RESEARCH PAPER

Effect of Mind Mapping Techniques on Students' Intrinsic Motivation at BS (Hons) Level in Lahore

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ABSTRACT

This study aimed to examine the impact of the mind-mapping technique on the intrinsic motivation of BS (Hons) students in Lahore, specifically focusing on public sector university students. Motivating learners is a critical aspect of enhancing academic performance and learning experiences. Mind mapping, as a visual learning tool, is believed to enhance students' motivation and cognitive engagement. However, its impact on intrinsic motivation, especially at the undergraduate level in Pakistan, is underexplored. A quantitative, causal-comparative design was used. A multistage sampling method selected 300 BS students from Lahore's public universities. Data were collected using two structured questionnaires. Descriptive (mean, SD) and inferential statistics (t-test, regression) were analyzed via SPSS. Findings revealed a significant positive effect of the mind-mapping technique on students' intrinsic motivation. No gender-based difference was found in motivation outcomes. Mind mapping should be integrated into university teaching practices. Teachers should be trained and encouraged to use it as a regular instructional strategy to enhance student motivation and engagement.

| **KEYWORDS** | Mind Mapping Techniques, Intrinsic Motivation |

Introduction

Mind mapping is a pioneering approach that promotes learner engagement. The method is extraordinarily simple and easy to understand. Mind maps allow us to focus on learning and recalling information from memory (Berminati, Subari, & Wiratno, 2023). Mind mapping is an effective learning technique that allows students to gain a deeper understanding of content. Through mind maps, information is divided into coherent parts, which helps in making the learning process efficient and effective (Tatipang et al., 2021).

Mind maps support the development of connections between ideas and aid in concept visualization. However, limitations become apparent when attempting to present complex concepts, as mind maps primarily rely on simple hierarchical relationships (Shi et al., 2023).

Literature Review

Intrinsic Motivation

Intrinsic motivation refers to the internal drive that compels individuals to engage in activities for their own sake, for the enjoyment, interest, or satisfaction they bring (Zeng et al., 2022). In educational settings, students who are intrinsically motivated

demonstrate greater engagement, persistence, and a deeper approach to learning. They participate in academic tasks not because they have to, but because they want to, finding the process itself rewarding. According to John et al. (2023), students at the undergraduate level who exhibit high levels of intrinsic motivation often outperform their peers in areas such as reading comprehension, writing fluency, and speaking skills.

Research by Firmansyah et al. (2022) supports the idea that intrinsic motivation is a strong predictor of academic success, particularly in language learning and self-directed tasks. These students tend to take ownership of their learning, which results in more effective use of resources and higher retention rates. Early theories of intrinsic motivation originated from animal behavior studies, where researchers like Kruglanski et al. (2018) observed that animals engaged in exploratory behaviors even in the absence of external rewards, highlighting a natural inclination toward curiosity and mastery.

Mauck (2022) identifies several key components of intrinsic motivation including interest, tension, perceived skill, autonomy, and connectedness. These elements work together to create an internal state that promotes learning without the need for external incentives. When educational environments cultivate these psychological aspects, students are more likely to enjoy learning and persist through academic challenges.

Mind Mapping

Mind mapping is a visual and conceptual technique for organizing information. It involves creating diagrams that show relationships between ideas, allowing learners to represent complex information hierarchically and associatively. Buzan (2018) introduced this technique as a brain-friendly tool for enhancing creativity, memory, and understanding. He emphasized principles such as central imagery, radiating branches, use of colors, and the inclusion of keywords and symbols, which align with the brain's associative processes.

Mind maps serve not only as note-taking tools but also as instruments for reflection and critical thinking. They support students in synthesizing new knowledge and making connections between concepts. According to Niluh (2024), mind maps can take different forms, including circle maps, tree maps, double bubble maps, brace maps, and fishbone diagrams. Each structure is designed to facilitate specific cognitive processes such as comparison, classification, or cause-effect analysis.

By actively constructing mind maps, students engage with content in a way that supports long-term memory formation. Bures et al. (2021) suggest that mind mapping activates both the left and right hemispheres of the brain, promoting holistic learning. Moreover, when students are allowed to personalize their maps using images and color, the learning experience becomes more enjoyable and intrinsically motivating.

Self-Determination Theory (SDT)

Self-Determination Theory, developed by Deci and Ryan (1985), offers a psychological framework that explains why individuals are motivated to act. According to SDT, three basic psychological needs must be satisfied for intrinsic motivation to thrive: autonomy, competence, and relatedness. These needs represent universal human desires. When fulfilled, they lead to higher self-motivation, engagement, and well-being.

In the academic domain, supporting these needs can dramatically influence students' motivation. Zhou and Li (2023) found that students who perceive their learning environments as autonomy-supportive and competence-building report greater levels of intrinsic motivation. Teachers who encourage student choice, acknowledge their feelings, and minimize controlling behaviors contribute to such environments.

Mind mapping naturally supports the needs outlined in SDT. It fosters autonomy by allowing learners to choose how they organize and represent content. It promotes competence by helping students see connections and structure in material that might otherwise seem fragmented. When used in group settings, it can also enhance relatedness through shared learning and collaboration.

Theoretical Perspectives on Mind Mapping and Motivation

Mind mapping is rooted in constructivist learning theory, which posits that learners actively construct knowledge through interaction with information and their environment. Vygotsky (1978) emphasized the social and cognitive dimensions of learning, both of which are supported when students work on mind maps collaboratively. Similarly, Piaget's (1954) ideas about cognitive development align with mind mapping's emphasis on organizing and restructuring knowledge.

Cognitive Load Theory (Sweller, 1994) also underpins the effectiveness of mind mapping. The theory suggests that learners have limited working memory and that instructional techniques should minimize unnecessary cognitive load. Mind maps help by visually simplifying complex concepts and reducing mental effort, allowing students to focus more on understanding than memorization. This creates a more manageable learning experience that enhances motivation and comprehension.

Empirical Evidence Supporting Mind Mapping and Motivation

Several empirical studies have validated the use of mind mapping to increase intrinsic motivation among students. Al-Jarf (2020) conducted research with university students and found that those who used mind mapping experienced greater satisfaction and involvement in their studies. They reported enjoying the learning process more and retained information better compared to those using traditional note-taking methods.

Şahin and Tuncer (2021) found that undergraduate students who practiced mind mapping during their studies exhibited higher intrinsic motivation, improved self-confidence, and greater creative thinking. Their study emphasized the transformative power of visual learning in increasing student engagement.

In a local context, Malik et al. (2022) examined the impact of visual learning tools, including mind mapping, on student motivation in Pakistani universities. They observed that these strategies contributed not only to better academic results but also to a more positive attitude toward learning. These findings support the idea that mind mapping can play a vital role in motivating students at the BS (Hons) level in cities like Lahore, where traditional teaching methods often dominate.

Overall, the literature suggests a strong connection between the use of mind mapping techniques and the enhancement of students' intrinsic motivation. As such, integrating these strategies into university-level classrooms could help create more engaging, student-centered learning environments.

Hypotheses

H_{01}: There is no significant effect of the mind-mapping technique on students' intrinsic motivation at the BS (Hons) level in Lahore. H_{02}: There is no significant difference in the effect of mind-mapping technique on intrinsic motivation based on gender among BS (Hons) students in Lahore.
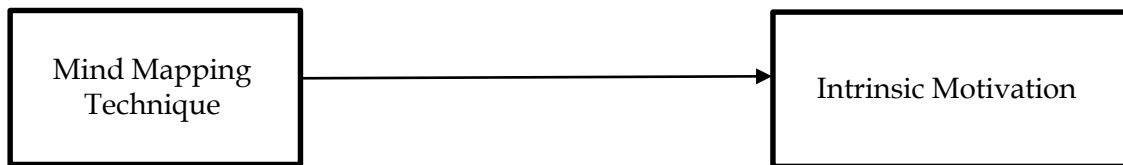
Conceptual Framework

Figure 1: Conceptual Framework showing the Relationship between Mind Mapping Technique and Intrinsic Motivation

Material and Methods

This study employed a quantitative approach with a causal-comparative research design. The population comprised all BS (Hons.) students enrolled in 14 public universities in Lahore (Higher Education Department, 2018). Using a multistage sampling technique, four universities were selected through cluster sampling. From each, 75 students were randomly selected, forming a total sample of 300 students (150 males, 150 females).

Instruments

- Mind Mapping Techniques Assessment Scale (MMTAS) by Amin & Hina (2018), with 13 items on a 5-point Likert scale.
- Intrinsic Motivation to Learn Scale (IMLS) by Goldman et al. (2017), comprising 10 items on a 7-point Likert scale.

Results and Discussion

Statistical analysis was conducted using SPSS, including descriptive statistics, independent sample t-tests, and regression analysis.

Table 1
Gender

Gender	Frequency
Male	150
Female	150
Total	300

Table 2
Regression Analysis: Mind Mapping and Intrinsic Motivation

Model	B	Std. Error	Beta	t	p
Mind Mapping Technique	-23.105	9.497	.795	-2.433	.010
$F_{(1,278)} = 476.88$, $R^2 = .632$					

The regression analysis indicates a significant effect of the mind mapping technique on students' intrinsic motivation (B = .795, t = 21.83, p < .000), with R^2 = .632 indicating a strong predictive relationship.

Table 3
Independent Sample t-Test: Gender-Based Differences

Variable	Group	N	M	SD	t	df	Sig. (2-tailed)
Mind Mapping Technique	Male	150	58.9	9.21	.166	298	.021*
	Female	150	59.2	8.98			
Intrinsic Motivation	Male	150	23.5	2.11	1.14	298	.021*
	Female	150	23.1	2.10			

*p ≤ 0.05

Results indicate no significant difference in the effectiveness of mind mapping based on gender (t = .166, p = .021), implying equal influence on both male and female students' intrinsic motivation.

The results of this study clearly indicate a significant positive effect of mind mapping techniques on students' intrinsic motivation. With a strong R^2 value of .632, the regression analysis suggests that a substantial portion of the variance in intrinsic motivation can be explained by students' use of mind mapping. This finding supports the view that visual learning tools like mind maps do not merely enhance comprehension and retention but also play a critical role in sustaining students' internal desire to learn. These results align with Self-Determination Theory (Deci & Ryan, 1985), which emphasizes autonomy and competence as central to intrinsic motivation—both of which are fostered when students actively create and engage with mind maps.

Furthermore, the study found no meaningful gender-based differences in the effectiveness of mind mapping. Both male and female students demonstrated similar levels of intrinsic motivation and engagement when using this technique, indicating that mind mapping is an inclusive and adaptable strategy suitable for diverse learning styles. This supports findings from Malik et al. (2022), who observed similar motivational outcomes across genders in Pakistani higher education settings. The minimal differences in mean scores further highlight the universal appeal and utility of mind mapping in classroom settings.

The findings also reflect previous empirical evidence (e.g., Al-Jarf, 2020; Şahin & Tuncer, 2021), confirming that mind mapping promotes deeper learning by encouraging students to visualize and connect ideas. As a student-centered learning approach, mind mapping helps reduce cognitive overload and promotes critical thinking, making it a powerful instructional tool in higher education. Integrating such strategies into regular university teaching practice could improve not only academic performance but also long-term learner motivation and engagement.

Conclusion

The research revealed that students perceive the mind mapping technique as enhancing their comprehension, memory, and ability to organize information. It aids in connecting concepts and improving retention. Findings confirmed a statistically significant positive effect of mind mapping on students' intrinsic motivation, with no gender-based differences.

This study reinforces the conclusions of Amin and Hina (2018) and Edward (2011), emphasizing the usefulness of mind mapping in improving students' learning outcomes and motivational levels.

Recommendations

- University instructors should be trained in the use of mind mapping as a classroom strategy.

- Curriculum planners and policymakers should incorporate visual tools like mind maps to foster student engagement and internal motivation.

- Further research should explore the use of mind mapping across disciplines and age levels to broaden its practical application.

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