A RESEARCH INITIATIVE TO CREATE A VIRTUAL LEARNING PLATFORM FOR ENHANCING COGNITIVE PEDAGOGY PRINCIPLES AND INSTRUCTIONAL STRATEGIES

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Abstract

The aim of this study was to examine a research project aiming at building a virtual learning environment. This endeavour aimed to improve cognitive pedagogy concepts and instructional methodologies inside the context of digital education overall. Cognitive learning theories formed the basis of a learner-centred approach used throughout platform design. Among the elements used in this approach were interactive materials, reflecting activities, instantaneous comments, and group projects. These features were created with the hope of simplifying education. Using a quantitative research approach, the participants—students who had used the platform for a specific length of time—were gathered to help to fulfil the goals of this study. Data were gathered using pre-intervention and post-intervention performance tests as well as standardised questionnaires both before and after the intervention. Besides, the assessments were carried out to gather data. The results of the statistical studies showed quite significant gains in learners' cognitive engagement, critical thinking, and use of metacognitive strategies. The results of the research helped one to decide this. The teachers' capacity to clearly transmit instructional information and inspire deeper learning was another element that was observed to have improved. Among the things seen to have improved was this one. The findings of the study appeared to indicate that using cognitive pedagogy in virtual settings produced learning chances with not only higher significance but also more interesting nature. The results of this study indicate that carefully designed virtual learning systems have great potential to be tools for improving teaching strategies and boosting cognitive development. These findings will enable legislators, teachers, and instructional designers to obtain critical analysis that will assist them negotiate the always changing landscape of digital education.

Keywords: *Virtual Learning Environment, Digital Education, Instructional Information, Metacognitive Strategies, Reflecting Activities.*

Introduction

As a result of global moves towards digital education, online learning environments have emerged as an essential component of current pedagogy. The learners are provided with solutions that are both adaptive and scalable by these settings, which enables them to fulfil the ever-increasing demands of the learners. However, the effectiveness of these platforms is not only based on the technology infrastructure, but also on the careful inclusion of educational ideas that are aimed to stimulate cognitive growth. This is because the foundation of these platforms is the technological infrastructure. Cognitive pedagogy is a method of teaching that focusses on the manner in which pupils think, learn, and take in information. A strong focus is placed on active involvement, metacognition, and the application of information in settings that are pertinent to the topic at hand. Many courses continue to fail to combine instructional design with cognitive learning needs, which results in learning experiences that are passive. This is despite the fact that online resources have been developed (Chen et al., 2021).

This study project included an online learning environment specifically meant to promote cognitive pedagogy concepts and teaching strategies in order to close current knowledge gaps. The way this goal was reached was the building of a virtual classroom. The aim of the study was to evaluate the several ways in which components like structured scaffolding, timely feedback, learner autonomy, and interactive activities may be introduced into the design of a

course in order to promote critical thinking and meaningful learning. While the improvement of cognitive pedagogy and instructional approaches was regarded as the dependent component for this study, the course design was regarded as the independent variable. Focussing on this specific aspect, the study aimed to determine how intentional design influences students' degree of cognitive involvement as well as their learning efficiency. This study provided a framework for educators and instructional designers, which let them create digital experiences fit for the learner that were not only appropriate but also targeted on them. The aim was effectively reached by means of an online environment based on cognitive theory and instructional best practices. The results help future alternative models for online learning to be developed. These approaches not only gave cognitive development, instructional quality, and long-term educational effect top priority but also enhanced students' access to training possibilities. The study helped to close the distance between evidence-based pedagogy and educational technology in digital learning environments in response to the increasing need for successful virtual education. This is a need that is become ever more important (García-Peñalvo et al., 2022).

Background of the study

Fast growth of digital technology and the growing need for flexible education are driving more and more individuals to seek online learning environments. Recent years have seen this tendency noted. Conversely, several online platforms were found to be inadequate in their capacity to effectively foster critical cognitive engagement and deep learning, although their simplicity and easy access. Previous studies have indicated that in online learning, the transmission of materials was usually given more priority than the application of cognitive pedagogical ideas. Important for promoting significant learning and higher-order thinking are these ideas: scaffolding, metacognitive reflection, adaptive feedback, and learner autonomy. The problems caused by the global COVID-19 outbreak have exposed further gaps in online educational quality and pedagogy, underscoring the crucial requirement of well-crafted virtual platforms that enable cognitive development (Li & Lalani, 2020). This study was conducted with the aim of creating an online learning environment especially built to improve cognitive pedagogy principles in combination with efficient teaching strategies, therefore addressing these shortcomings. The study sought to embed fundamental cognitive processes into the course design using active learning, structured scaffolding, interactive activities, and formative evaluations. Among these processes are metacognition, memory, attention, and reasoning. Learning requires all of these steps in some capacity. Dependent variables in this study were students' cognitive engagement and instructional efficiency, which were raised by the online learning environment. Under study, the independent variable was the online learning environment. The aim of the project was to give teachers and instructional designers a paradigm that would let them create more learner-centred, interesting digital experiences. This would be achieved by close proximity between pragmatic online teaching strategies and theoretical cognitive pedagogy models. The study finally aided to raise the quality of online learning by strengthening deeper cognitive processing, critical thinking skills, and more successful teaching results within virtual learning settings. This was achieved by raising the learning efficiency (Zhang et al., 2023).

Purpose of the research

The aim of this study was to evaluate the effect of social support inside an online learning environment on the efficiency with which educational approaches are applied as well as the efficacy of the techniques themselves. The aim of this study was to investigate the ways in which different kinds of social support—including peer contact, instructor feedback, chances

for cooperative learning, and emotional encouragement—contributed to the enhancement of instructional strategies founded on the foundations of cognitive pedagogy. This study aimed to ascertain how much acceptability of strategies meant to raise degrees of engagement, motivation, critical thinking, and deep learning changed depending on supportive online groups. The way this goal was achieved was by looking at how interpersonal interactions and social dynamics fit virtual learning settings. The study aimed to provide a better knowledge of the ways in which social support networks gave teachers the chance to do cognitively rich, learner-centred, and more flexible instruction. Finally, the studies produced information that may help to shape the design of virtual learning systems thereby enhancing their efficiency. These results made it abundantly evident that the development of socially acceptable surroundings is necessary to support teaching strategies and raise student performance in digital education environments.

Literature review

Studies prior included the creation of virtual learning environments and the value of these settings in terms of enhancing cognitive pedagogy concepts and methodological methods to teaching. Structured scaffolding, timely and adaptive feedback, learner autonomy, and interactive activities—all of which define online learning environments—have been found to greatly increase cognitive engagement and improve higher order thinking skills. Studies of several kinds have confirmed this. One of the ways these websites supported the development of improved strategies for knowledge generation and understanding was by fascinating metacognitive processes like self-monitoring and introspection. Many studies have shown that including social support and cooperative tools inside virtual platforms improved communication and peer learning, which finally resulted in an enhancement of the cognitive learning process. Studies have also shown that many conventional online courses—which usually stress the passive dissemination of knowledge—fall short in providing opportunities for active learning and critical thinking. This is so because the transfer of knowledge is usually given great importance in these courses (Johnson & Brown, 2021). The existence of this gap revealed the need of a planned course of action based on cognitive theories in order to give pupils surroundings that motivate them to use, examine, and evaluate knowledge. This was done to provide pupils chances to grow in knowledge. Whether or whether adaptive learning technology can effectively control cognitive load and enhance educational results by customising the delivery of knowledge to the specific needs of individual students was investigated. It was shown that instructional tactics emphasising problem-solving, active participation, and practical work are very vital for inspiring students and raising their memory in online environments. Moreover, the literature recognised the rapid shift towards online learning as well as the challenges teachers face in trying to effectively blend cognitive pedagogy ideas into effectively delivered online training. This acknowledged that online learning is growingly popular. Taken all together, these studies provide the foundation for the creation of virtual learning environments that not only give students tools but also actively involve them cognitively, therefore improving their academic achievement and critical thinking capacity. This review helped to strengthen the basis on which this study was conducted as it stressed the need of integrating cognitive pedagogy with instructional strategies in virtual learning environments in order to generate very significant educational advantages (Martínez et al., 2022).

1. **Research questions**

- What is the influence of Social Support on Instructional Strategies?

2. **Research methodology**

a. **Research design**:

The quantitative data analysis used SPSS version 25. The odds ratio and 95% confidence interval were used to determine the degree and direction of the statistical association. The researchers established a statistically significant criteria at $p < 0.05$. A descriptive analysis was conducted to identify the main features of the data. Quantitative methods are often used to assess data collected via surveys, polls, and questionnaires, as well as data altered by computing tools for statistical analysis.

b. **Sampling:**

A convenient sampling technique was applied for the study. The research relied on questionnaires to gather its data. The Rao-soft program determined a sample size of 80. A total of 120 questionnaires were distributed; 112 were returned, and 16 were excluded due to incompleteness. In the end, 96 questionnaires were used for the research.

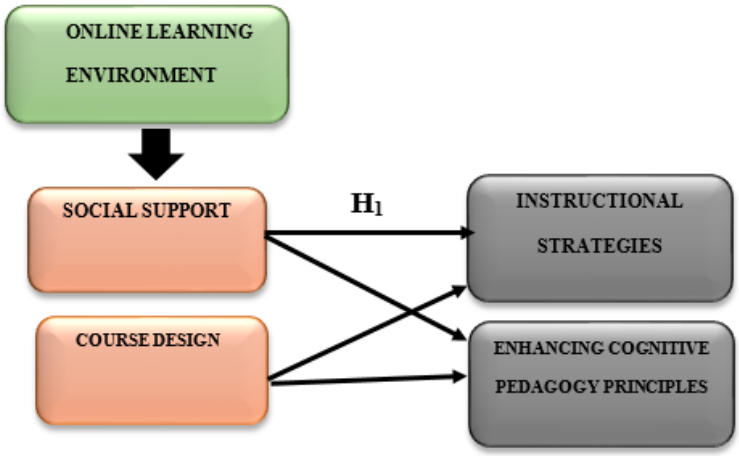
c. Data and Measurement:

The primary method of collecting data for research was questionnaire surveys. In section A, participants were requested to provide fundamental demographic data; in section B, they were instructed to evaluate the significance of many channels, both online and offline, using a 5-point Likert scale. A diverse array of secondary sources, including online databases, was meticulously examined to get the necessary information.

6.4 Statistical Software: The statistical analysis was conducted using SPSS 25 and MS-Excel.

6.5 Statistical Tools: To grasp the fundamental character of the data, descriptive analysis was used. The researcher is required to analyse the data using ANOVA.

Conceptual framework



Result

- **Factor Analysis**

One typical use of Factor Analysis (FA) is to verify the existence of latent components in observable data. When there are not easily observable visual or diagnostic markers, it is common practice to utilise regression coefficients to produce ratings. In FA, models are essential for success. Finding mistakes, intrusions, and obvious connections are the aims of modelling. One way to assess datasets produced by multiple regression studies is with the use of the Kaiser-Meyer-Olkin (KMO) Test. They verify that the model and sample variables are representative. According to the numbers, there is data duplication. When the proportions are less, the data is easier to understand. For KMO, the output is a number between zero and one. If the KMO value is between 0.8 and 1, then the sample size should be enough. These are the

permissible boundaries, according to Kaiser: The following are the acceptance criteria set by Kaiser:

A pitiful 0.050 to 0.059, below average 0.60 to 0.69

Middle grades often fall within the range of 0.70-0.79.

With a quality point score ranging from 0.80 to 0.89.

They marvel at the range of 0.90 to 1.00.

Table1: KMO and Bartlett's Test

Testing for KMO and Bartlett's

Sampling Adequacy Measured by Kaiser-Meyer-Olkin 0.90

The results of Bartlett's test of sphericity are as follows: approx. chi-square

df=190

sig.=.000

This establishes the validity of assertions made only for the purpose of sampling. To ensure the relevance of the correlation matrices, researchers used Bartlett's Test of Sphericity. Kaiser-Meyer-Olkin states that a result of 0.90 indicates that the sample is adequate. The p-value is 0.00, as per Bartlett's sphericity test. A favourable result from Bartlett's sphericity test indicates that the correlation matrix is not an identity matrix.

Table: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.90
Bartlett's Test of Sphericity	**Approx. Chi-Square**	3252.968
	df	190
	Sig.	.000

The first stage in exploratory factor analysis (EFA) is to ascertain the data's appropriateness for factor analysis. Kaiser advised postponing factor analysis until a sample adequacy coefficient over 0.5 is achieved, as shown by the KMO (Kaiser-Meyer-Olkin) measure. The KMO value derived from the data used in this analysis is 0.90. Bartlett's test of sphericity yielded a significant result of 0.00.

❖ INDEPENDENT VARIABLE

- **Online Learning Environment**

The term "online learning environment" (OLE) refers to a digital platform or ecosystem that was designed specifically for the aim of promoting online education and student participation.

Students and teachers from different parts of the world can collaborate in a setting that is both secure and interesting in order to teach and learn from one another. This can be accomplished through the sharing of ideas and the evaluation of each other's work. These kinds of settings are typically constructed with the help of learning management systems (LMSs) such as Google Classroom, Moodle, and Blackboard, to name a few examples. Few of the services that are available on these platforms include video conferencing, online forums, quizzes, electronic books, multimedia resources, and virtual laboratories. These are only few of the platforms' offerings. Online courses of high quality should not only provide students with the essential course materials, but they should also inspire students to actively participate in the learning process, intellectual progress, and meaningful connection with one another. Active learning tactics are utilised in their sessions. These strategies include group projects, real-time feedback, self-paced courses, and resources that may be adapted to the student's needs. The fact that they accommodate a broad variety of learning styles and requirements, in addition to giving alternatives for when, where, and how teaching may be delivered, is the primary reason for their significance. By participating in an online learning environment that makes use of ideas from instructional design and cognitive pedagogy, the researcher may be able to increase their abilities in metacognition, critical thinking, and problem-solving. In the event that it is carried out well, it enhances the education of students by providing them with access to global resources, enabling them to tailor their learning experience, and promoting material interaction in a manner that is comparable to that of a conventional classroom. Additionally, it is of utmost significance in the classrooms of today, particularly in situations when students are compelled to enrol in hybrid or online classes (Smith & Zhao, 2021).

❖ **FACTOR**

- **Social Support**

When the researcher refers to "social support," they are referring to the assistance that individuals receive from their social networks. These social networks may include their family, friends, peers, and communities. For the purpose of describing this aid, the term "social support" is utilised. This aid may be of an emotional, informational, or practical nature, depending on the circumstances. Through the use of this technique, which contains the expression of empathy, encouragement, direction, and real assistance, an individual's capacity to manage stress, boost well-being, and maintain both psychological and physical health may be improved. This approach also includes the ability to maintain both physical and mental health. A few examples of the many methods in which social support can be provided are as follows: emotional support, which encompasses empathy and care; informational support, which encompasses direction and feedback; and instrumental support, which encompasses assistance or services that are of a practical nature. The many different kinds of support that are accessible have an effect on a number of outcomes, including the creation of a sense of belonging, the reduction of feelings of isolation, and the enhancement of resilience. The construction of an atmosphere that is constructive and engaging, as well as one that is conducive to learning and growth, is one of the most crucial duties that social support performs in educational and cognitive contexts. Social support serves a variety of significant purposes in these contexts. It has a crucial role in encouraging increasing levels of motivation and engagement, as well as cognitive development, and it is of fundamental significance. As a result of the fact that the perceived availability and quality of social support are typically more important than the actual quantity of aid received, it is an essential component in both the achievement of one's academic goals and the satisfaction of all aspects of one's personal life (Garcia & Lopez, 2023).

❖ **DEPENDENT VARIABLE**

- **Instructional Strategies**

In order to facilitate student learning, increase student engagement, and achieve certain educational objectives, teachers employ instructional techniques, which are methods that are both methodical and purposeful. These techniques are used by teachers in order to accomplish these aims. Some of the several instructional strategies that are included in these strategies are problem-solving, inquiry-based activities, cooperative learning, direct instruction, and differentiated education. Direct instruction is another one of these strategies. Every one of these approaches is purposefully crafted to accommodate a diverse variety of learning styles and abilities. Instructional strategies that are successful are those that are established in educational psychology and cognitive research to a significant degree. The ways in which students process, remember, and apply knowledge are the focal points of these instructional methodologies. For the purpose of fostering critical thinking, creativity, and the development of higher-order cognitive capacities, they provide learners structured opportunities to investigate, contemplate, and practise new areas of knowledge. Every one of these things is done by providing students with opportunity to put newly acquired knowledge into exercise. Both scaffolding, which offers learners assistance in a progressive manner as they develop competency, and timely and constructive feedback, which promotes growth, are crucial components that are usually incorporated in instructional approaches. Scaffolding involves providing learners with assistance in a steady manner. In addition, instructional approaches are flexible enough to be adapted to a variety of learning environments, including face-to-face, blended, and entirely online settings. This guarantees that students continue to have access to training that is both relevant and accessible to them. Through the use of instructional tactics, it is possible to create a learning environment that is not only animated and interesting but also increases academic achievement, motivation, and engagement. That which eventually serves as the basis for good teaching is the instructional methods that are utilised. Through the use of these strategies, educators are able to develop courses that not only transmit knowledge but also enhance the abilities, understanding, and capacities of learners to continue learning throughout their whole educational careers (Singh & Lee, 2020).

- **Relationship between Social Support and Instructional Strategies**

When it comes to the process of creating an educational environment that is not only successful but also pleasurable for students, one of the most important components is the relationship that exists between social support and instructional techniques. It is claimed that a student receives social support when they receive assistance from their classmates, instructors, and the learning community. This assistance might come in the form of emotional support, informational support, or physical assistance. The instructional techniques that educators use to facilitate learning typically incorporate elements that encourage social engagement and collaboration. These instructional strategies are the methods and tactics that educators adopt to help students learn. The reason for this is that it is acknowledged that the presence of social support has a significant impact on the levels of motivation, engagement, and academic success for individuals. Instructional methods such as cooperative learning, group discussions, peer feedback, and joint projects are all examples of activities that are intended to foster the development of social support networks within the framework of the learning environment. Learners are encouraged to share their knowledge, give assistance to one another, and cooperate in order to discover answers to obstacles through the use of these strategies, which can help facilitate the reduction of feelings of isolation, particularly in situations that are conducive to online or virtual learning. Having the perception that they are supported socially increases the probability that students will actively participate in class, take intellectual risks, and persevere through obstacles. This is because students are more likely to feel that they are supported (García-Peñalvo et al., 2022). Additionally, instructional methods that promote social presence and community building increase learners' sense of belonging and confidence,

which in turn has a positive affect on both the cognitive and emotional aspects of learning. This is because these activities encourage learners to interact with others and develop relationships. It is possible for educators to create environments that are more welcoming and supportive of their students by introducing social support mechanisms into their instructional methods. This, in turn, makes it easier for students to acquire more knowledge and achieve better results. Generally speaking, social support and instructional strategies are intertwined with ones another. When it comes to instructional techniques, well-designed instructional strategies contribute to the formation of meaningful social interactions among students, while social support helps to increase the efficiency of instructional approaches (Nguyen et al., 2023).
Based on the above discussion, the researcher generated the following hypothesis to examine the link between Social Support and Instructional Strategies.

- ***"H_{01}: There is no significant relationship between Social Support and Instructional Strategies."***
- ***"H_1: There is a significant relationship Social Support and Instructional Strategies."***

Table 2: H_1 ANOVA Test

ANOVA					
Sum					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	39588.620	41	5385.422	1052.868	.000
Within Groups	492.770	55	5.115		
Total	40081.390	96			

In this study, the result is significant. The value of F is 1052.868, which reaches significance with a p-value of .000 (which is less than the .05 alpha level). This means the ***"H_1: There is a significant relationship between Social Support and Instructional Strategies."*** Is accepted and the null hypothesis is rejected.

Discussion

This investigation was conducted with the purpose of enhancing the principles of cognitive pedagogy by conducting an investigation into the ways in which the presence of social support influences instructional strategies inside a virtual learning environment. The findings indicated that social support need to be taken into consideration as an essential component in the process of upgrading instructional techniques. This may be accomplished through the cultivation of a sense of community, the promotion of learner participation, and the facilitation of group learning. Active learning strategies, such as group projects, peer feedback, and learning via discussion, were more likely to be utilised by participants when they received higher levels of support from both their peers and the instructor. The ideals of cognitive pedagogy, which places an emphasis on knowledge application, critical thinking, and learning that is based in the learner, are complemented by these techniques. One may draw the conclusion from the findings that social support was a motivating factor for educators to implement teaching practices that

were more interactive and adaptable. Educators who saw high levels of student involvement and engagement were more likely to implement scaffolding strategies, give projects that were challenging from a cognitive standpoint, and provide prompt feedback. Because students had access to both emotional and intellectual support within the context of the online environment, they were able to boost their self-confidence and their level of motivation, which ultimately led to an improvement in their ability to participate in activities that required a high level of cognitive capacity. It was generally supported by the findings that the hypothesis that social support had a substantial impact on the execution and efficiency of instructional instruments was correct. It was highlighted by the findings of the study that it is important to incorporate social presence into online platforms in order to not only strengthen connections but also to encourage educational and cognitive growth. Teaching professionals and instructional designers have a responsibility to be aware of these realisations because they have significant implications for the organisation of virtual learning environments that are supported by teaching.

Conclusion

According to the findings of the current study, social support was shown to be connected with a significant positive influence on instructional strategies inside the virtual learning platform that was developed to reinforce cognitive pedagogy principles. This was proved to be the case. It has been demonstrated that students are more likely to be actively engaged in the learning process and responsive to different instructional approaches when they get consistent intellectual, emotional, and collaborative support from their classmates and teachers. It was discovered that this encouragement would encourage groups of students to collaborate. An atmosphere that was conducive to the effective execution of strategies that were participatory and focused on the needs of the students was established with the aid of this support. Cooperative learning, scaffolded education, and real-time feedback are a few examples of the tactics that fall under this category. When social support mechanisms were included into the design of the course, teachers were more likely to use teaching tactics that were adaptive and reflective. This was another benefit of the course design. Not only did these findings show the significance of social support in terms of ensuring that learners continue to be motivated and engaged in the learning process, but they also underlined the significance of social support in terms of playing a vital role in supporting the adoption of cognitive pedagogy ideas. According to the findings of the study, the introduction of social support into online learning environments led to a significant increase in the quality and effectiveness of instructional strategies. This was shown by the fact that the aforementioned improvement was seen. The results of this study provide valuable insights that may be put to use in the process of designing and implementing virtual education platforms of the next generation.

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