

Cognitive psychology and the classroom: what teachers need to know

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Abstract

This paper examines the dynamics of learning and how they relate to the optimal teaching strategies for learners. The authors aim to enhance learners' information processing abilities by highlighting the importance of considering different learning theories in the classroom. These considerations are based on the qualitative behaviour of learners' conscious awareness, cognitive and metacognitive engagement. A multi-stage cluster sampling procedure was employed to select a sample of 840 Grade 11 learners from 20 schools in the education district. A questionnaire was used to collect data, and statistical tests were conducted to validate and analyse the data. The study's results suggest that it is crucial for teachers to use a variety of learning theories and to consider variables that facilitate effective information processing by learners. Understanding diverse learning theories and their interplay positively influence the cognitive development of learners. The study's findings, which include SEM and HLM analyses and implications from teachers' application of juxtaposed theories, suggest that inefficiencies may exist in certain teaching approaches and in individual learners' information processing. Teachers who understand and apply the simultaneous impact of juxtaposed theories of learning can enable learners to assimilate or accommodate incoming information into their cognitive schema, leading to deeper and more meaningful understanding.

Keywords: cognition; cognitive psychology; information processing; learning theories; metacognition

1. Introduction

The authors aim to enhance learners' information processing abilities by highlighting the importance of considering different learning theories in the classroom. Eggen and Kauchak (2014) contend that an individual's cognitive processes, including perception, memory, judgment, and reasoning, undergo enduring changes in mental representations and associations through learning and environmental experiences from childhood to adulthood. Unlike emotional and volitional processes, cognitive development involves the refinement of thought processes over time. Goldberg (2022) indicates that learning, especially in a classroom context, is fundamentally a mental process rooted in the brain. This ongoing cognitive development results in lasting alterations in mental representations and associations, enabling learners to enhance their thinking skills.

Willis (2012) asserts the importance of incorporating not only traditional learning theories from the past three decades but also insights from the emerging field of neuroscience into professional teacher education curricula. Teachers well-versed in the implications of neuroscience research on teaching and learning can effectively tap into learners' brain potential, irrespective of their prior knowledge and performance. Such teachers act as catalysts, narrowing the achievement gap among learners by

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motivating them and instilling optimism about their capacity to cultivate complex and sophisticated minds (Van der Merwe, 2013).

The authors conducted a comparative analysis of various learning theories, aiming to discern similarities and differences and their impact on learning, particularly in a conventional classroom setting.

2. Theoretical framework

A theoretical framework serves as the scientific rationale for a study, being firmly rooted in scientific theory (Vinz, 2022). In this study, the theoretical framework is centred on the domain of cognitive psychology. This conceptual foundation serves as the underpinning from which learning theories are expounded and delineated. It also acts as the starting point for understanding how learner performance variables contribute to the cognitive growth and development of learners' information-processing abilities in a classroom setting. The subsequent section on learning theories further delves into the intricacies of cognitive psychology.

3. Learning theories

Cognitive psychology is the foundation for learning theories, which provide teachers with both theoretical and practical knowledge to create effective learning experiences in the classroom. Effective teaching requires teachers to consider individual differences, assessment, development, subject matter, problem-solving, and transfer of learning for each learner (Jeschke et al., 2021). To comprehend how individuals learn and perceive information, teachers must appreciate how knowledge is processed, stored, and reclaimed in the human mind. As Vandenbroucke et al. (2017) emphasise, teaching is purposeful and effective teaching considers all aspects that can impact a learner's cognitive development.

Learning theories offer teachers a comprehensive understanding of teaching and learning, including key aspects of learner conduct as reflected in performance. The research examines learning theories proposed by prominent figures such as Sigmund Freud (psychoanalysis), Erik Erikson (psychosocial development), Jean Piaget (cognitive development), Lev Vygotsky (social constructivism), Albert Bandura (social cognitive development), and John Flavell (metacognition). These theories are categorised into three groups: Behaviourism, Cognition, and Constructivism, based on the learning behaviours manifested during the teaching-learning process. Specifically, the study delves into theories by B.F. Skinner and Erik Erikson as representatives of behaviourism, and Sigmund Freud, Jean Piaget, Albert Bandura, and John Flavell as proponents of cognitivism. Lev Vygotsky, Albert Bandura, and John Flavell are emphasised as contributors to constructivism. It is worth highlighting that the theoretical contributions of both Bandura and Flavell extend across the cognitive and constructivist domains.

3.1. Freud's theory of the mind (1856 – 1939)

Freud's cognitive theory, commonly referred to as the theory of the mind, has significantly impacted mainstream educational thought, particularly in the field of learning theory. Freud formulated a structural model of the mind, likening it to an iceberg, delineating its features, structure, and functions. According to McLeod (2023a), the mind is segmented into three levels: the conscious, the subconscious, and the unconscious. Freud posited that the subconscious inundates the learner's conscious mind with conflicting forces from the id (the primitive and instinctual part of the mind) and the superego (the moral conscience). The ego, situated at the conscious level, is a facet teachers can use to extract features of learner performance like conscious awareness, cognitive engagement, metacognitive involvement, and information-processing ability (Papamitsiou et al., 2021). A fundamental tenet of Freudian theory is the significant role attributed to the unconscious mind in shaping behaviour (Cherry, 2018).

The learning processes entail intricate connections among diverse cognitive functions, including perception, memory, language, imagery, emotion, and motivation. These connections empower learners to assimilate new information with prevailing knowledge constructs in long-term memory. Kuldass et al. (2013) assert that a comprehensive insight of human learning practices extends beyond conscious learning; it encompasses both conscious and unconscious dimensions. Processes of unconscious learning encompass the registration of information in sensory memory, the formation of connections between information patterns, and the activation of associative memory networks that involve personal expectations, beliefs, and desires (Liaw & Augustine, 2023).

Conscious learning, as delineated by Kuldass et al. (2013), involves actively concentrating on instructional materials, discerning similarities and contrasts between concepts, and establishing connections based on prior experiences. Both conscious and subconscious learning processes encompass mental operations facilitating knowledge acquisition, memory encoding, association formation, retention, and utilisation.

3.2. Erikson's psychosocial developmental theory (1902 – 1994)

Erik Erikson emphasised learning and development through social interaction. His psychosocial theory, which concerns both psychological and social development, builds on the principles of Sigmund Freud's developmental theories (Slavin, 2009). Erikson's theory also extends beyond Freud's ideas by emphasising the adaptive and creative aspects of the ego.

According to Eggen and Kauchak (2014), learners' cognitive development, such as the improvement of their information-processing ability and metacognitive skills, is closely linked to their personal and social development, including the development of their self-concepts, ways of co-operating with peers, and outlooks toward the environment. As Slavin (2009) notes, Erikson's theory highlights the value of cognitive development for learners' personal and social growth, including their self-concepts, social interactions, and attitudes towards learning.

According to Johnson (2017), a teacher's comprehension of personal and social development is essential to successfully interact, motivate, and teach learners at different ages and cognitive levels. Throughout the 20th century, several influential scholars and psychologists developed theories to assist us recognise how children's brains process the world, leading to significant changes in our understanding of childhood development (Cherry, 2019b). The theories of Erikson and Piaget have significantly impacted our comprehension of learners' cognitive and emotional growth and development, and they are highly beneficial in determining the best practices for teaching, leading, and educating learners. Additionally, Taylor (2018) suggests that personality is developed through nurture rather than nature, as the environment (familial and social) plays a crucial role in shaping personality. Both theorists highlight the impact of the learning environment on learners, shaping their cognitive abilities, self-perceptions, interpersonal interactions, and perspectives on the world.

3.3. Piaget's theory on cognitive development (1896 – 1980)

Piaget's theory of cognitive development constitutes a systematic exploration of cognitive growth, grounded in the notion that learners are inherently inquisitive explorers seeking to comprehend their environment (O'Donnell et al., 2009). This theory has wielded a reflective influence on modern perspectives regarding learning, thinking, and cognitive evolution (Krause et al., 2010). Piaget's cognitive theory comprises three fundamental elements: schemas, the adaptation process, and developmental stages (McLeod, 2024). Schemas represent knowledge categories aiding learners in interpreting and comprehending their environment, shaped through the processes of assimilation and accommodation (Lefa, 2014). According to Piaget, children strive to maintain an equilibrium between assimilation and accommodation (Cherry, 2019b). Equilibration elucidates the transition between thought stages, with

accommodation and assimilation continually interacting in an ongoing cycle (Lefa, 2014). Hence, maintaining equilibrium between applying prior knowledge and adjusting conduct to incorporate additional knowledge is pivotal for advancing through cognitive development stages.

Piaget's cognitive development theory delineates four childhood developmental stages: the sensorimotor stage (0-2 years), the pre-operational stage (2-7 years), the concrete operational stage (7-11 years), and the formal operational stage (11-19 years) (Weisz, 2018). McLeod (2024) asserts that Piaget's theory accentuates biological maturing and stages, highlighting the significance of 'readiness' in determining when to impart specific information or concepts. Piaget asserted that concepts should be taught to children only when they have reached the corresponding cognitive development stage. In the realm of cognitive psychology, diverse perspectives currently influence teaching practices, with Eggen and Kauchak (2014) emphasising the crucial role of teachers in fostering learners' active engagement in the classroom.

3.4. Vygotsky's social constructivist theory (1896 – 1934)

According to Selepe and Moll (2016), Vygotsky believed that cognitive development is driven by sociocultural activities, and that children need to learn how to use cultural tools provided by their environment in shared activities with more skilled individuals to develop new cognitive structures. This perspective posits that our thoughts are moulded by social and historical culture, suggesting that learning precedes development. Vygotsky's theory has played a pivotal role in the evolution of constructivism, a key learning theory in modern education (Eberwein, 2015). In Vygotsky's framework, the learning process unfolds through the zone of proximal development (ZPD), incorporating scaffolding to assist learners in reaching their potential learning capacities (Slavin, 2009). Vygotsky also advocates for cooperative learning setups among learners with varying ability levels in the classroom. In contrast to Piaget's theory, Vygotsky emphasises the importance of society and culture in promoting cognitive development from a sociocultural perspective, highlighting the strong connection between learning and external input (O'Donnell et al., 2009). Nonetheless, both Piaget and Vygotsky agreed that the process of acquiring sign systems adheres to an unchanging sequence of steps, and that learning involves acquiring signs through instruction and information from others.

As noted by Slavin (2009), Vygotsky's work is grounded in two primary concepts. Firstly, intellectual progress can only be comprehended within the historical and cultural perspectives of a learner's capability. Secondly, Vygotsky asserted that development hinges on the sign systems people encounter in their culture, aiding them in thinking, communicating, and problem-solving. Eggen and Kauchak (2014) assert that Vygotsky's developmental theory is sociocultural, highlighting the influences of social interaction, language, and culture on the evolving mind of a learner.

Vygotsky's theory accentuates the stimulus of adults or more informed peers as the catalysts for cognitive development, aligning with the concept of the ZPD. The ZPD denotes the disparity between what a child can independently reach and what is attainable with assistance from an experienced partner, such as a teacher (McLeod, 2023b). In simpler terms, the ZPD denotes the difference between a child's current developmental level and their potential level of development, which is revealed through problem-solving under adult supervision or in partnership with more competent peers (Vygotsky, 1978).

3.5. Bandura's social cognitive theory (1925 – 2021)

Bandura's social cognitive theory incorporates elements of both behavioural and cognitive theories. The theory of social learning, also recognised as modelling or mediated learning, is shaped by internal psychological processes like attention, memory, and motivation, alongside observable behaviour and its outcomes (Cherry, 2019a). Central to this theory are concepts such as mutual determinism, self-efficacy, and self-regulation. According to Bandura, observational learning is an interactive

process situated between stimuli and response, where positive behaviour is more likely to be imitated when demonstrated by good role models as opposed to negative ones. Social cognitive learning theory serves as a link between behaviourist and cognitive learning theories, emerging as one of the most prominent theories in the realms of learning and development (Nabavi, 2012).

To successfully replicate modelled behaviour, learners need to be attentive to the model's actions and conscious of the information being presented. As role models, teachers play an important part in capturing learners' attention and directing their awareness to the model's behaviour. The extent to which learners effectively imitate modelled behaviour depends on their level of engagement, awareness, and processing of the information demonstrated by the model. In the classroom, learning is not solely determined by external factors such as the academic environment and reinforcement from teachers and peers; it is also influenced by learners' individual thoughts, self-beliefs, and interpretations of the classroom context. Bandura (1986) characterises perceived self-efficacy as individuals' assessments of their capacity to arrange and carry out actions required to attain specific goals. Simply put, self-efficacy denotes an individual's confidence in their capacity to effectively execute a given task.

According to McLeod (2016), the internal mental states involved in observational learning and the modelling process are considered mediational processes that are essential components of social cognitive learning. Teachers serve as role models and are anticipated to serve as effective and efficient models for their learners. By behaving in ways that are beneficial to learner learning and development, teachers can shape and influence their learners' behaviour. Observing how a teacher behaves and responds in various situations has the potential to inspire learners to exhibit similar behaviour. Furthermore, teachers can foster the development of learners' self-efficacy by promoting confidence-building activities and offering constructive feedback, supporting the principles of social learning theory.

3.6. Flavell's theory on metacognition (1928 –)

Metacognition is the term used to describe one's knowledge of their own cognitive processes (Güner & Erbay, 2021). Flavell is considered a pioneer in the field of metacognition, having coined the term, and established an early model for it (Schmorrow & Fidopiastis, 2011). Flavell (1979) explains that higher-order thinking comprises an individual's operational control over their cognitive processes during learning. Özçakmak et al. (2021) propose that greater metacognitive awareness leads to better learning and academic achievement.

Flavell's model revolves around the cognitive monitoring process, wherein metacognitive knowledge, metacognitive experiences, aims, and actions interact. Metacognitive knowledge involves an individual's beliefs about how certain variables (person, task, and strategy category) can interact to impact the outcome of a situation. Those possessing strong metacognitive skills and responsiveness can leverage these processes to supervise their learning, strategically plan and monitor cognitive activities, and assess cognitive outcomes against internal or external benchmarks. Metacognition necessitates self-reflection and a recognition of mental processes, rendering it abstract and reliant on the capacity to reflect on intangible processes. Price-Mitchell (2015) highlights that metacognitive ability tends to increase with age, with the most significant growth observed between ages 12 and 15.

The authors contend that comprehending the brain and its operations can potentially revolutionise education, leading to the conversion of conventional classrooms into interactive learning spaces and facilitating the implementation of improved teaching methodologies. It is imperative for effective teaching strategies to take into account learners' cognitive developmental stages, their level of consciousness during the learning process, and their awareness of metacognitive abilities.

4. Methodology

4.1. Objective

For this study, the following main research question was formulated:

What are the opinions of learners regarding how the simultaneous use of different learning theories by teachers affects their ability to process information, and how this impacts their cognitive growth and development?

The following sub-question were formulated:

Is there a correlation between conscious awareness (CA), cognitive engagement (CE), metacognitive engagement (ME), and information processing ability (IPA) and what role do conscious awareness (CA), cognitive engagement (CE), and metacognitive engagement (ME) play in the information processing ability (IPA) of learners in the classroom?

4.2. Participants

The study adopted a non-experimental design to explore intricate relationships among variables using techniques such as Hierarchical Linear Modeling (HLM) and Structural Equation Modeling (SEM). The research employed a survey method, focusing on the Further Education and Training (FET) Phase Grade 11 learners in the Fezile Dabi Education district, South Africa. A multi-stage cluster sampling procedure was employed to select a sample based on probability, resulting in 840 Grade 11 learners representing 20 out of the 65 schools in the education district. The study obtained permission from the Free State Provincial Department of Basic Education, and ethical clearance was granted by the Faculty Research and Innovation Committee (FRIC) of the university.

4.3. Instrument

Data collection utilised a questionnaire as the primary instrument, featuring two sections. Section A encompassed demographic variables, while Section B comprised questions rated on a four-point Likert-type scale ranging from 'strongly disagree' to 'strongly agree.' Ensuring the questionnaire's validity involved conducting both exploratory and confirmatory factor analyses. Only items with a regression weight exceeding 0.3 were kept, constituting the final questionnaire. The reliability of the questionnaire items was evaluated using Cronbach's alpha in the SPSS statistical software program, and all statistical assumptions were satisfactorily met.

4.4. Procedure

The independent variables (IVs) included age, home language, language of learning and teaching (LOLT), average obtained, and average class size. The dependent variables (DVs) were conscious awareness (CA), cognitive engagement (CE), metacognitive engagement (ME) and information processing ability (IPA).

Utilising inferential statistics, the authors integrated both structural equation modelling (SEM) and hierarchical linear modelling (HLM) analyses to capitalise on the benefits of modeling both the hierarchical data structure and intricate relationships between variables. This approach significantly contributed to the development of more precise and dependable models and results. The authors employed HLM to evaluate the relative influence of independent variables on dependent variables. The selection of HLM was motivated by its advanced computational capability to manage the nested structure of the data, where learners are nested within schools.

These ANOVA-type HLMs were accomplished using conscious awareness (CA), cognitive engagement (CE), and metacognitive engagement (ME), as dependent variables. The HLM null hypothesis for the study included:

- There is no statistically significant distinction in the performance of learners (CA, CE, and ME) across various age groups.
- There is no statistically significant difference in the performance of learners (CA, CE, and ME) with different home languages.
- There is no statistically significant difference in the performance of learners (CA, CE, and ME) with different languages of learning and teaching (LOLT).
- There is no statistically significant difference in the performance of learners (CA, CE, and ME) with different overall averages obtained.
- There is no statistically significant difference in the performance of learners (CA, CE, and ME) with different average class sizes. (Methods should be described in detail).

5. Results

The authors surmise that investigating the concurrent influence of teachers' application of juxtaposed learning theories on learners' information processing ability for cognitive growth and development may provide insights into the matter of unsatisfactory performance among some learners.

The null hypotheses tested using HLM explained how the independent variables affected the dependent variables and their impact on learners' cognitive growth and development. The results indicated which independent variables had a significant impact on each dependent variable, and this information is summarised below.

CA - home language, average class size.

CE - home language, language of learning and teaching (LOLT), average obtained.

ME - home language, LOLT, average obtained.

IPA – age, home language, LOLT, average class size

Furthermore, the SEM analysis revealed a direct and positive impact of learners' conscious awareness (CA), specifically focused attention, on their information processing ability (IPA) in the classroom. This relationship is additionally affected by their cognitive engagement (CE) and metacognitive engagement (ME) as predictor variables. Notably, conscious awareness (CA) strongly influences both cognitive engagement (CE) and metacognitive engagement (ME), and in turn, both cognitive and metacognitive engagement (CE and ME) exert an influence on information processing ability (IPA). Figure 1 indicates the HLM and SEM results for learners.

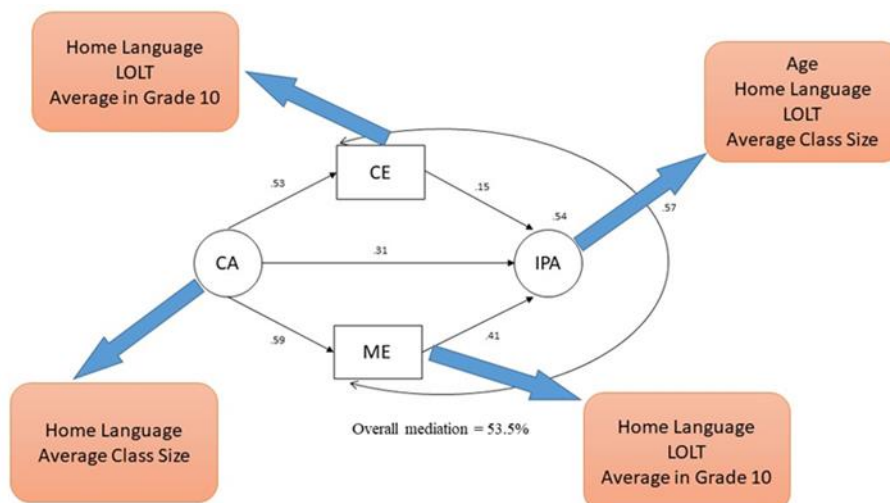


Fig 1. HLM and SEM analysis results for learners

Solis (2008) concurs that teaching should aim to promote engagement, which is supported by educational literature that highlights learner engagement as a necessary condition for effective learning. For learning to be meaningful, learners need to be engaged both cognitively and metacognitively. In Figure 1, the authors illustrate the relationship between the dependent variables and the various independent variables

that influence them. Against this background, the authors concurrently considered relevant learning theories in relation to each dependent variable to optimise the implementation of IPA.

6. Discussions

6.1. Juxtaposition of the various theories of learning and their educational implications

The authors aimed to investigate how teachers' use of contrasting learning theories in the classroom affects learners' attention and thinking, as well as how the teachers' skills and the classroom setting contribute to maximising learning outcomes. Figure 2 illustrates the intricate dynamics involved in capturing learners' attention when teaching is conducted with a deliberate effort to enhance their cognitive abilities and information processing skills through awareness, knowledge, and compliance with established principles. Figure 2 shows the Juxtaposed Learning Theories as applied to the Structural Equation Model (SEM).

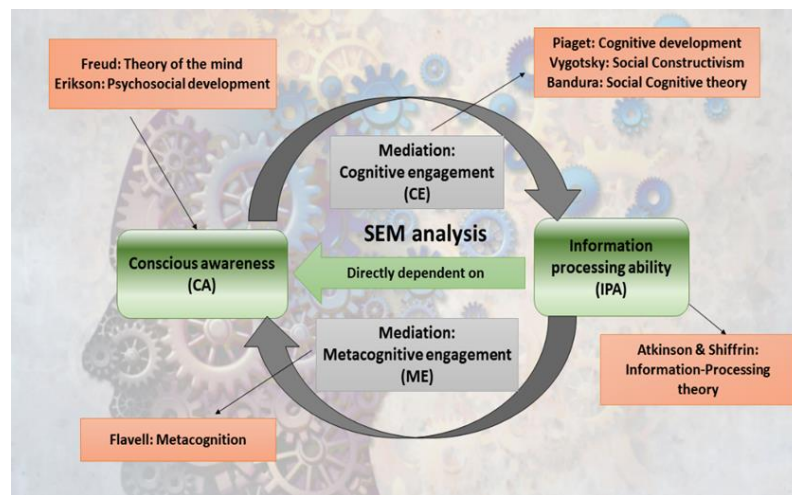


Fig 2. Juxtaposed learning theories as applied to the Structural Equation Model (SEM)

6.2. Juxtaposition regarding Conscious Awareness (CA)

Positive psychological factors such as awareness, engagement, and self-efficacy can enhance cognitive processes and impact a learner's cognition, as described by Freud, Erikson, and Bandura. According to Freud, a learner is constantly struggling with conflicting forces of the subconscious mind, which can distract them and make it difficult to focus in class. Awan (2017) emphasises the importance for teachers to recognise the power of a learner's unconscious drives over their conscious self, and to create a liberal teaching environment to facilitate learning.

Bandura's socio-cognitive theory proposes that learners should be consciously aware of the learning process and maintain attention until they have mastered the skill being taught. Teachers should endeavour to capture and sustain learners' interest to foster conscious awareness during the learning process in the classroom. Erikson's psychosocial theory highlights the impact of cultural and social context on a learner's ability to learn effectively, serving as a valuable insight for teachers.

David (2019) asserts that according to Bandura's social learning theory, thought is shaped by internal processes involving attention, memory, and motivation, which may not be as readily observable as behaviour and its consequences. Latief and Dar (2014) elucidate that learning relies on the effective utilisation of cognitive processes such as memory, attention, and cognitive strategies. While active learning can aid in

cultivating classroom attention, its practical implementation remains a challenge for teachers.

In this study, a hierarchical linear modelling (HLM) analysis was conducted to examine the influence of learner demographic variables on the establishment of interactive learning environments in South African schools. The findings substantiate the significance of conscious awareness in the classroom, aligning with the perspectives of David (2019) and Latief and Dar (2014).

6.3. Juxtaposition regarding Cognitive Engagement (CE)

The notion of acquired knowledge structures relates to what learners learn, and it is essential to grasp how they mentally establish connections or construct these structures for successful teaching and learning. Chen et al. (2011) contend that an instructional environment fostering interaction between teaching and learning, while recognising the significance of learners mentally connecting knowledge structures, employs strategies that prioritise learner well-being and encourage cooperative learning to enrich the educational experience. Research shows that positive learner engagement in the classroom can significantly improve academic achievement.

According to Slavin (2009), Vygotsky's theory places a strong emphasis on the benefits of cooperative learning among learners with varying abilities. In a Vygotskian instructional approach, scaffolding is a key concept, with learners gradually assuming more responsibility for their own learning. Vygotsky asserts that teachers should design activities that align with learners' capabilities while challenging them to learn with the assistance of their peers. Erikson emphasises the significance of Vygotsky's cooperative learning theory by highlighting the contemporary educational practice of reciprocal teaching, aimed at enhancing learners' text comprehension skills. In reciprocal teaching, teachers and learners collaborate on four essential skills: summarising, questioning, clarifying, and predicting. As learners become more proficient over time, the teacher's role diminishes.

Language is a critical tool for cognitive development, and teachers must use understandable language to explain concepts and constructs to learners. Teachers can use Vygotsky's ZPD theory to enhance learner thinking abilities by aligning subject presentation consistent with the learner's cognitive developmental age. Vygotsky contends that education should provide learners with experiences that match their ZPD, just as Piaget recommended that teachers tailor instruction to learners' cognitive developmental stages. Understanding the levels of the ZPD and the learners' stage of cognitive development is essential for effective teaching. Teachers can organise classroom activities that enable learners at different levels to assist each other, provide practice within the ZPD, and use scaffolding to gradually increase learner proficiency.

6.4. Juxtaposition regarding Metacognitive Engagement (ME)

According to research, a combination of various factors is important for effective learning, and learners need to utilise multiple resources simultaneously. Breed and Bailey (2018) suggest that cognitive resources and metacognitive resources, which are related to knowledge about information processing and available learning strategies respectively, are some of these resources. Schneider (2008) also emphasises that teachers should understand the information-processing model to effectively teach metacognitive awareness to learners. Flavell (cited in Krause et al., 2010) argues that children develop a complex theory of mind and mental processes as their capacity for abstract thought increases.

Price-Mitchell (2015) suggests several strategies that teachers can incorporate in their classrooms to enhance metacognition. These strategies involve educating learners about the growth mindset and how their brains are predisposed to growth, along with encouraging them to engage in reflective thinking about their learning and pinpoint areas of confusion. Establishing a culture of reflection, teachers can prompt learners to articulate what they found most perplexing about the material covered in

class. This not only stimulates metacognitive processing but also assists learners in acknowledging that confusion is a natural aspect of the learning process.

It is crucial for teachers to consider the importance of feedback and reflection. They can promote reflective thinking by offering opportunities for learners to reflect on classwork and giving constructive feedback. This process helps learners develop higher order thinking skills and recognise their cognitive growth. Reflexivity, which involves becoming aware of our biases and prejudices that hinder our healthy development, is a metacognitive process that teachers should encourage. Teachers can foster a classroom culture of deeper learning and reflexivity by promoting dialogue that challenges societal and human biases. Engaging in conversations or writing essays on topics such as politics, wealth, racism, poverty, justice, and liberty enables learners to "think about their own thinking," challenging their own biases and becoming more flexible and adaptable.

6.5. Juxtaposition regarding Information Processing Ability (IPA)

According to Breed and Bailey (2018), research highlights the significance of various factors in the learning process, indicating that learners need to utilise multiple resources simultaneously. Some of these resources, including knowledge about information processing (cognitive resources) and awareness of diverse learning strategies (metacognitive resources), are crucial for effective learning. (The results should be discussed and interpreted from the perspective of previous studies and the working hypotheses in the broadest context possible).

7. Conclusion

The focus of this study was on the relationship between various cognitive theories of learning, the variables involved in information processing by learners, and the strategies employed by successful teachers to facilitate efficient and effective learning. The dynamics of learning are complex and require reliable research to be properly understood. Therefore, this article discussed the application of different learning theories by teachers to improve learners' ability to process information. This was achieved using strategies that promote learner awareness, cognitive engagement, and metacognitive engagement. Ultimately, the goal of this study was to provide evidence for the effectiveness of these approaches and their impact on learner performance.

Based on the evidence presented, the authors conclude that understanding the various theories of learning and their juxtaposition can have a positive impact on learners' cognitive development. Furthermore, teachers who possess and apply this knowledge can promote learners' metacognitive engagement and improve their ability to understand how they learn. The study's findings, which include SEM and HLM analyses and implications from teachers' application of juxtaposed theories, suggest that inefficiencies may exist in certain teaching approaches and in individual learners' information processing. However, teachers who understand and apply the simultaneous impact of juxtaposed theories of learning can stimulate and cultivate learners' information processing ability by enabling them to assimilate or accommodate incoming information into their cognitive schema, leading to deeper and more meaningful understanding.

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