

EFFECT OF MIND MAPPING METACOGNITIVE STRATEGY ON STUDENTS' MOTIVATION IN SPECIAL EDUCATION IN COLLEGES OF EDUCATION IN BAUCHI STATE, NIGERIA

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Abstract

This study investigated the effect of mind mapping metacognitive strategy on students' motivation in special education in colleges of education in Bauchi state, Nigeria. The study was guided by two objectives, two (2) research questions were raised and two (2) null hypotheses were formulated and tested at 0.05 level of significance. The study adopted quasi-experimental design with 577 NCE II students sampled from three state-owned colleges of education. Two colleges of education were selected as experimental and control groups. The experimental group was taught using mind mapping strategy while, the control group was taught using lecture method. The instrument used for data collection was the Academic Motivation Scale (AMS), adapted from Vallerand et al. (1993), comprising 30 items rated on a Likert scale. The instrument was validated by experts in educational psychology and yielded a reliability coefficient (Cronbach's Alpha) of 0.87. The pre-test was administered before the intervention. After six weeks of instructional exposure, the post-test was conducted. ANCOVA was used to control pre-existing differences and assess the effect of treatment and gender on students' motivation. Results revealed that students exposed to mind mapping strategies exhibited significantly higher motivation levels than those taught using traditional method. However, no significant gender-based difference in motivation was found. This study recommends widespread adoption of mind mapping as a pedagogical tool in colleges of education to enhance student motivation and engagement.

Keywords: Mind Mapping Strategy, Motivation, Special Education.

Introduction

Motivation is a critical driver of learning outcomes, particularly in teacher education where future educators must internalize both subject content and pedagogical principles. In recent years, research has increasingly emphasized the need for innovative teaching strategies that foster deeper engagement and intrinsic motivation (Gopalan, Rosinger, & Ahn, 2020; Schunk, Pintrich, & Meece, 2014). Students in Colleges of Education in Nigeria, especially in special education programs, often experience low motivation due to rigid instructional practices, content overload, and minimal student participation (Yusuf & Afolabi, 2021).

Mind mapping, a visual and metacognitive strategy introduced by Buzan (2006), facilitates active learning by enabling learners to organize information graphically, enhance conceptual understanding, and improve memory retention. It operates on the dual-coding theory which asserts that the combination of verbal and visual elements improves cognition and motivation

(Paivio, 1991). Recent studies have shown that mind mapping enhances self-regulation and motivation by providing learners with clear structures and meaningful relationships between ideas (Seth & Jain, 2022; Tzeng et al., 2021).

Metacognitive strategies, including planning, monitoring, and evaluating, play a vital role in learning effectiveness. When students employ such strategies, they not only become more engaged but also develop autonomy and resilience in learning (Zimmerman & Moylan, 2009). In contexts like Nigerian Colleges of Education, where infrastructural and instructional limitations persist, incorporating such learner-centered strategies is both timely and necessary. This study, therefore, investigates the effect of mind mapping as a metacognitive strategy on the motivation of students in special education programs in Bauchi State. The research focuses on whether such strategies outperform traditional lecture methods and whether gender influences motivational outcomes in these pedagogical settings.

Mind mapping is a learner-centered strategy designed to help students' structure knowledge visually, enhancing both retention and comprehension. According to Buzan (2006), mind maps engage both hemispheres of the brain, facilitating creative thinking, critical analysis, and memory consolidation. Research has shown that students taught using mind maps outperform those taught with traditional note-taking methods in terms of both understanding and motivation (Al-Jarf, 2019; Tzeng et al., 2021).

Moreover, mind mapping aligns with **constructivist learning theory**, which posits that knowledge is actively constructed through interaction and personal meaning-making (Vygotsky, 1978). By visually mapping content, learners can identify prior knowledge, link new concepts, and develop cognitive autonomy. Metacognition refers to "thinking about thinking" and includes planning, monitoring, and regulating one's learning activities (Flavell, 1979). Metacognitive strategies have been widely associated with improved academic outcomes and student motivation (Schunk et al., 2014; Efklides, 2011). According to **Zimmerman (2002)**, self-regulated learners are more motivated because they take ownership of their goals and learning processes. Recent studies by **Seth and Jain (2022)** found that when students use metacognitive tools like mind maps, their motivation significantly increases due to enhanced clarity, focus, and the ability to visualize progress.

Statement of the Problem

Despite significant policy efforts and curriculum reforms aimed at revitalizing teacher education in Nigeria, students' motivation particularly in special education programs remains critically low (Ajayi & Omirin, 2020). Conventional teaching methods continue to dominate classrooms, leading to passive learning, reduced engagement, and minimal academic self-efficacy (Okebukola, 2016). These methods often fail to stimulate the cognitive and emotional involvement necessary for sustaining student motivation.

Furthermore, the challenges of abstract content delivery, inadequate learning aids, and large class sizes continue to diminish students' enthusiasm and interest, especially in Colleges of Education located in under-resourced areas like Bauchi State (Ibrahim & Lawal, 2021). These conditions necessitate the adoption of pedagogical innovations that enhance not only cognitive but also affective learning outcomes. Although the benefits of metacognitive strategies have been well documented globally (Efklides, 2011; Zimmerman, 2002), there remains limited empirical evidence on their application and effectiveness within Nigerian teacher training

institutions particularly with respect to gender equity and learner motivation. Therefore, this study was conceived to fill this critical gap by evaluating the **effects of mind mapping metacognitive strategy on students' motivation**, while also exploring whether **gender differences** exist in motivational responses when these strategies are employed.

Objectives of the Study

This study sought to:

1. examine the effect of mind mapping strategy on students motivation in special education against lecture method in colleges of education in Bauchi state.
2. Determine the effect of gender on students' motivation in special education against lecture method in colleges of education in Bauchi state.

Research Questions

1. What is the effect of mind mapping strategy on students' motivation in special education against lecture method in colleges of education in Bauchi state?
2. Does gender affect students' motivation in special education against lecture method in colleges of education in Bauchi state?

Hypotheses

H01: There is no significant difference in students' motivation when taught special education using mind mapping strategy and those taught using lecture method in colleges of education in Bauch state.

H02: There is no significant difference between gender of students' in motivation when taught special education using mind mapping strategy and those taught using lecture method in colleges of education in Bauch state.

Methodology

This study adopted a quasi-experimental research design, specifically the pre-test, post-test control group design. The population consisted of all NCE II students offering special education across three Colleges of Education in Bauchi State. These students were selected due to their intermediate academic standing and exposure to both theory and practice in special education. A purposive sampling technique was used to select a sample of 577 students (402 males and 175 females), ensuring gender representation and course consistency.

The instrument used for data collection was the Academic Motivation Scale (AMS), adapted from Vallerand et al. (1993), comprising 30 items rated on a Likert scale. The instrument was validated by experts in educational psychology and yielded a reliability coefficient (Cronbach's Alpha) of 0.87. The pre-test was administered before the intervention. After six weeks of instructional exposure, the post-test was conducted. ANCOVA was used to control pre-existing differences and assess the effect of treatment and gender on students' motivation. A significance level of 0.05 was adopted.

Results

Research Question 1: What is the effect of mind mapping strategy on students’ motivation in special education against lecture method in colleges of education in Bauchi state?

Table 1: Mean and Standard Deviation showing difference in motivation scores of students taught with the mind mapping strategy versus those taught with the lecture method

Teaching Strategy	N	Mean Motivation Score	Std. Deviation	Mean Difference
Mind Mapping	251	58.65	15.59	
				+6.50
Lecture Method	103	52.15	15.57	

Based on the above table it shows that Students taught using the mind mapping strategy had a higher mean motivation score (M = 58.65) compared to those taught using the lecture method (M = 52.15). The mean difference is 6.50 points in favor of mind mapping, indicating improved motivation levels.

Research Question 2: Does gender affect students’ motivation in special education against lecture method in colleges of education in Bauchi state?

Table 2: Mean and Standard Deviation showing difference on gender significantly affect students’ motivation across the different teaching strategies?

Gender	N	Mean Motivation Score	Std. Deviation	Mean Difference
Male	402	55.30	15.76	
				+0.50
Female	175	54.80	15.47	

The table above indicate that the difference in mean scores between male and female students is just 0.50 points, indicating a negligible difference in motivation across gender.

Hypothesis 1: There is no significant difference in students’ motivation when taught special education using mind mapping strategy and those taught using lecture method in colleges of education in Bauch state.

Table 3: Analysis of Covariance (ANCOVA) showing effect of teaching strategy (mind mapping, lecture method) on students' motivation.

Source	Sum of Squares (SS)	df	Mean Square (MS)	F	Sig. (p)	Partial Eta ²
	3495.64	2	1747.82			
				6.149	0.002**	0.021
	162860.00	573	284.21			

The table 3 indicate that there is a significant main effect of teaching strategy on students' motivation, $F(2, 573) = 6.149, p = 0.002$. The mean difference of 6.50 supports the conclusion that mind mapping is more effective than the lecture method in enhancing motivation. The partial eta squared ($\eta^2 = 0.021$) suggests a small to moderate effect size.

Hypothesis 2: There is no significant difference between gender of students' in motivation when taught special education using mind mapping strategy and those taught using lecture method in colleges of education in Bauch state.

Table 4: Analysis of Covariance (ANCOVA) showing effect of gender on students' motivation across instructional strategies.

Source	Sum of Squares (SS)	Df	Mean Square	F	Sig. (p)	Partial Eta ²
Gender	20.22	1	20.22	0.072	0.789	0.000
Error	160000.00	573	279.40			

The table 4 above indicate that there is no statistically significant effect of gender on students' motivation, $F(1, 573) = 0.072, p = 0.789$. The mean difference of 0.50 is very small, and the partial eta squared ($\eta^2 = 0.000$) confirms a negligible effect size.

Discussion of Findings

The results of the ANCOVA revealed a statistically significant main effect of teaching strategies on students' motivation. Students who were taught using the mind mapping metacognitive strategy recorded significantly higher post-test motivation scores (Mean = 58.65) compared to those taught using the lecture method (Mean = 52.15), with a statistically significant F-value of 6.149 ($p < 0.05$). This finding affirms the first objective and underscores the motivational advantage of mind mapping strategies in teacher education settings. This outcome is in agreement with several studies in educational psychology and instructional design. For example, Asikainen et al. (2018) found that metacognitive strategies such as planning, monitoring, and evaluating one's learning processes significantly enhance intrinsic motivation and engagement. Mind mapping, by visually structuring knowledge and highlighting conceptual connections, helps students internalize and control their learning, thus increasing their motivation to participate.

Similarly, Efklides (2011) emphasized the interaction between metacognition and motivation, asserting that when learners are guided to reflect on their thinking processes such as through mapping concepts they become more motivated and confident in their learning. The cognitive stimulation provided by mind mapping aligns with Buzan's (2006) theory that learning becomes more memorable and engaging when students actively build mental schemas around key concepts. Mind maps facilitate not only visual learning but also collaborative exploration when applied in groups, which boosts participation and motivation. Moreover, Ellis, Pardo, and Han (2016) noted that aligning instruction with cognitive and motivational goals of learners leads to better outcomes. The mind mapping strategy, as applied in this study, provided a student-centered, visual, and reflective learning experience that evidently led to improved motivational outcomes. In contrast, the traditional lecture method being passive and linear limits students' interaction with content, as supported by Boone (2015) who argued that lecture-based systems are less effective in sustaining learners' attention and interest, particularly in special education contexts. The result of the analysis showed that there was no statistically significant effect of gender on students' motivation ($F = 0.072$, $p = 0.789$), indicating that both male and female students benefited equally from the teaching strategies used. This finding is supported by the study of González et al. (2016), who found that when equitable and interactive learning strategies are applied, motivational outcomes are consistent across gender. In particular, they argue that metacognitive strategies like mind mapping provide universal cognitive scaffolding that benefits all learners regardless of gender identity.

Additionally, Ryan and Deci (2000) proposed that educational environments that support autonomy, competence, and relatedness tend to eliminate motivational disparities among demographic groups. The mind mapping strategy used in this study supported these three needs by allowing students to structure their knowledge independently, connect ideas meaningfully, and express their thinking visually. Furthermore, Pintrich and Schunk (2002) observed that gender effects on academic motivation become less prominent in learning contexts where students engage actively with content and self-regulate their cognitive processes. This is consistent with the present study's finding that male and female students showed comparable levels of motivation when exposed to mind mapping and even lecture-based instruction.

Conclusion

The research confirms that mind mapping significantly boosts students' motivation in special education courses. The strategy encourages active engagement, creativity, and reflective thinking core elements missing in conventional lecture methods. Gender does not appear to influence the effectiveness of the strategy.

Recommendations

Colleges of Education in Nigeria, especially in special education departments, should formally integrate mind mapping into instructional practices. This strategy promotes active learning and boosts student motivation, as demonstrated by the significant improvement in motivation scores among students taught with mind mapping.

1. Lecturers should receive regular training on how to apply metacognitive strategies such as mind mapping effectively in their teaching. Such workshops will help shift pedagogy

from passive, lecture-based methods to student-centered approaches that foster engagement and long-term motivation.

2. Since the study found no significant difference in motivation between male and female students when mind mapping was used, institutions should prioritize equitable instructional methods like mind mapping that work effectively across gender groups. This supports inclusive education goals and promotes fairness in learner engagement.
3. Students should be encouraged and supported to use mind mapping and similar tools during independent study, assignments, and group work.

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