Exploring the Relationship Between Person, Behaviour and Environment in Learning

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ABSTRACT

This study examines the intricate relationship between cognitive, behavioural, and environmental factors in learning, based on Bandura's (1986) social cognitive theory and Wenden & Rubin's (1987) research on learning strategies. Understanding how these elements interact is crucial for enhancing educational practices and student outcomes. The research is set in Johor, Malaysia, focusing on public university students to provide a real-world educational context. The objective is to identify the combined effects of cognitive strategies, behaviour, and environmental management on academic performance. This quantitative study utilized a 5-point Likert scale survey to gather data from 113 respondents. The findings indicate that effective cognitive and behavioural strategies and well-managed learning environments significantly enhance student performance. The study's implications suggest that integrating these strategies into educational practices and fostering supportive environments can improve academic outcomes. This research highlights the need for a holistic approach to learning, emphasizing the interplay of cognitive, behavioural, and environmental factors.

Keywords: cognitive strategies, behavioural factors, environmental management, academic performance, social cognitive theory.

INTRODUCTION

The Relationship Between Person, Behaviour, And Environment In Learning

Understanding educational dynamics requires examining the interconnected roles of personal, behavioural, and environmental elements in the learning process. Bandura's (1986) social cognitive theory provides a foundational explanation, emphasizing that learning emerges through the mutual interaction of these three components. Personal aspects involve cognitive and emotional elements, including learners' attitudes, beliefs, and sense of self-efficacy. Behaviour relates to the observable actions learners take during learning, while the environment comprises external factors such as social interactions, cultural expectations, and physical surroundings. Bandura (1986) stresses that these elements are deeply interrelated, where alterations in one can directly affect the others, collectively influencing how learning unfolds.

Personal factors significantly impact learning outcomes. Personal factors significantly impact learning outcomes. One key component is self-efficacy, which is defined as an individual's confidence in their ability to perform tasks and reach goals, which is a major driver of motivation and persistence in learning (Zimmerman, 2000). Students with high self-efficacy are more likely to tackle complex challenges and remain committed, leading to better learning outcomes. Conversely, learners with low self-efficacy may avoid demanding tasks

and are more prone to disengagement. Moreover, students' interests and prior knowledge shape how they interpret and integrate new information, further influencing their academic success (Pajares, 1996).

Behaviour within the learning context encompasses the strategies and actions learners employ to gain knowledge and competencies. This includes both cognitive strategies, such as repetition, structuring, and elaborating, and metacognitive techniques like planning, self-monitoring, and reflection (Schunk, 1991). When students actively use these approaches, they are better able to understand and retain information. In addition, behavioural involvement, such as contributing to class discussions, completing academic tasks, and seeking assistance when needed, plays a vital role in achieving positive learning results. These behaviours are closely intertwined with personal beliefs and environmental conditions, forming a continuous feedback cycle that shapes overall educational experiences.

The learning environment, encompassing physical settings and social and cultural contexts, is pivotal in shaping educational outcomes. Supportive learning environments that provide adequate resources, encouragement, and opportunities for interaction and collaboration foster positive learning experiences. Conversely, environments lacking these elements may hinder learning. Cultural values and norms also influence learners' attitudes towards education and preferred learning styles. For instance, collectivist cultures may emphasize collaborative learning and group success, whereas individualist cultures might focus more on independent learning and personal achievement. Understanding these environmental influences is crucial for creating effective and inclusive educational practices (Bandura, 1986).

Relevance of the Topic in Malaysia

The interplay between personal factors, behaviour, and environment in learning is particularly pertinent in the Malaysian educational context due to its multicultural and diverse population. Malaysia's education system serves various ethnic groups, including Malays, Chinese, Indians, and indigenous peoples, each with distinct cultural values and learning preferences. Recognizing and integrating these diverse cultural perspectives into educational practices can enhance engagement and learning outcomes. For example, adopting collaborative learning strategies that resonate with the collectivist orientation of many Malaysian communities can significantly improve student participation and academic success (Ministry of Education Malaysia, 2013).

Malaysia’s dedication to transforming its education system is clearly articulated in the Malaysia Education Blueprint 2013–2025, which emphasizes the need for equitable and inclusive learning settings. The blueprint advocates for high-quality teaching, accessible learning materials, and tailored interventions that address the diverse needs of learners. By understanding how personal, behavioural, and environmental factors intersect, educators can design strategies that specifically target Malaysian students’ learning challenges, promoting inclusivity and reducing achievement gaps.

Technological advancements and the increasing integration of digital tools in Malaysian education highlight the relevance of this topic. Digital learning platforms can transform traditional educational environments, providing personalized and interactive learning experiences. By considering the interplay of personal, behavioural, and environmental factors, educators can effectively leverage technology to enhance learning outcomes. For instance, adaptive learning technologies can address individual learning styles and needs, while online collaborative tools can facilitate peer interactions and support (Hamid et al., 2015).

Overall, understanding the relationship between person, behaviour, and environment in learning is crucial for improving educational practices in Malaysia. A comprehensive approach that acknowledges and addresses the diverse factors influencing learning can help create more inclusive, effective, and engaging educational experiences. This holistic understanding is essential for fostering a knowledgeable and skilled population capable of contributing to Malaysia's socio-economic development and global competitiveness (Ministry of Education Malaysia, 2013).

Problem Statements

Current Studies in the Area of Research

Although educational innovations have advanced considerably, the holistic integration of cognitive, behavioural, and environmental dimensions remains underexplored, especially in Malaysia. Core components such as critical thinking, cognitive structuring, and motivation are widely recognized as vital to academic achievement (Bandura, 1986; Wenden & Rubin, 1987). When effectively utilized, these cognitive strategies can significantly enhance students' ability to process and retain information, leading to improved academic performance. Behavioural factors, including self-regulation, motivation, and engagement, are equally crucial as they directly impact students' ability to manage their learning processes and maintain consistent academic effort. According to Zimmerman (2000), self-regulated learning is a key predictor of academic success, underscoring the need for students to develop strong behavioural strategies.

In the Malaysian higher education context, there is a distinct lack of empirical studies that investigate the interplay between these factors. Malaysian universities are uniquely characterized by student populations with varying cultural, socioeconomic, and educational backgrounds, which presents challenges in designing effective teaching strategies. The current research landscape in Malaysia lacks a nuanced understanding of how cognitive and behavioral strategies interact within specific environmental contexts to influence student outcomes. This gap in the literature is significant, as it hinders the development of targeted interventions and educational frameworks that can address the specific needs of Malaysian students.

Environmental aspects, such as classroom infrastructure, access to learning materials, and peer engagement, are equally vital in shaping students' academic journeys. Previous research (Schunk & Zimmerman, 1994) affirms that supportive environments enhance motivation and student performance. In Malaysia, where educational institutions often grapple with issues related to infrastructure and resource allocation, understanding the impact of these environmental factors is crucial. However, limited research focuses on how these environmental variables interact with cognitive and behavioural strategies to affect learning in the Malaysian context.

The need for comprehensive research is further underscored by the Malaysia Education Blueprint 2013-2025, which emphasizes the importance of improving educational quality and student outcomes across the country (Ministry of Education Malaysia, 2013). To achieve these goals, developing a holistic understanding of the factors that influence learning is imperative. This requires a shift from isolated studies focusing on individual factors to integrated research that examines the interplay between cognitive, behavioural, and environmental elements.

Research Gaps

While significant strides have been made in understanding the individual roles of cognitive, behavioural, and environmental factors in learning, there remains a critical research gap in examining their integrated effects within the Malaysian educational context. Most existing studies focus on these elements in isolation, failing to capture the holistic interplay that Bandura (1986) and Wenden & Rubin (1987) suggest is crucial for optimizing educational outcomes. Specifically, there is a lack of empirical research on how these factors collectively influence student performance in Malaysia's diverse and resource-variable educational settings. Additionally, the impact of environmental factors such as classroom infrastructure and peer interactions, which Schunk and Zimmerman (1994) highlight as significant, is underexplored in Malaysian universities. This gap hampers the development of tailored educational strategies that address the unique challenges Malaysian students face, such as varied socioeconomic backgrounds and differing levels of access to educational resources. Comprehensive studies integrating cognitive, behavioural, and environmental perspectives are essential to inform policy and practice, as emphasized by the Malaysia Education Blueprint 2013-2025 (Ministry of Education Malaysia, 2013), to enhance student outcomes and educational quality nationwide.

In conclusion, addressing the gap in empirical research on the integration of cognitive, behavioural, and environmental factors in Malaysian education is essential for developing effective educational strategies. By understanding how these elements interact to influence learning outcomes, educators and policymakers can create targeted interventions that cater to the diverse needs of Malaysian students. This comprehensive approach is vital for enhancing educational quality and ensuring that all students have the opportunity to achieve their full academic potential.

Objective Of The Study And Research Questions

This study is done to explore the perception of learners on their use of learning strategies. Specifically, this study is done to answer the following questions.

How do cognitive components influence learning?
How does behaviour influence learning?
How does the environment influence learning?
Is there a relationship between cognitive, behaviour, and environment for learning?

LITERATURE REVIEW

Social Cognitive Theory

Albert Bandura's social cognitive theory provides a broad lens for analyzing how individuals acquire knowledge and shape behaviours. Central to this theory is the concept of reciprocal determinism, which asserts that personal characteristics, behaviours, and environmental conditions interact continuously to influence learning outcomes. Personal attributes include internal processes such as self-efficacy, motivation, and belief systems. Behaviour refers to observable actions influenced by both personal cognition and external settings, while the environment encompasses social, cultural, and physical contexts in which learning occurs. A key element of this theory is observational learning, whereby individuals model behaviours based on what they witness in others. This process involves four stages: attention, retention, reproduction, and motivation. Furthermore, Bandura emphasized self-efficacy, an individual's belief in their capacity to succeed, as a pivotal factor in driving motivation and regulating learning. His theory underscores that learning is not purely internal or external, but a result of ongoing interaction between the learner and their environment (Bandura, 1986).

Learning Strategies

Effective learning hinges on comprehensive strategies spanning cognitive, metacognitive, and environmental dimensions. Cognitive strategies, including elaboration, rehearsal, and organization, help learners make sense of new material and improve retention. These approaches support mental structuring and processing of information, making learning more meaningful and lasting. Meanwhile, metacognitive strategies enable learners to reflect on and regulate their cognitive processes. Students can adapt their learning approaches to align with specific goals and challenges by planning, monitoring progress, and evaluating outcomes. This self-regulatory capacity is essential for fostering autonomy and long-term academic development.

Additionally, environmental strategies play a critical role in shaping effective learning environments. These include selecting suitable study locations, engaging with peers, and utilizing academic resources. When learners actively manage their surroundings to support concentration and collaboration, their ability to perform academically improves significantly (Schunk, 1991; Zimmerman, 2000).

Past Studies On Learning Strategies

The paper by Fooladvand, Yarmohammadian, and Zirakbash (2017) systematically reviews literature on the impact of cognitive and metacognitive strategies on academic achievement. Analyzing studies published from 2000 to 2014 reveals that these strategies significantly enhance learning outcomes across various educational levels and subjects. The methodology included a comprehensive search of international and Iranian databases for relevant research employing different experimental designs. The findings emphasize the effectiveness of

these strategies in improving students' academic performance, advocating for their integration into educational curricula to boost learning efficacy.

Parviz (2013) explored how learners apply cognitive and metacognitive strategies across different physical and social learning environments. The study sampled 241 female students from urban and rural areas in Islamabad, spanning secondary and tertiary levels. Findings showed urban secondary students used these strategies more than their rural counterparts, while no notable difference was observed at the university level. The study emphasized the strong link between the learning environment and students' strategic learning behaviours.

Said, Idris, and Hussain (2018) study investigated the relationship between social behaviour and academic performance among female secondary school students in Khyber Pakhtunkhwa. Using a descriptive and survey methodology, data were collected from 15 schools, categorizing students into high, average, and below average achievers across science and arts streams. The study utilized a structured questionnaire to assess social behaviour and academic performance. Findings revealed a significant correlation between social behaviour and academic performance, with high achievers exhibiting better social behaviour. The research emphasized the mutual influence of social behaviour and academic performance, recommending improvements in both areas to enhance students' overall development.

Abedini, Abedin, and Zowghi (2023) investigated how personal, environmental, and behavioural elements influence adult participation in online communities of practice (OCOPs), using a social cognitive theory lens. Through qualitative interviews with GitHub users, the study identified key themes such as collaborative problem-solving, mutual support, and experiential learning. The authors proposed a revised framework highlighting the dominant role of environmental contexts, particularly digital platforms, in driving sustained engagement and lifelong learning within virtual spaces.

Conceptual Framework

The conceptual framework of this study, illustrated in Figure 1, integrates Bandura's (1986) social cognitive theory with learner strategy models by Wenden and Rubin (1987). The framework outlines three key domains: cognitive, behavioural, and environmental, that collectively influence learning, motivation, and outcomes. Each domain contributes distinct yet interrelated mechanisms that shape students' academic behaviours.

Additionally, according to Rahmat (2018), cognitive factors reflect the cognitive components that the learners use to make the learning a success.

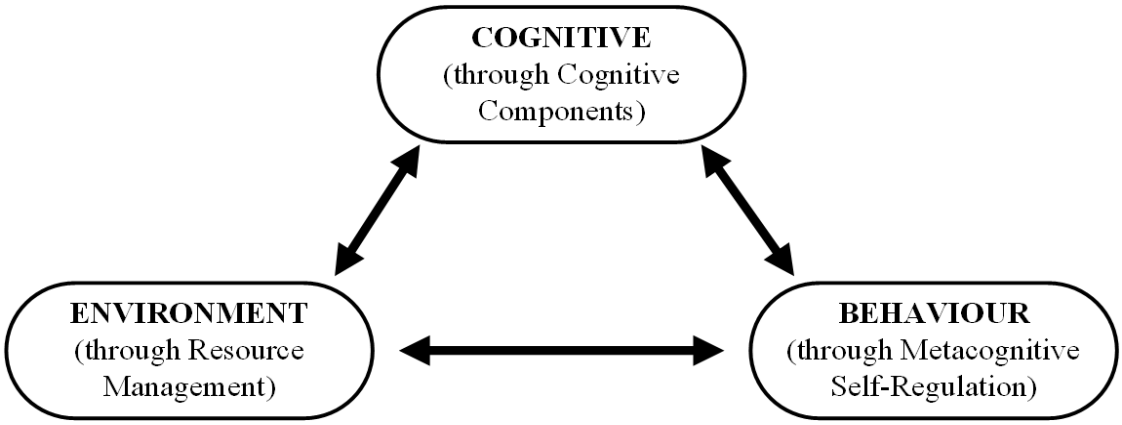

Figure 1. Conceptual Framework of the Study

Furthermore, the conceptual framework depicted in Figure 1 illustrates the dynamic interplay between cognitive components, behaviour, and the environment in the context of learning. Cognitive factors influence learning through strategies such as organization and elaboration, which are further refined through metacognitive regulation involving planning, monitoring, and evaluation. These behavioural responses, in turn, are shaped by the surrounding learning environment, including access to resources and peer collaboration. The

model emphasizes a reciprocal process where each component supports and reinforces the others, highlighting the importance of an integrated approach to educational design.

METHODOLOGY

This quantitative study is done to explore learning strategies among undergraduates. The methodology of this study involved a structured survey comprising four sections designed to capture comprehensive data on the factors influencing learning among university students. Section A focused on demographic information, gathering details about the gender, and academic discipline. Section B aimed to understand how cognitive components influence learning by including items related to cognitive strategies such as rehearsal, organization, elaboration, and critical thinking. Section C explored the impact of behaviour on learning, assessing behaviours such as self-regulation, motivation, and engagement through metacognitive strategies. Finally, Section D examined how the environment affects learning, with questions about the physical and social aspects of the learning environment, including classroom settings, resource availability, and peer interactions. The survey utilized a 5-point Likert scale rooted in Bandura's (1986) social cognitive theory and Wenden & Rubin's (1987) framework and was administered to 113 public university students in Johor, Malaysia, to provide a nuanced understanding of the interplay between cognitive, behavioural, and environmental factors in learning.

Table 1 displays the Cronbach's alpha analysis of learning strategies under cognitive, behavioural, and environmental components based on Bandura's (1986) Social Cognitive Theory. Cognitive components, encompassing Rehearsal, Organization, Elaboration, and Critical Thinking, show a high reliability with a Cronbach's alpha of .894. Behavioural strategies, focused on Metacognitive Self-Regulation, present a good reliability score of .832. Environmental strategies, including Environment Management, Effort Management, and Help-Seeking, demonstrate excellent reliability with an overall Cronbach's alpha of .829. These values indicate high internal consistency and reliability in measuring the respective constructs. Further analysis using SPSS is done to present findings to answer the research questions for this study.

Table 1. Distribution of Items in the Survey

	SOCIAL COGNITIVE THEORY (BANDURA, 1986)	STRATEGY		SUB-STRATEGY			
A	COGNITIVE	COGNITIVE COMPONENTS	(a)	Rehearsal	4	19	.894
			(b)	Organization	4		
			(c)	Elaboration	6		
			(d)	Critical Thinking	5		
B	BEHAVIOUR	METACOGNITIVE SELF-REGULATION				11	.832
C	ENVIRONMENT	RESOURCE MANAGEMENT	(a)	Environment Management	5	11	.829
			(b)	Effort Management	4		
			(c)	Help-Seeking	2		
						41	.942

FINDINGS

Findings for Demographic Profile

Table 2 presents the gender distribution of the study's 113 participants. The analysis reveals a significant gender disparity, with males constituting 74% of the sample (84 participants), while females represent 26% (29 participants). This disproportion suggests a male-dominant sample, which may influence the study's findings

and generalizability. Understanding this gender composition is crucial for interpreting the results and considering any potential gender-related biases or implications within the research context.

Table 2**.** Percentage for Gender

1	Male	74%
2	Female	26%

Table 3 illustrates the disciplinary distribution of the 113 participants in the study. The majority of participants, 73%, are from the Science & Technology field, indicating a strong representation from this discipline. Business students make up 23% of the sample, while only 4% of the participants are from the Social Sciences. This distribution highlights a significant concentration in Science & Technology, suggesting potential disciplinary biases in the study's findings and emphasizing the need to consider these differences when interpreting the results.

Table 3. Percentage for Discipline

1	Science & Technology	73%
2	Social Sciences	4%
3	Business	23%

Findings For Cognitive

The study examined four cognitive strategies, rehearsal, organization, elaboration, and critical thinking, to understand their impact on learning. Students demonstrated frequent use of rehearsal techniques, particularly keyword memorization and note repetition. Organizational strategies such as outlining key ideas and visual representation also showed moderate to high engagement. Elaboration strategies like connecting new content to prior knowledge and applying ideas across contexts were commonly practiced. Similarly, critical thinking skills such as questioning assumptions and considering alternatives were regularly observed.

Table 4 presents the mean values for four items related to the rehearsal strategy, part of the cognitive components in learning. Each item assesses how frequently students use repetitive techniques to reinforce their learning. The means are as follows: LSCCRQ1 (3.5) indicates moderate repetition in practicing material, LSCCRQ2 (3.8) shows higher engagement in re-reading class notes, LSCCRQ3 (4.1) reflects strong use of keyword memorization for important concepts, and LSCCRQ4 (3.9) suggests frequent list-making for memorization. These results demonstrate that students commonly employ various rehearsal strategies, with keyword memorization being the most prevalent, to enhance their learning and retention of academic material.

Table 4. Mean for (a) Rehearsal (4 items)

	MEAN
LSCCRQ1 When I study for the classes, I practice saying the material to myself over and over.	3.5
LSCCRQ2 When studying for the courses, I read my class notes and the course readings over and over again.	3.8
LSCCRQ3 I memorize key words to remind me of important concepts in this class.	4.1
LSCCRQ4 I make lists of important items for the courses and memorize the lists.	3.9

Table 5 details the mean scores for four items assessing the use of organization strategies in learning, which are crucial for cognitive processing. LSCCOQ1, with a mean of 3.6, indicates that students moderately outline material to organize thoughts. LSCCOQ2 has a higher mean of 3.9, showing frequent efforts to identify key

ideas in readings and notes. LSCCOQ3, with a mean of 3.3, suggests moderate use of visual aids like charts and diagrams. LSCCOQ4, with a mean of 3.8, reflects common practice in creating outlines of essential concepts. These findings highlight that students frequently use organizational strategies to structure and comprehend their study materials effectively, particularly in identifying key ideas and making outlines, enhancing their learning process.

Table 5. Mean for (b) Organization (4 items)

	MEAN
LSCCOQ1 When I study the readings for the courses in the program, I outline the material to help me organize my thoughts.	3.6
LSCCOQ2 When I study for the courses, I go through the readings and my class notes and try to find the most important ideas.	3.9
LSCCOQ3 I make simple charts, diagrams, or tables to help me organize course materials in this program.	3.3
LSCCOQ4 When I study for the courses, I go over my class notes and make an outline of important concepts.	3.8

Table 6 provides a detailed analysis of the use of elaboration strategies among students, which are crucial for deep learning and comprehension. The mean scores for six items reveal how students integrate and apply new knowledge: integrating information from different sources (3.5), relating ideas across subjects (3.5), connecting new material to prior knowledge (4.0), summarizing main ideas (3.4), understanding material through connections (3.8), and applying ideas in various contexts (3.7). These scores indicate a moderate to high engagement in elaboration strategies, highlighting their role in fostering comprehensive understanding and application of knowledge.

Table 6. Mean for (c) Elaboration (6 items)

	MEAN
LSCCEQ1 When I study for the courses in this program, I pull together information from different sources, such as lectures, readings, and discussions.	3.5
LSCCEQ2 I try to relate ideas in one subject to those in other courses whenever possible	3.5
LSCCEQ3 When reading for the courses, I try to relate the material to what I already know.	4
LSCCEQ4 When I study for the courses in this program, I write brief summaries of the main ideas from the readings and my class notes.	3.4
LSCCEQ5 I try to understand the material in the classes by making connections between the readings and the concepts from the lectures.	3.8
LSCCEQ6 I try to apply ideas from course readings in other class activities such as lecture and discussion.	3.7

Table 7 presents the mean scores for five items evaluating using critical thinking strategies. The mean scores are as follows: LSCCCTQ1 (3.6), indicating frequent questioning of the material; LSCCCTQ2 (3.5), reflecting efforts to evaluate evidence supporting theories; LSCCCTQ3 (3.5), showing that students develop their ideas from course materials; LSCCCTQ4 (3.6), indicating engagement in creative thinking; and LSCCCTQ5 (3.5), which shows that students consider alternative perspectives. These means suggest a consistent engagement in critical thinking strategies, highlighting their importance in fostering analytical and evaluative skills among students.

Table 7. Mean for (d) Critical Thinking (5 items)

	MEAN
LSCCCTQ1 I often find myself questioning things I hear or read in the courses to decide if I find them convincing.	3.6
LSCCCTQ2 When a theory, interpretation, or conclusion is presented in classes or in the readings, I try to decide if there is good supporting evidence.	3.5
LSCCCTQ3 I treat the course materials as a starting point and try to develop my own ideas about it.	3.5
LSCCCTQ4 I try to play around with ideas of my own related to what I am learning in the courses.	3.6
LSCCCTQ5 Whenever I read or hear an assertion or conclusion in the classes, I think about possible alternatives.	3.5

Findings for Behaviour

Analysis of metacognitive self-regulation revealed that students actively plan, monitor, and modify their study behaviours. They frequently revisited unclear concepts, adjusted learning methods to suit different tasks, and used goal-setting to maintain focus. However, moderate distraction during class suggests an area for further improvement.

Table 8 presents the mean scores for eleven items measuring metacognitive self-regulation strategies. These strategies reflect students' ability to plan, monitor, and regulate learning processes. The items show varying levels of engagement: MSSRQ1 (3.1) indicates moderate distraction during class, MSSRQ2 (3.2) shows frequent question formulation to focus reading, MSSRQ3 (3.9) and MSSRQ4 (3.8) highlight strong problem-solving efforts, MSSRQ5 (3.5) suggests regular skimming before thorough study, MSSRQ6 (3.5) shows self-questioning for comprehension, MSSRQ7 (3.5) and MSSRQ8 (3.6) reflect adaptability and critical thinking, MSSRQ9 (3.8) emphasizes identifying unclear concepts, and MSSRQ10 and MSSRQ11 (3.7) indicate goal-setting and review of notes. These scores suggest a generally high use of metacognitive strategies, essential for effective self-regulated learning.

Table 8. Mean for Metacognitive Self-Regulation (11 items)

	MEAN
MSSRQ1 During class time, I often miss important points because I am thinking of other things.	3.1
MSSRQ2 When reading for the courses, I make up questions to help focus my reading.	3.2
MSSRQ3 When I become confused about something I am reading for the classes, I go back and try to figure it out.	3.9
MSSRQ4 If course readings are difficult to understand, I change the way I read the material.	3.8
MSSRQ5 Before I study new course material thoroughly, I often skim it to see how it is organized	3.5
MSSRQ6 I ask myself questions to make sure I understand the material I have been studying in this program.	3.5
MSSRQ7 I try to change the way I study in order to fit any course requirements and the instructors' teaching style.	3.5
MSSRQ8 I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for the courses in this program.	3.6
MSSRQ9 When studying for the courses in this program I try to determine which concepts I do not understand well.	3.8
MSSRQ10 When I study for the courses, I set goals for myself in order to direct my activities in each study period.	3.7
MSSRQ11 If I get confused taking notes in classes, I make sure I sort it out afterwards.	3.7

Findings for Environment

Environmental strategies were found to support student learning significantly. Most students reported studying in distraction-free zones, attending classes regularly, and managing time efficiently. Help-seeking behaviours were also prevalent, with high average scores in identifying peers for academic support and consulting classmates when facing difficulties.

Table 9 displays the mean scores for five items related to environment management strategies, which are essential for effective study. The scores reveal that students generally maintain conducive study environments: RMCEMQ1 (4.2) shows a strong preference for studying in distraction-free areas, RMCEMQ2 (3.8) and RMCEMQ3 (3.7) indicate good use of study time and regular study spots, RMCEMQ4 (3.5) reflects efforts to keep up with readings and assignments, and RMCEMQ5 (4.5) demonstrates high class attendance. These findings highlight students' proactive management of their study environments, facilitating better academic performance.

Table 9. Mean for (a)Environment Management (5 items)

	MEAN
RMCEMQ1 I usually study in a place where I can concentrate on my course work.	4.2
RMCEMQ2 I make good use of my study time for the courses in this program.	3.8
RMCEMQ3 I have a regular place set aside for studying	3.7
RMCEMQ4 I make sure that I keep up with the weekly readings and assignments for the courses.	3.5
RMCEMQ5 I attend the classes regularly in this program.	4.5

Table 10 provides the mean scores for four items assessing effort management strategies, which are critical for maintaining academic performance. The scores reveal consistent effort management among students: RMCEMQ1 (3.8) and RMCEMQ2 (3.8) indicate students regularly set aside specific study spaces and work hard despite disliking certain tasks. RMCEMQ3 (3.0) reflects a moderate tendency to avoid challenging coursework, while RMCEMQ4 (3.8) shows perseverance in completing dull or uninteresting tasks. These findings highlight the students' dedication to their studies, emphasizing the importance of structured study environments and consistent effort in achieving academic success.

Table 10. Mean for (b)Effort Management (4 items)

	MEAN
RMCEMQ1 I have a regular place set aside for studying	3.8
RMCEMQ2 I work hard to do well in the classes in this program even if I do not like what we are doing.	3.8
RMCEMQ3 When course work is difficult, I either give up or only study the easy parts.	3
RMCEMQ4 Even when course materials are dull and uninteresting, I manage to keep working until I finish.	3.8

Table 11 presents the mean scores for two items assessing help-seeking behaviours among students. The first item, RMCHSQ1, with a mean score of 4.3, indicates that students frequently seek assistance from classmates when they do not understand course material. The second item, RMCHSQ2, with a mean score of 4.4, shows that students actively identify peers they can approach for help if needed. These high mean scores reflect a strong tendency among students to engage in help-seeking behaviours, underscoring the importance of social support and collaboration in the learning process.

Table 11. Mean for (c) Help-Seeking (2 items)

	MEAN
RMCHSQ1 When I cannot understand the material in a course, I ask another student in the class for help.	4.3
RMCHSQ2 I try to identify students in the classes whom I can ask for help if necessary.	4.4

Findings for The Relationship Between Cognitive, Behaviour and Environment for Learning

This section presents data to answer research question 4 - Is there a relationship between cognitive, behaviour and environment for learning? To determine if there is a significant association in the mean scores between cognitive, behaviour, and environment, data is analysed using SPSS for correlations. Results are presented separately in Tables 12,13, and 14.

Table 12 presents the relationship between cognitive factors and behavioural responses. The correlation analysis indicates a strong and statistically significant connection between these two variables, with a correlation coefficient of r = .806** and p = .000. Based on the scale outlined by Jackson (2015), where significance is determined at the 0.05 level. Positive correlations range from 0.1 to 1.0, reflecting a robust association. Correlations between 0.1 and 0.3 are considered weak, 0.3 and 0.5 moderate, and values above 0.5 indicate a strong correlation. Therefore, the findings support the existence of a high positive correlation between cognitive engagement and behavioural involvement in the learning process.

Table 12. Correlation between cognitive and behaviour

Correlations

		COGNITIVE	BEHAVIOUR
COGNITIVE	Pearson Correlation	1	.806**
	Sig. (2-tailed)		.000
	N	113	113
BEHAVIOUR	Pearson Correlation	.806**	1
	Sig. (2-tailed)	.000	
	N	113	113

**. Correlation is significant at the 0.01 level (2-tailed).

Table 13 highlights a statistically significant relationship between behavioural patterns and environmental conditions, with a correlation coefficient of r = .729** and a significance value of p = .000. Referring to Jackson (2015), correlations are considered significant at the 0.05 level, with values ranging from 0.1 to 1.0 interpreted as positive correlations. Specifically, values between 0.1–0.3 indicate a weak relationship, 0.3–0.5 moderate, and 0.5–1.0 strong. The result obtained here falls within the upper range, clearly indicating a strong positive correlation between students' behavioural engagement and the environments in which they learn.

Table 13. Correlation between Behaviour and Environment

Correlations

		BEHAVIOUR	ENVIRONMENT
BEHAVIOUR	Pearson Correlation	1	.729**
	Sig. (2-tailed)		.000
	N	113	113
ENVIRONMENT	Pearson Correlation	.729**	1
	Sig. (2-tailed)	.000	
	N	113	113

**. Correlation is significant at the 0.01 level (2-tailed).

Table 14 reveals a significant positive correlation between environmental factors and cognitive components, with a correlation coefficient of r = .707** and a significance value of p = .001. In line with Jackson's (2015) interpretation framework, correlations are considered meaningful at the 0.05 significance level, with values from 0.1 to 1.0 denoting the strength of positive relationships. Specifically, correlations between 0.1 and 0.3 are viewed as weak, 0.3 to 0.5 as moderate, and those exceeding 0.5 as strong. The result here, falling well within the strong range, indicates that conducive learning environments are essential in supporting students' cognitive development.

Table 14. Correlation between Environment and Cognitive

Correlations

		ENVIRONMENT	COGNITIVE
ENVIRONMENT	Pearson Correlation	1	.707**
	Sig. (2–tailed)		.000
	N	113	113
COGNITIVE	Pearson Correlation	.707**	1
	Sig. (2–tailed)	.000	
	N	113	113

**. Correlation is significant at the 0.01 level (2–tailed).

CONCLUSION SUMMARY OF FINDINGS AND DISCUSSIONS

How Do Cognitive Components Influence Learning?

The research findings underscore the pivotal role of cognitive components in influencing learning outcomes. Cognitive strategies such as organization, elaboration, and critical thinking are essential for processing and retaining information effectively. The study reveals that students who actively employ these cognitive strategies demonstrate improved academic performance, as they can better understand and integrate new knowledge. Effective cognitive strategies enable learners to structure their study materials, make meaningful connections between concepts, and critically evaluate information, enhancing their comprehension and retention. These findings highlight the necessity of incorporating cognitive strategy training into educational practices to foster deeper learning and improve student outcomes. Educators can help students become more efficient and autonomous learners by focusing on developing cognitive skills, ultimately leading to enhanced academic success.

How Does Behaviour Influence Learning?

The research findings demonstrate that behaviour is crucial in shaping learning outcomes by impacting self-regulation, motivation, and engagement. Students who demonstrate effective self-regulatory behaviours, such as establishing objectives, tracking their progress, and adapting their approaches, when necessary, generally experience greater academic success. Motivated and engaged students persevere through complex tasks and are more inclined to seek assistance when needed, ultimately enhancing their learning experiences. The study emphasizes the importance of metacognitive awareness in driving behaviours like planning and self-assessment, which are essential for effective learning. These behaviours empower students to take charge of their learning processes, resulting in improved understanding and long-term retention of information. As a result, by implementing specific educational interventions, educators have the power to enhance student outcomes greatly. Educators must prioritize the development of self-regulatory and motivational skills in their teaching methods.

How Does Environment Influence Learning?

The research findings emphasize the learning environment's crucial role in shaping student outcomes. Various elements, including the environment in which students learn, the resources at their disposal, and their interactions with their peers, profoundly impact their level of engagement and academic achievement.

Organized and well-equipped environments promote improved focus and enhance the utilization of cognitive and metacognitive strategies. The study emphasizes the importance of environments that offer prompt feedback and personalized support to keep students motivated and engaged. In addition, the physical aspects of the environment, such as acoustics and temperature, also impact learning efficiency. The significance of establishing supportive and conducive learning environments that meet the diverse needs of students cannot be overstated, as it greatly contributes to their overall academic achievement.

Is There A Relationship Between Cognitive, Behaviour, And Environment For Learning?

The research findings affirm a significant interrelationship between cognitive, behavioural, and environmental factors in learning. Cognitive strategies such as organization and critical thinking are enhanced by self-regulatory behaviours, including goal setting and progress monitoring, which are crucial for academic success. These behaviours are further influenced by the learning environment, which provides the necessary resources, feedback, and support to foster effective learning. The study demonstrates that an optimal learning environment not only facilitates the application of cognitive strategies but also promotes positive learning behaviours. This dynamic interplay suggests that cognitive, behavioural, and environmental factors are interdependent, collectively contributing to improved student outcomes. Thus, a holistic approach that integrates these elements is essential for developing effective educational practices and fostering a conducive learning atmosphere.

Pedagogical Implications and Suggestions for Future Research

Pedagogical Implications

The findings of this research highlight significant pedagogical implications for enhancing educational practices in Malaysia. Integrating cognitive and metacognitive strategies into the curriculum is essential for fostering students' problem-solving skills, critical thinking, and knowledge retention. Educators should focus on developing these cognitive components through structured tasks and interactive learning environments. Additionally, promoting self-regulation and motivational behaviours can help students manage their learning processes more effectively. The research also underscores the importance of creating supportive and adaptive learning environments that cater to diverse student needs, as these environments significantly impact student engagement and academic performance. By adopting a holistic approach incorporating cognitive, behavioural, and environmental factors, educators can develop more effective teaching strategies that enhance learning outcomes and address the unique challenges Malaysian students face.

Suggestions for Future Research

This research suggests several avenues for future exploration to understand further the interplay between cognitive, behavioural, and environmental factors in learning. First, longitudinal studies are needed to investigate the long-term impact of integrated cognitive and metacognitive strategies on student academic performance. Researchers can better understand how these strategies influence learning outcomes and adaptability in various educational stages and settings by tracking students over extended periods. Such studies could also explore the sustained effects of supportive learning environments on student engagement and motivation, providing deeper insights into the durability and evolution of effective educational practices.

Second, expanding the research to include diverse educational contexts is crucial. While this study focused on university students in Johor, Malaysia, future research should encompass a broader range of educational institutions, including primary and secondary schools, vocational training centres, and rural versus urban settings. This expansion would help to identify specific challenges and opportunities unique to different educational environments and student populations. Additionally, cross-cultural studies could examine how cultural factors influence the implementation and effectiveness of cognitive and metacognitive strategies, contributing to a more global understanding of these dynamics (Bandura, 1986; Schunk & Zimmerman, 1994).

Third, investigating the role of emerging educational technologies in enhancing cognitive, behavioural, and environmental interactions warrants attention. Adaptive learning platforms, virtual reality, and artificial

intelligence-driven educational tools offer new possibilities for personalized learning experiences. Future research should examine how these technologies can support the development of cognitive and metacognitive skills, promote positive learning behaviours, and create adaptive learning environments tailored to individual needs. By integrating these technological advancements into educational research, scholars can develop innovative strategies that align with the evolving landscape of education, ensuring that educational practices remain relevant and effective in the digital age (Ministry of Education Malaysia, 2013).

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