually express and organise ideas, information, and potential connections between them. To evaluate the fundamental data elements that support effective intervention design, CM offers a robust, multi-faceted approach. In addition, a CM's use in a clinical context opens a broader perspective on etiological aspects, which considers the patient's complicated condition holistically rather than as a discrete function of their situational qualities. Thus, the researchers should inquire about the treatment, the provider, and the efficacy of the suggested treatment for a specific patient with a specific mental illness, as well as any other factors influencing the treatment's efficacy, while they are designing the study.
Based on the previous debate, the researcher analysed the relationship between Mental health and Concept mapping.

H_{01}: There is no significant relationship between Mental health and Concept mapping.
H_1: There is a significant relationship between Mental health and Concept mapping.

Table 2: ANOVA

ANOVA					
Sum					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	75114.754	115	3576.893	360.390	.000
Within Groups	774.156	533	9.925		
Total	75888.910	648			

The outcome of this research is noteworthy. With a p-value of.000 (less than the.05 alpha level), the value of F, which is 360.390, approaches significance. That the null hypothesis is not true and that "***H_1: There is a significant relationship between Mental health and Concept mapping."*** is indeed true.

DISCUSSION

Respondents also said that private schools provide a higher quality of education, which is a benefit of the current system when considering student achievement. Due to their reputation for providing excellent education, international private schools have grown in popularity. If they want to see more of the private sector involved in education, private schools are still a good bet. Data gathered from 10 schools last year shows that most of the top-performing schools, from fifth to eighth place, are privately financed facilities, according to the National Centre for Measuring. Additionally, the NCP maintains that private schools that follow the public-school model are excellent. According to the researcher, there are certain public-school models that demonstrate wonderful educational standards. These examples include the Aramco schools and the Royal Commission. Notably, according to NCP, private organisations may effectively adopt the public-school model; this, in turn, means that the quality of school governance is a major factor in deciding whether or not private schools provide excellent education. Several researchers have argued that failing public schools may be effectively addressed by using ways to improve teacher learning, such as involving private management. The results of the interviews show that private schools have a reputation for providing excellent education. However, it could be argued that improving educational outcomes would require more than just addressing fiscal and governance inefficiencies, especially given the literature that highlights the importance of quality teachers as the main factor influencing student achievement. Therefore, efforts to improve the educational system in the country of China (KSC) would be fruitless unless there are clear and effective plans to raise the quality of educators.

CONCLUSION

There have been many positive changes and opportunities brought about by teachers learning, but it has not helped alleviate the burden on publicly funded institutions and it breaks laws meant to protect human rights. There has been an uptick in commercial activity after the implementation of cutting-edge infrastructure and educational practises. The need to closely watch schools to make sure they're following rules like treating students fairly, having enough money, and respecting human rights has been highlighted. A great deal has changed in China's educational system since the country began its process of opening to the outside world in the late 1970s. Many recent events, including market-oriented

economic reforms, have contributed to these shifts. The importance of education to the local economy has been emphasised more because of the trend of economic integration with the global economy. The population's educational needs and demands have likewise increased because of this integration. Financial restraints and the need for economic growth were pragmatic factors that led the Chinese government to decentralise educational policy and marketize educational services. This means that non-state social entities may now engage in education as the state has given up its monopoly. There is tremendous importance in applying decentralisation and marketization ideas to the Chinese setting. Under the restrictions of fiscal restraint, the Chinese government sought to improve its financial status and optimise resource allocation by implementing these techniques. The changes have greatly affected the state's role in education, the dynamics between the federal and local governments, and the state and educational institutions. There has been a shift in power away from the federal government and towards the provinces and counties because of increased responsibility for educational expenditure at the local level, with the federal government playing a smaller role overall. School autonomy has been improved while the responsibilities of the federal and state governments in educational finance have been diminished via the introduction of fees and the integration of various funding mechanisms. However, there are now wider gaps in access to and quality of education because of education's decentralisation and commercialization. The involvement of non-state entities and local governments in education development has grown since decentralisation policies were put into place. On the other hand, this has exacerbated existing inequalities in educational results between regions.

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