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A Cognitive Learning Model Integrating Attitude, Independence, And Self-Belief for Metacognitive Awareness Enhancement

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ABSTRACT

The development of students' metacognitive awareness has become a central objective in contemporary educational research because learners' abilities to monitor, regulate, and evaluate their own cognitive processes significantly influence academic achievement and lifelong learning capabilities. However, many educational environments continue to emphasize content acquisition rather than the development of internal cognitive regulation mechanisms. This research proposes a cognitive learning model integrating learning attitude, learning independence, and self-belief as interconnected psychological and behavioral pathways for enhancing students' metacognitive awareness. The study adopts a research synthesis and conceptual modeling approach based exclusively on existing empirical findings related to metacognition, self-efficacy, learning attitudes, autonomous learning behaviors, and cognitive skill development. The proposed model explains how positive attitudes toward learning establish motivational readiness, independence facilitates self-regulated learning practices, and self-belief strengthens learners' confidence in managing complex academic tasks. Previous studies demonstrate significant relationships between metacognitive skills, self-efficacy, critical thinking, and learning strategies, suggesting that these factors operate collectively rather than independently (Amin et al., 2020; Çelik & ARSLAN, 2022; Di et al., 2022). The model further integrates structural assessment perspectives using validated analytical approaches commonly applied in educational research (Barclay & Thomson, 1995; Hair et al., 2019). Findings indicate that a cognitive learning framework combining psychological readiness and autonomous learning mechanisms can provide a comprehensive approach for improving metacognitive awareness. The study contributes a theoretical foundation for educators, curriculum designers, and researchers seeking to promote deeper learning through cognitive, emotional, and motivational integration.

Keywords: Metacognitive Awareness, Self-Efficacy, Learning Independence, Learning Attitude, Cognitive Learning Model, Self-Regulated Learning, Educational Psychology, Learning Strategies.

1. INTRODUCTION

1.1 Background

Modern educational systems increasingly recognize that

academic success depends not only on students' acquisition of knowledge but also on their ability to understand, control, and evaluate their own learning processes. Metacognitive awareness represents a higher-order cognitive capability through which learners identify learning requirements, select appropriate strategies, monitor performance, and modify approaches when difficulties arise. Within this context, metacognition has evolved from being considered an individual cognitive skill into a multidimensional learning mechanism influenced by psychological, motivational, and behavioral factors.

Research examining metacognitive development has demonstrated that students who possess stronger awareness of their cognitive processes often show improved critical thinking, problem-solving ability, and academic performance. Amin et al. (2020) identified a relationship between metacognitive skills and critical thinking across different instructional strategies, emphasizing that metacognition functions as an important mechanism connecting learning strategies with higher-order thinking outcomes. Similarly, Antika et al. (2022) highlighted the association between metacognitive abilities and creative thinking skills, demonstrating that learners' awareness of their own cognition supports flexible and productive thinking processes.

Although metacognitive awareness is widely acknowledged as essential, its development remains complex because it is influenced by multiple internal and external factors. Students do not develop effective cognitive regulation merely through exposure to academic content; rather, they require psychological confidence, positive learning orientations, and opportunities for independent decision-making. Self-efficacy, learning attitude, and learning independence represent three important dimensions that shape how students approach challenges, regulate effort, and maintain engagement during learning activities.

Self-efficacy refers to learners' beliefs regarding their ability to successfully perform academic tasks. Students with stronger self-belief are more likely to engage in challenging activities, persist when encountering difficulties, and apply effective learning strategies. Research has shown that self-efficacy contributes significantly to metacognitive functioning. Duratun (2023) found that self-efficacy influences students' metacognitive skills, indicating that confidence in personal capability

affects learners' ability to manage cognitive processes. Furthermore, Çelik and ARSLAN (2022) demonstrated that self-efficacy related to problem posing plays an important role in predicting mathematical achievement through metacognitive processes.

Learning attitude represents students' emotional and cognitive orientation toward learning activities. Positive attitudes encourage active participation, persistence, and openness toward acquiring new knowledge, whereas negative attitudes may reduce motivation and restrict cognitive engagement. Alkursheh (2024) emphasized the importance of validating students' attitudes toward blended learning, suggesting that learners' perceptions and acceptance of learning environments influence their engagement patterns and educational outcomes.

Learning independence provides another critical dimension of metacognitive development. Independent learners demonstrate the ability to establish goals, select strategies, monitor progress, and evaluate outcomes without excessive external dependence. Problem-based and research-based learning environments have been shown to support these characteristics by encouraging students to actively construct knowledge. Downing et al. (2011) reported that problem-based learning positively influences students' experiences and metacognitive development, highlighting the relationship between autonomous learning practices and cognitive regulation.

Based on these perspectives, this study develops "A Cognitive Learning Model Integrating Attitude, Independence, and Self-Belief for Metacognitive Awareness Enhancement" as a conceptual framework explaining how psychological and behavioral factors collectively contribute to metacognitive growth. The proposed model positions learning attitude, independence, and self-belief as interconnected predictors that strengthen learners' capacity for monitoring and regulating cognition.

1.2 Problem Statement

Despite increasing recognition of metacognitive awareness as a fundamental educational outcome, many learning environments continue to demonstrate limitations in developing students' self-regulatory capabilities. Traditional instructional approaches frequently prioritize examination performance and knowledge reproduction while providing insufficient attention to learners' internal cognitive processes. As a result, students may acquire

information without developing the ability to evaluate their understanding, identify weaknesses, or independently select effective learning strategies.

A significant challenge is that metacognitive awareness is influenced by several psychological variables that are often examined separately. Existing research has investigated self-efficacy, learning attitudes, and independent learning behaviors individually; however, fewer studies have attempted to integrate these dimensions into a unified cognitive learning model. This fragmentation limits understanding of how motivational beliefs, learning orientations, and autonomous behaviors interact to influence metacognitive development.

Furthermore, variations in educational contexts create additional challenges. Students experiencing online, blended, or technology-supported learning environments require stronger self-management abilities because reduced direct supervision increases dependence on personal regulation skills. Studies examining learning during and after COVID-19-related educational changes revealed that psychological factors, stress conditions, and learning adaptation significantly influenced students' experiences (Ekasari & Ahmad, 2023). Therefore, developing an integrated model that considers cognitive and psychological dimensions is necessary for addressing contemporary educational demands.

1.3 Research Relevance

The relevance of this research emerges from the growing need to understand learning as an integrated cognitive and psychological process. Contemporary education requires learners who can independently acquire knowledge, evaluate information critically, and adapt to changing academic demands. Metacognitive awareness provides the foundation for these abilities because it enables learners to become active participants rather than passive recipients of information.

Previous research provides evidence that metacognition interacts with various learning variables. Al-Khresheh and Al Basheer Ben Ali (2023) demonstrated the importance of metacognitive awareness in reading strategy utilization among EFL students, showing that learners' awareness of strategies affects their ability to manage comprehension processes. Similarly, Cristea et al. (2023) identified epistemological beliefs as predictors of metacognitive awareness, indicating that internal cognitive beliefs

influence how students understand and regulate learning.

The proposed cognitive learning model extends these findings by integrating attitude, independence, and self-belief into a single explanatory framework. Rather than viewing metacognitive awareness as an isolated cognitive outcome, the model conceptualizes it as the result of interactions among motivational, emotional, and behavioral factors.

1.4 Objectives

The primary objective of this research is to develop a conceptual cognitive learning model explaining how learning attitude, independence, and self-belief contribute to the enhancement of students' metacognitive awareness.

The specific objectives are:

1. To analyze the theoretical relationship between self-belief and metacognitive awareness development.
2. To examine the role of learning attitude in shaping students' cognitive engagement and regulatory abilities.
3. To investigate how learning independence contributes to autonomous cognitive monitoring and evaluation.
4. To propose an integrated learning model combining psychological and behavioral pathways for metacognitive enhancement.
5. To identify implications for educational practices and future empirical validation.

1.5 Scope and Significance

This research focuses on the conceptual relationship between three major learner characteristics—learning attitude, learning independence, and self-belief—and their influence on metacognitive awareness. The study does not examine institutional factors, teacher characteristics, or external educational policies; instead, it concentrates on learner-centered psychological and cognitive mechanisms.

The significance of this research lies in providing an integrated perspective for understanding metacognitive development. By combining motivational beliefs, learning orientations, and autonomous behaviors, the proposed model offers educators a broader framework for designing

instructional strategies that promote deeper learning.

The model may support curriculum designers in developing learning environments that encourage reflection, independence, and confidence. It may also assist researchers in conducting future empirical studies using structural modeling approaches to examine relationships among these variables. The integration of cognitive and psychological dimensions reflects the increasing importance of learner-centered education, where students are expected to actively manage their own knowledge development.

2. LITERATURE REVIEW

2.1 Conceptual Foundation of Metacognitive Awareness in Learning

Metacognitive awareness refers to learners' understanding of their own cognitive processes and their ability to regulate those processes during learning activities. It involves two interconnected dimensions: knowledge about cognition and regulation of cognition. Knowledge about cognition includes awareness of strategies, learning requirements, and personal cognitive strengths, whereas regulation of cognition involves planning, monitoring, controlling, and evaluating learning activities. In educational contexts, metacognitive awareness enables students to make informed decisions about how they learn, why particular strategies are effective, and how learning approaches should be modified.

Research has consistently positioned metacognition as a critical factor influencing higher-order thinking. Amin et al. (2020) examined the relationship between metacognitive skills and critical thinking skills under different learning strategies and found that students with stronger metacognitive abilities demonstrated improved analytical and evaluative thinking. Their findings indicate that metacognition functions as a mechanism through which instructional approaches influence cognitive performance. Similarly, Antika et al. (2022) identified a relationship between metacognitive skills and creative thinking abilities, suggesting that awareness of cognitive processes supports flexible thinking and innovative problem-solving.

The importance of metacognitive awareness is also evident in language learning contexts. Al-Khresheh and Al Basheer Ben Ali (2023) investigated metacognitive

awareness among Saudi EFL students and demonstrated that learners' understanding and application of reading strategies were closely connected with their ability to regulate comprehension. Their findings emphasize that metacognition is not limited to general academic performance but operates as a transferable learning capability across disciplines.

However, metacognitive awareness does not develop independently. Students require psychological readiness, confidence, and autonomous learning behaviors to effectively apply metacognitive strategies. Therefore, understanding the factors that contribute to metacognitive growth requires examination of motivational and behavioral variables such as self-efficacy, learning attitude, and independence.

2.2 Role of Self-Belief and Self-Efficacy in Metacognitive Development

Self-belief, commonly represented through self-efficacy, refers to students' perceptions of their capability to organize and execute actions required to achieve desired academic outcomes. Within cognitive learning processes, self-efficacy influences the selection of tasks, persistence during difficulties, emotional responses, and strategic decision-making. Learners with strong self-belief are more likely to approach challenging tasks as opportunities for improvement rather than threats to competence.

The relationship between self-efficacy and metacognitive awareness has been demonstrated in several educational contexts. Duratun (2023) examined the influence of self-efficacy on students' metacognitive skills and confirmed that confidence in personal learning ability contributes to stronger cognitive regulation. This finding supports the argument that students who believe they can succeed are more willing to engage in planning, monitoring, and evaluating their learning processes.

Similarly, Di et al. (2022) explored the relationship between metacognitive strategies, self-efficacy, and academic achievement among university students. Their findings indicated that self-efficacy interacts with metacognitive strategies to influence learning outcomes. This suggests that self-confidence alone does not directly produce academic success; rather, it strengthens students' willingness and ability to apply appropriate cognitive strategies.

Çelik and ARSLAN (2022) further demonstrated the predictive importance of self-efficacy by examining mathematical achievement through metacognition and problem-posing self-efficacy. Their findings suggest that students' beliefs about their capability influence how effectively they engage in complex cognitive activities. When students possess confidence in their ability to solve problems, they are more likely to employ reflective thinking and strategic adjustment.

The relationship between self-efficacy and psychological factors is also important. Corbí et al. (2024) highlighted the influence of emotional factors and self-efficacy on trainee teachers' psychological well-being. Although their study focused on teacher development, it provides insight into how confidence-related beliefs interact with emotional conditions to influence learning-related behaviors. Therefore, self-belief should be considered a foundational component of any cognitive learning model designed to enhance metacognitive awareness.

2.3 Learning Attitude as a Determinant of Cognitive Engagement

Learning attitude represents learners' perceptions, emotions, and behavioral tendencies toward educational activities. A positive learning attitude encourages curiosity, engagement, persistence, and openness to challenging academic experiences. Conversely, negative attitudes may reduce motivation and limit students' willingness to engage in reflective learning processes.

The relationship between learning attitude and metacognitive awareness can be explained through students' cognitive engagement patterns. Learners who value learning activities are more likely to actively analyze information, evaluate understanding, and seek improved strategies. Attitude therefore functions as an internal motivational condition that influences whether students utilize metacognitive mechanisms effectively.

Alkursheh (2024) investigated university students' attitudes toward blended learning through exploratory and confirmatory analysis, demonstrating that students' perceptions toward learning environments represent important factors affecting educational acceptance and participation. This finding is particularly relevant in modern learning contexts where students increasingly encounter technology-mediated and flexible learning systems requiring greater self-management.

Chen et al. (2020) examined the effects of educational games on students' emotions and science learning achievement. Their findings showed that emotional engagement influences learning experiences and achievement outcomes. Although their research focused on game-based learning, it highlights the broader principle that emotional responses and attitudes toward learning environments shape cognitive involvement.

The development of positive learning attitudes is therefore essential for metacognitive enhancement. Students who perceive learning as meaningful are more likely to reflect on their understanding, evaluate their progress, and adopt effective strategies. In the proposed cognitive learning model, attitude functions as an initial activation mechanism that encourages learners to participate actively in cognitive regulation

2.4 Learning Independence and Autonomous Cognitive Regulation

Learning independence refers to students' ability to manage their own learning processes through goal setting, strategy selection, self-monitoring, and evaluation. Independent learners demonstrate greater responsibility for academic progress because they do not rely exclusively on external guidance. This characteristic is increasingly important in contemporary educational environments involving online learning, blended instruction, and flexible learning structures.

The connection between independence and metacognitive awareness is supported by research examining learner-centered instructional approaches. Downing et al. (2011) investigated the impact of problem-based learning on student experiences and metacognitive development. Their findings suggested that learning environments encouraging active problem solving promote students' awareness of their own thinking processes. Problem-based learning requires learners to identify knowledge gaps, develop strategies, and evaluate solutions, which directly reflects independent cognitive regulation.

Gavassa et al. (2019) examined strategies for improving student achievement through course structure and learning engagement. Their findings emphasized the importance of balancing instructional support with opportunities for students to develop responsibility for their own learning. This indicates that independence does not mean complete removal of instructional guidance but rather the

development of learners' capacity to manage cognitive activities effectively.

Research-based teaching approaches also support independent learning behaviors. Granjeiro (2019) demonstrated that research-based teaching-learning methods can motivate and engage students by encouraging active participation in knowledge construction. Such approaches provide opportunities for learners to investigate, analyze, and reflect, thereby strengthening metacognitive processes.

Therefore, learning independence serves as a behavioral pathway through which students transform awareness into action. While self-belief provides confidence and attitude provides motivation, independence enables students to apply cognitive regulation strategies consistently.

2.5 Theoretical Positioning of the Integrated Cognitive Learning Model

The reviewed literature indicates that metacognitive awareness emerges from the interaction of cognitive, motivational, and behavioral factors rather than from a single variable. Existing studies have primarily examined individual relationships, such as self-efficacy and metacognition or learning strategies and cognitive performance. However, a comprehensive model integrating attitude, independence, and self-belief remains insufficiently developed.

The proposed cognitive learning model addresses this gap by positioning these three variables as interconnected predictors of metacognitive awareness enhancement. Self-belief operates as a motivational foundation that determines students' confidence in managing academic challenges. Learning attitude influences willingness and emotional readiness toward learning activities. Learning independence provides behavioral mechanisms that allow students to implement self-regulation strategies.

The model also aligns with analytical approaches used in educational research. Structural equation modeling techniques, particularly partial least squares approaches, provide suitable methods for examining complex relationships among latent psychological constructs. Barclay and Thomson (1995) introduced the application of partial least squares modeling for analyzing causal relationships, while Hair et al. (2019) and Hair et al. (2021) emphasized its usefulness for evaluating complex models

involving multiple constructs.

Through this theoretical positioning, the proposed framework contributes to understanding how psychological characteristics and learning behaviors combine to enhance metacognitive awareness. The model extends existing literature by shifting attention from isolated predictors toward an integrated cognitive architecture of learning.

2.6 Research Gap Identification

Although previous studies provide substantial evidence regarding metacognition, several gaps remain. First, existing research frequently investigates metacognitive awareness in specific subject areas, such as language learning, mathematics, or science education. While these studies provide valuable insights, they offer limited understanding of general cognitive mechanisms applicable across educational contexts.

Second, previous investigations often examine self-efficacy, attitude, or independent learning separately. This fragmented approach limits understanding of how these variables collectively influence metacognitive development. Students' cognitive regulation is likely shaped by the interaction between confidence, motivation, and behavioral control rather than by individual factors alone.

Third, many studies emphasize outcomes such as academic achievement but provide less attention to the underlying cognitive pathways that produce these outcomes. The proposed model addresses this limitation by focusing on metacognitive awareness as a central developmental outcome.

Finally, while statistical modeling approaches have been widely applied in educational research, integrated models combining psychological and cognitive variables remain an area requiring further exploration. Future empirical studies can validate the proposed framework using structural equation modeling methods.

3. METHODOLOGY

3.1 Research Design and Approach

This study adopts a conceptual research design based on systematic synthesis and theoretical model development.

The methodology focuses on constructing an integrated cognitive learning model that explains the relationship between learning attitude, learning independence, self-belief, and metacognitive awareness enhancement. Rather than collecting primary empirical data, the study develops a theoretically grounded framework by analyzing patterns, relationships, and implications identified within the provided empirical literature.

A conceptual modeling approach is appropriate because the objective of this research is to establish a comprehensive explanation of how psychological and behavioral learning factors interact to influence metacognitive development. Existing studies have examined individual relationships among these constructs, but the integration of these variables into a unified cognitive framework requires theoretical synthesis. The proposed model therefore organizes existing knowledge into a structured representation of learner cognitive development.

The methodological foundation is supported by previous applications of structural modeling approaches in educational and behavioral research. Partial least squares structural equation modeling provides a suitable analytical perspective for examining complex relationships among latent constructs because it enables researchers to evaluate predictive relationships between multiple psychological variables (Barclay & Thomson, 1995). Furthermore, PLS-SEM approaches have been widely discussed as effective methods for analyzing theoretical models involving interconnected educational constructs (Hair et al., 2019; Hair et al., 2021).

3.2 Proposed Cognitive Learning Model Framework

The proposed cognitive learning model is designed around four primary constructs:

1. Learning Attitude
2. Learning Independence
3. Self-Belief
4. Metacognitive Awareness Enhancement

The framework assumes that metacognitive awareness is the final cognitive outcome resulting from the interaction of motivational, psychological, and behavioral dimensions.

The conceptual structure can be represented as:

Learning Attitude → Cognitive Engagement → Metacognitive Awareness

Self-Belief → Learning Confidence → Cognitive Regulation → Metacognitive Awareness

Learning Independence → Self-Regulated Learning → Metacognitive Awareness

Within this framework, learning attitude functions as an initiating factor, self-belief operates as a motivational reinforcement mechanism, and independence represents the behavioral implementation pathway. Together, these factors create conditions that allow learners to actively monitor and regulate their cognitive processes.

The model also recognizes that the relationship among constructs is dynamic rather than linear. For example, students with positive attitudes may become more willing to engage independently, while successful independent learning experiences may further strengthen self-belief. Therefore, the framework represents a continuous cognitive development cycle rather than a one-directional process.

3.3 Learning Attitude Component

The first component of the model focuses on learning attitude as a psychological determinant of cognitive involvement. Learning attitude includes students' perceptions of learning value, emotional responses toward academic activities, and willingness to participate in educational processes.

Within the proposed framework, attitude influences metacognitive awareness through three mechanisms:

a. Motivation Activation

Positive attitudes increase students' willingness to invest cognitive effort. Learners who perceive academic activities as meaningful are more likely to engage in reflection and strategic thinking.

b. Strategy Acceptance

Students with favorable learning attitudes are more receptive to adopting learning strategies, including planning, monitoring, and evaluation techniques. This

relationship is particularly important in blended and technology-supported learning environments where students must actively manage learning processes.

Alkursheh (2024) demonstrated that students' attitudes toward blended learning represent measurable psychological factors affecting their engagement with educational systems. This supports the model assumption that attitude influences how learners interact with learning environments.

c. Emotional Regulation

Learning attitude also affects emotional responses during academic challenges. Chen et al. (2020) demonstrated that emotional experiences within learning environments influence achievement and engagement. Therefore, positive attitudes may reduce avoidance behaviors and encourage cognitive persistence.

However, attitude alone may not guarantee metacognitive development. Students may possess positive perceptions of learning but lack confidence or independent regulation abilities. Therefore, attitude functions as an enabling condition rather than a complete explanation of metacognitive enhancement.

3.4 Self-Belief and Cognitive Confidence Mechanism

The second component of the model represents self-belief as a psychological mechanism influencing learners' cognitive regulation abilities. Self-belief determines whether students perceive themselves as capable of managing difficult learning tasks.

The proposed model identifies three functional roles of self-belief:

a. Academic Challenge Engagement

Students with stronger self-belief are more likely to approach complex tasks because they expect that effort can lead to improvement. This encourages deeper cognitive processing.

Duratum (2023) confirmed that self-efficacy influences students' metacognitive skills, suggesting that confidence in personal ability contributes to improved cognitive regulation.

b. Persistence and Strategic Adjustment

Self-belief influences learners' responses when encountering difficulties. Confident learners are more likely to modify strategies rather than abandon tasks. This behavior reflects metacognitive regulation because students evaluate effectiveness and make cognitive adjustments.

Çelik and ARSLAN (2022) demonstrated that mathematical self-efficacy contributes to achievement through relationships with metacognitive processes. Their findings support the argument that confidence influences how learners manage complex thinking activities.

c. Psychological Stability

Self-belief also contributes to emotional stability during learning. Corbí et al. (2024) highlighted the relationship between self-efficacy and psychological well-being among trainee teachers, indicating that confidence-related beliefs influence broader psychological functioning.

Nevertheless, excessive reliance on self-belief without appropriate learning strategies may produce unrealistic confidence. Therefore, the proposed model positions self-belief as a supportive factor requiring interaction with independence and metacognitive knowledge.

3.5 Learning Independence and Self-Regulated Learning Pathway

The third component focuses on learning independence as the behavioral mechanism through which cognitive awareness becomes practical learning behavior.

Learning independence consists of:

- Goal establishment
- Learning strategy selection
- Progress monitoring
- Performance evaluation
- Adjustment of learning methods

Independent learners actively participate in constructing knowledge rather than depending entirely on external instruction.

The model explains that independence enhances

metacognitive awareness through continuous self-regulation. When students independently plan learning activities, they become aware of their cognitive strengths and weaknesses.

Downing et al. (2011) demonstrated that problem-based learning environments promote metacognitive development by requiring students to actively investigate problems and evaluate solutions. This supports the role of independence as a pathway toward cognitive awareness.

Similarly, Granjeiro (2019) showed that research-based teaching approaches encourage student engagement through active knowledge construction. Such environments promote independent thinking and reflection, which are essential elements of metacognitive development.

However, independence must be balanced with instructional support. Completely unguided learning may increase cognitive burden, particularly among students who have limited prior knowledge or weak regulatory skills. Therefore, the model supports guided independence, where educators provide appropriate structures while encouraging learner autonomy.

3.6 Integration Mechanism of the Proposed Model

The central contribution of this research is the integration of attitude, independence, and self-belief into a unified cognitive architecture. The model proposes that metacognitive awareness emerges through the interaction of three developmental pathways:

Motivational Pathway

Learning attitude creates willingness and readiness to engage with learning processes.

Psychological Pathway

Self-belief strengthens confidence, persistence, and strategic decision-making.

Behavioral Pathway

Learning independence transforms motivation and confidence into actual cognitive regulation behaviors.

The interaction among these pathways creates a reinforcing learning cycle:

Positive attitude encourages engagement → engagement develops independent learning behaviors → successful independent learning strengthens self-belief → stronger self-belief improves metacognitive regulation.

This integrated perspective provides a broader explanation of metacognitive development than isolated variable analysis.

3.7 Analytical Validation Framework

Although this study is conceptual, future empirical validation can employ structural equation modeling techniques to evaluate relationships among proposed constructs.

The measurement model may assess:

- Reliability of construct indicators
- Internal consistency
- Convergent validity
- Discriminant validity

The structural model may evaluate:

- Direct effects of self-belief on metacognitive awareness
- Influence of learning attitude on cognitive engagement
- Contribution of independence to self-regulated learning
- Mediating relationships among constructs

Hair et al. (2019) and Hair et al. (2021) emphasized that PLS-SEM provides practical advantages for predictive models involving multiple latent variables. Therefore, future researchers can apply this approach to test the proposed cognitive learning framework across different educational contexts.

4. RESULTS

The conceptual analysis resulted in the identification of an integrated relationship structure among learning attitude, independence, self-belief, and metacognitive awareness.

The findings indicate that metacognitive awareness is not developed through cognitive instruction alone but emerges through the interaction of motivational, psychological, and behavioral factors.

The first finding demonstrates that learning attitude functions as a foundational condition for metacognitive engagement. Students who possess positive orientations toward learning are more likely to participate actively, evaluate their understanding, and adopt reflective strategies. This finding aligns with research showing that attitudes toward learning environments influence student engagement and learning behavior (Alkursheh, 2024).

The second finding highlights self-belief as a critical psychological predictor of cognitive regulation. Students who believe in their academic capabilities demonstrate greater persistence, strategic flexibility, and willingness to manage challenging tasks. Previous research confirms that self-efficacy contributes to metacognitive skill development and academic achievement pathways (Duratun, 2023; Çelik & ARSLAN, 2022).

The third finding identifies learning independence as the behavioral mechanism transforming cognitive intention into practical regulation. Independent learners demonstrate stronger abilities to plan, monitor, and evaluate their learning processes. Evidence from problem-based and research-based learning studies supports the importance of autonomous engagement in developing metacognitive abilities (Downing et al., 2011; Granjeiro, 2019).

Overall, the findings support the proposed cognitive learning model, demonstrating that metacognitive enhancement requires simultaneous development of positive learning attitudes, strong self-belief, and independent learning behaviors. The integrated framework provides a comprehensive explanation of how students progress from motivational readiness to cognitive self-regulation.

5. DISCUSSION

The findings of this conceptual study provide evidence that metacognitive awareness enhancement requires an integrated understanding of cognitive, motivational, and behavioral learning dimensions. The proposed cognitive learning model demonstrates that learning attitude, independence, and self-belief function as interconnected mechanisms rather than isolated predictors. This

perspective contributes to existing educational research by explaining how internal learner characteristics combine to influence students' abilities to monitor, evaluate, and regulate their own learning processes.

The first theoretical implication concerns the role of self-belief as a psychological foundation for metacognitive development. Previous studies have established that self-efficacy influences students' willingness to engage with complex tasks and apply cognitive strategies. The present model extends this understanding by positioning self-belief as an initiating factor that affects both motivation and cognitive regulation. When students perceive themselves as capable learners, they are more likely to engage in planning, strategic adjustment, and reflective evaluation. This relationship is consistent with findings showing that self-efficacy contributes to metacognitive skills and academic performance (Duratun, 2023; Di et al., 2022). Furthermore, research on mathematical achievement indicates that self-efficacy interacts with metacognitive processes to influence problem-solving performance (Çelik & ARSLAN, 2022).

However, the discussion also reveals an important limitation regarding self-belief. Confidence alone cannot guarantee effective learning outcomes. Students may possess strong beliefs about their abilities but lack appropriate strategies for managing cognitive tasks. Therefore, the proposed model emphasizes that self-belief must operate together with learning independence and metacognitive knowledge. This interaction prevents excessive confidence without strategic competence.

The second implication relates to learning attitude as a motivational and emotional pathway. The findings suggest that students' perceptions toward learning activities influence their willingness to participate in reflective cognitive processes. Positive attitudes encourage engagement, persistence, and openness toward adopting learning strategies. This interpretation is supported by studies demonstrating that students' attitudes toward educational environments influence participation and learning experiences (Alkursheh, 2024). Similarly, research examining emotional aspects of learning has shown that affective experiences influence academic engagement and achievement patterns (Chen et al., 2020).

Nevertheless, learning attitude represents a complex construct influenced by contextual and individual factors. Students may develop positive attitudes toward learning

but encounter environmental barriers that restrict their ability to apply metacognitive strategies. Factors such as academic pressure, psychological conditions, and learning environments may influence the relationship between attitude and cognitive outcomes. Research examining students' psychological stress during remote learning illustrates that emotional challenges can affect learning experiences and adaptation processes (Ekasari & Ahmad, 2023). Therefore, educational interventions should address both motivational development and environmental support.

The third major implication involves learning independence as the behavioral pathway connecting psychological characteristics with actual learning practices. The findings indicate that independent learning enables students to transform confidence and motivation into cognitive regulation behaviors. Students who independently establish goals, select strategies, and evaluate progress develop stronger awareness of their thinking processes.

This finding supports research on active learning approaches. Downing et al. (2011) demonstrated that problem-based learning environments encourage metacognitive development because students must actively analyze problems and regulate their learning activities. Similarly, research-based teaching approaches promote engagement and cognitive responsibility by requiring learners to participate in knowledge construction (Granjeiro, 2019). These findings suggest that instructional environments should provide opportunities for guided independence rather than passive information reception.

The proposed model also has practical implications for educational design. Teachers can enhance metacognitive awareness by creating learning environments that combine motivational support, autonomy opportunities, and strategy instruction. Rather than teaching metacognition as a separate skill, educators can embed reflective activities within subject-based learning. For example, students can be encouraged to evaluate their understanding after completing assignments, explain strategy choices, and identify areas requiring improvement.

The model also contributes methodological implications. The integration of multiple latent constructs provides opportunities for empirical validation through structural equation modeling. Previous studies have demonstrated the usefulness of PLS-based approaches for analyzing

complex relationships among educational variables (Barclay & Thomson, 1995; Hair et al., 2019; Hair et al., 2021). Future empirical research can test the proposed relationships and determine whether the strength of these pathways varies across educational levels and disciplines.

Despite its contributions, the study has several limitations. First, the research is conceptual and does not include primary empirical data; therefore, causal relationships cannot be confirmed. Second, the model is developed from selected educational studies and may require adaptation across different cultural and institutional contexts. Third, metacognitive development is influenced by additional variables, including instructional design, teacher support, and technological learning environments, which are not included in the current framework.

Future research should empirically evaluate the proposed model using diverse student populations and longitudinal designs. Such studies may examine whether improvements in self-belief, learning attitude, and independence produce sustained changes in metacognitive awareness. Additionally, comparative research across different learning environments, including online, blended, and traditional classrooms, may provide deeper understanding of contextual influences.

6. CONCLUSION

This research developed a cognitive learning model integrating attitude, independence, and self-belief as fundamental pathways for enhancing students' metacognitive awareness. The study demonstrates that metacognitive development should not be understood solely as a cognitive ability but as an outcome produced through interaction among psychological readiness, motivational orientation, and autonomous learning behavior.

The proposed model identifies learning attitude as the motivational foundation that encourages cognitive engagement, self-belief as the psychological mechanism that strengthens confidence and persistence, and learning independence as the behavioral pathway through which students apply self-regulation strategies. Together, these components create a comprehensive framework explaining how learners develop stronger awareness and control over their thinking processes.

The theoretical contribution of this research lies in

integrating previously separated dimensions of learner development into a unified cognitive architecture. Existing research has demonstrated relationships between metacognition and individual factors such as self-efficacy, learning strategies, and emotional engagement. However, this study advances the discussion by proposing that metacognitive awareness emerges through the combined influence of attitude, independence, and self-belief.

From a practical perspective, the findings suggest that educators should move beyond content-focused instruction and design learning environments that actively cultivate students' confidence, autonomy, and reflective thinking abilities. Learning activities should encourage students to make decisions about strategies, evaluate their performance, and develop responsibility for their own learning progress.

The proposed framework also provides a foundation for future empirical investigation. Researchers can examine the relationships among these constructs using structural equation modeling approaches to validate the proposed pathways. Such validation may contribute to the development of evidence-based instructional models supporting self-regulated and lifelong learning.

Ultimately, enhancing metacognitive awareness requires a holistic approach that recognizes students as cognitive, emotional, and autonomous learners. By integrating attitude, independence, and self-belief, the proposed cognitive learning model offers a meaningful direction for improving educational practices and promoting deeper learning outcomes.

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