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Practical Application of Piaget's Cognitive Theory and Vygotsky's Sociocultural Theory in Classroom Pedagogy

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Abstract

This analytical-descriptive study explores the practical application of Jean Piaget's Cognitive Development Theory and Lev Vygotsky's Social Constructivism Theory in classroom pedagogy. The paper examines how teachers' instructional strategies and practices, including classroom environment, align with the principles of the two influential theories. In addition, the paper explores each theory's key principles, commonalities, and practical application in fostering student understanding, motivation, retention, and critical thinking. Through qualitative observation, five selected random YouTube videos were analyzed, ranging from kindergarten interactive writing to 11th-grade mathematics lessons. The study reveals how integrating Piaget's and Vygotsky's theories provides a comprehensive framework for classroom pedagogy. The results reveal how combined insights from cognitive and sociocultural perspectives allow educators to create more diverse and suitable learning environments. The combined approaches enhance student understanding and retention and are conducive to critical thinking and collaborative learning. The analysis highlights how both theories have shaped modern educational practices and learning environments, influencing teaching methods, curriculum design, and student engagement. By evaluating the effectiveness of cognitive and sociocultural instructional strategies, the paper offers valuable insights for educators seeking to enhance learning experiences and promote active, collaborative, culturally responsive teaching and developmentally appropriate learning

environments. Also, by illustrating the alignment between theoretical principles and classroom practices, this paper enriches the field of educational psychology by providing educators with actionable insights for creating appropriate and favorable learning environments and encouraging further exploration of how the theories can be integrated into modern educational practices.

Keywords: Cognitive Theory, Sociocultural Theory, Active Learning, Student Engagement, Critical Thinking.

1. Introduction

In educational psychology, theories of cognitive development help educators and psychologists understand how children learn and process information. Two of the most influential theories in the field are Jean Piaget's (1952) Cognitive Development Theory and Lev Vygotsky's (1978) Social Constructivism Theory. While Piaget emphasized stages of cognitive development driven by individual discovery and maturation, Vygotsky focused on the role of social interaction and cultural context in learning. The theories have shaped modern education by influencing teaching strategies, curriculum design, instructional methods, and learning activities that actively engage students' mental processes, fostering meaningful and lasting learning (Brown & White, 2023; Ormrod et al., 2020). The cognitive learning approach enhances students' understanding and retention.

Active learning strategies, such as collaborative group activities, peer learning, and problem-solving tasks, foster valuable skills and improve overall academic performance (Swiderski, 2017; Victoria Department of Education, 2018). Also, the idea that knowledge is constructed and developed through mental processes offers valuable insights into teaching methods and student engagement in the classroom (Ormrod et al., 2020). As a result, the paper explores the practical application and the in-depth understanding of each theory that allows educators to create developmentally appropriate and socially engaging learning experiences that support student growth.

1.1 Research Objectives

The paper aims to reflect on five randomly selected YouTube classroom pedagogy videos observed through the lens of Jean Piaget's Cognitive Theory and Lev Vygotsky's Sociocultural theory, analyzing and evaluating how the teachers' methods aligned with the theory's principles to support students' understanding, retention, and critical thinking. By observing the five selected videos: a writing lesson at the Rankin County School District, a Kindergarten Interactive Writing Lesson by Courtney Chan, a First Grade Literacy Lesson by Mr. A, a Science Life Cycle of Plants Kindergarten Lesson by Prudence Jamie Heusser and 11th Grade Mathematics lesson at Massachusetts DESE, the analysis explored the processes in action and assessed the effectiveness of cognitive and Sociocultural instructional strategies in the classroom. Also, the paper aims to shed more light, provide an in-depth understanding, and examine key principles, differences, similarities, and the practical application of cognitive and sociocultural theories in the classroom. It emphasizes both theoretical insights and practical strategies for teachers to enhance learning experiences for students.

1.2 Research Questions

1. How do Instructors apply Cognitive and Sociocultural theories to classroom pedagogy?

2. How do cognitive and sociocultural theories support students' effective learning in diverse settings?

3. How do cognitive and sociocultural theories complement each other in shaping classroom pedagogy?

2. Literature Review

The chapter defines key concepts, a theoretical framework, and other empirical studies on Cognitive Theory and Social Constructivism Theory in pedagogy. The chapter is a critical component of the paper, serving as a foundation for understanding existing knowledge of the two theories. The chapter helps build on previous studies to answer the research questions and engages in broader academic conversation, allowing for a more informed and credible contribution to the field (Booth, Sutton, & Papaioannou, 2021; Denyer & Tranfield, 2021). By synthesizing relevant studies, the paper highlights key aspects of the theories and their relevance to educational practices.

2.1 Jean Piaget's Cognitive Development Theory

Jean Piaget's 1950 Cognitive Development Theory has profoundly influenced the understanding of children's cognitive growth and development. The theory is considered groundbreaking in the field of developmental psychology and education. Piaget believed that children are not simply passive recipients of knowledge but actively construct their understanding of the world through interaction with their environment. The theory emphasizes the stages of cognitive development, the processes by which knowledge is acquired, and the mechanisms that support cognitive growth. As a result, at the heart of Piaget's cognitive theory are the four stages of cognitive development: the sensorimotor, preoperational, concrete, and formal operational Stages. Piaget proposed that these stages are universal, occurring in the same order for all children, but the age at which children enter each Stage may vary.

First is the sensorimotor stage (Birth to 2 Years). In this Stage, the theory believes that infants and toddlers begin to understand the world primarily through sensory experiences and motor activities. They gradually learn about object permanence, the realization that objects continue to exist even when invisible. Piaget's sensorimotor stage highlights the importance of sensory and motor activities in children's early cognitive development, demonstrating the emergence of object permanence (Turner & Hall, 2021). For instance, a six-month-old person might be able to search for a toy hidden under a cloth, demonstrating the understanding that the object still exists, even though they cannot see it. This Stage marks the transition from reflexive actions to intentional actions.

Second is the preoperational stage (2 to 7 Years). During the preoperational stage, Piaget's cognitive theory believes that children develop symbolic thinking, which allows them to use words, images, and symbols to represent objects and events. However, they will still struggle with understanding concepts such as conservation, egocentrism (difficulty in seeing things from others' perspectives), and reversibility (the ability to reverse actions mentally). Piaget's preoperational stage emphasizes the development of symbolic thought and the limitations in logical reasoning, including the lack of conservation and egocentrism" (Lee & Matthews,

2023). For example, a child in this stage might not realize that pouring water from a short, wide glass into a tall, narrow glass does not change the amount of water. This is because they focus on one dimension (height or width) rather than the concept of volume.

Third is the concrete Operational Stage (7 to 11 Years). The concrete operational stage marks the development of logical thought. According to the theory, children in this Stage can perform mental operations on concrete objects, meaning they can solve problems related to tangible things, such as understanding the concept of conservation or classifying objects. Piaget's concrete operational stage introduces logical thinking, where children can apply operations to concrete situations, such as understanding conservation and classification" (Brown & White, 2023). For example, children can know that the amount of liquid remains the same regardless of the container's shape (conservation) or that a cat is both an animal and a pet (classification). A typical classroom exercise at this stage involves asking children to sort out various objects based on shape or color. Children in the concrete operational stage could perform this task without confusion, demonstrating the ability to classify and group objects logically.

Fourth is the formal operational stage (12 Years and Older). According to the theory, children can think abstractly and hypothetically during the formal operational stage. They can reason about possible events or situations that do not have immediate real-world representations. Adolescents in this stage can think about hypothetical situations, consider different perspectives, and engage in deductive reasoning. Piaget's formal operational stage demonstrates the emergence of abstract and hypothetical thinking, crucial for complex problem-solving and reasoning" (Smith & Jones, 2023). For example, in a mathematics classroom, a 14-year-old student in the formal operational stage could solve complex algebraic equations by manipulating symbols, even without having a physical object to represent the problem. The ability to think abstractly marks a significant developmental milestone.

2.2 Key Concepts of Piaget's Cognitive Development Theory

In addition to the stages of cognitive development, Piaget introduced several key concepts integral to the theory. According to Piaget, children use schemas, mental structures, or frameworks that help them organize and interpret information, known as schemas and adaptation. As children interact with their environment, they adapt their schemas through assimilation and accommodation. Assimilation occurs when children apply existing schemas to new experiences, while accommodation involves changing or creating new schemas to fit new experiences. Piaget's concept of schemas and the processes of assimilation and accommodation are fundamental in understanding how children adapt to new information and experiences" (Martin, 2022). For example, a child with a schema for dogs (four-legged animals) may initially call a cat a dog. Over time, through accommodation, they will adjust their schema to differentiate between dogs and cats.

First, egocentrism is a characteristic of the preoperational stage, where children struggle to see things from others' perspectives. Children at this stage cannot understand that others may

have different thoughts, feelings, or viewpoints. In Piaget's theory, Egocentrism refers to a child's inability to adopt another person's perspective, particularly evident during preoperational (Turner & Hall, 2021). In Piaget's famous three-mountain task, a child was shown a model with three mountains and asked to describe what a doll from a different viewpoint would see. Children in the preoperational stage often describe the view from their perspective, failing to understand the doll's perspective.

Second, conservation refers to the understanding that specific properties of objects, such as quantity, volume, or number, remain the same despite changes in the object's appearance. Piaget argued that children in the concrete operational stage begin to grasp conservation concepts. Conservation is a key cognitive milestone in Piaget's concrete operational stage, illustrating the ability to understand that quantity remains constant despite changes in appearance (Brown & White, 2023). For example, Children in the concrete operational stage would understand that if a piece of clay is rolled into a ball and then flattened into a pancake shape, the amount of clay remains the same.

2.3 Application of Piaget's Cognitive Theory in Education

Piaget's theory has had profound implications for educational practices. The theory's emphasis on developmental stages has led to developmentally appropriate practices in the classroom, where educators create learning experiences that match children's cognitive abilities. Piaget's focus on active learning supports pedagogical methods encouraging exploration, experimentation, and discovery. First, Piaget's theory supports constructivist teaching practices emphasizing learning through active engagement with the environment. In this context, teachers are viewed as facilitators who guide students in exploring and discovering concepts independently. For example, science teachers may encourage hands-on experiments that allow students to test hypotheses and observe outcomes, fostering a deeper understanding of scientific concepts.

In addition, Piaget's stages highlight the importance of differentiated instruction, where teachers adjust their teaching methods to meet the needs of students at various developmental stages. Piaget's theory informs differentiated instruction practices, ensuring that teaching methods align with the cognitive developmental stages of students (Lee, 2022). For example, in a classroom, elementary students may engage in activities that require manipulating physical objects. In contrast, middle and high school students can work on more abstract problem-solving tasks.

2.4 Lev Vygotsky's Sociocultural Theory

Lev Vygotsky's Sociocultural Theory, first articulated in the early 20th century and expanded upon in his 1962 work, emphasizes the fundamental role of social interaction, culture, and language in cognitive development. Unlike Piaget, who focused on individual mental processes, Vygotsky argued that mental development is a collaborative process heavily influenced by social and cultural contexts. According to Vygotsky, learning occurs through interactions with more knowledgeable others, such as peers, parents, or teachers.

2.5 Key Concepts in Vygotsky's Sociocultural Theory

First is Social Interaction and the Role of Culture. Vygotsky proposed that cognitive development is deeply embedded in social interaction and cultural contexts. Children's mental abilities, including thinking, problem-solving, and reasoning, are shaped by their interactions with others, particularly those who are more skilled. Culture plays a significant role, providing tools (such as language, symbols, and practices) that shape cognitive processes. Vygotsky's theory emphasizes that cognitive development is a socially situated process where the child's interaction with others is critical in shaping their cognitive abilities (Smith & Lee, 2023). For example, a child learning to count may be taught by a parent or teacher demonstrating how to use counting strategies. In this process, the theory believes the child learns the mechanics of counting and internalizes cultural practices surrounding numbers and math, which are passed down through social interactions.

Second, One of Vygotsky's most influential concepts is the Zone of Proximal Development (ZPD). The concept refers to the gap between what a learner can do independently and what they can achieve with assistance from a more knowledgeable other. The concept emphasizes that learning is most effective when students are engaged in tasks slightly beyond their current ability but can be accomplished with guidance or collaboration. The ZPD suggests that teaching should focus on challenging but achievable tasks with support, fostering optimal cognitive development. Vygotsky's Zone of Proximal Development highlights the importance of tailored instruction that provides enough support to bridge the gap between what a student can do alone and with guidance (Turner & Hall, 2021). For example, the theory believes that a child who can solve simple addition problems might struggle with more complex subtraction tasks. A teacher working within the child's ZPD might scaffold the learning by providing hints, asking guiding questions, and offering praise. As the child begins to master subtraction, the teacher gradually removes the support, allowing the child to perform independently.

Third, the concept of scaffolding is closely related to the ZPD, which refers to the support that a more knowledgeable individual (teacher, parent, or peer) provides to help learners accomplish tasks within their ZPD. Scaffolding involves the gradual removal of support as the learner becomes more competent. As children progress in their ability to perform a task, the adult or peer support is gradually reduced, allowing the child to take on more responsibility for their learning. Scaffolding is a key concept in Vygotskian theory, as it allows learners to accomplish tasks beyond their current capabilities, with support that gradually fades as they gain independence (Brown & White, 2022). For example, in a classroom setting, a teacher might help a student write a story by first offering prompts and providing examples. As the student gains confidence, the teacher might reduce the assistance, encouraging the student to write independently. This gradual removal of support is the essence of scaffolding.

The fourth concept is Language and Thought. Vygotsky believed that language plays a central role in cognitive development. He argued that language is not merely a tool for

communication but a fundamental tool for thinking and reasoning. According to Vygotsky, language helps to structure thoughts, allowing individuals to internalize their thinking and regulate their behavior. In young children, external speech (talking aloud) gradually becomes internalized, becoming inner speech that helps them think and solve problems independently. Vygotsky emphasized that language is a tool for cognitive development, providing a foundation for higher-order thinking, self-regulation, and problem-solving (Lee, 2022). For example, a child might talk through the steps of solving a math problem aloud, such as, "First, I add the tens, then I add the ones." Over time, this external speech becomes internalized, and the child no longer needs to speak out loud to think through the problem.

The fifth concept is Cultural Tools and Artifacts. Vygotsky also highlighted the importance of cultural tools and artifacts in cognitive development. These tools, which include language, writing systems, mathematical notations, and technology, help individuals perform tasks and solve problems. Cultural tools are passed down through social interactions and become internalized as cognitive processes. The tools enable individuals to perform complex mental functions that would not be possible with innate abilities alone. Vygotsky's theory stresses the importance of cultural tools and artifacts in shaping cognitive development, as these tools are essential for performing higher-order tasks (Martin & Turner, 2023). For example, a child learning to use a calculator in mathematics uses a cultural tool that allows them to solve mathematical problems more efficiently. While a tool, the calculator also facilitates cognitive development by enabling the child to solve problems that would otherwise be too difficult.

2.6 Practical Applications of Vygotsky's Sociocultural Theory in Education

Vygotsky's theory has significantly impacted collaborative learning, where students work together in pairs or small groups to solve problems and complete tasks. Students can learn from each other in these settings, sharing knowledge and engaging in joint problem-solving. Collaborative learning is particularly effective because it allows students to interact and communicate, promoting cognitive and social development. Vygotsky's emphasis on social interaction and collaboration has led to the widespread adoption of collaborative learning strategies that enhance cognitive development and social skills (Smith & Jones, 2023). For example, in a science class, students might work in small groups to experiment, discussing their hypotheses, sharing observations, and interpreting results together. This collaborative process helps them learn the scientific content and how to work effectively with others.

Also, scaffolding has influenced many instructional practices, where teachers provide gradually withdrawn support as students gain competence. In modern classrooms, teachers often use scaffolding techniques such as prompting, questioning, and providing feedback to help students engage with tasks within their ZPD. Scaffolded instruction, grounded in Vygotsky's ZPD, allows students to build their skills progressively, receive support when needed, and gradually increase their independence (Brown & White, 2023). For example, a teacher in a reading class might begin by reading a story aloud to the class, providing vocabulary explanations, and asking questions. Over time, the teacher reduces the level of

support, encouraging students to read independently and make their interpretations of the text.

Moreover, peer tutoring and mentoring are practical applications of Vygotsky's sociocultural theory. In this model, more knowledgeable peers assist their classmates in learning new concepts. Peer tutoring allows students to engage in social interaction while also allowing them to internalize knowledge by teaching it to others. As an application of Vygotsky's theory, peer tutoring promotes social learning by allowing more capable students to support their peers in the ZPD (Martin, 2022). For example, advanced students might help classmates with complex algebraic problems, explaining and demonstrating problem-solving techniques in a mathematics classroom. The peer-to-peer interaction benefits both the tutor and the tutee, as the tutor strengthens their understanding by teaching and gains personalized support.

2.7 Complementing Aspects of Piaget's and Vygotsky's Theories in Pedagogy

Jean Piaget's Cognitive Theory (1950) and Lev Vygotsky's Sociocultural Theory (1962) both offer valuable insights into the development of children's cognitive abilities. While they focus on different aspects of the cognitive process, their beliefs complement each other. Piaget's theory emphasizes the individual's active role in constructing knowledge through stages of development, where cognitive structures evolve through interaction with the environment (Piaget, 1950). In contrast, Vygotsky's theory stresses the importance of social interaction and cultural context, arguing that cognitive development is deeply influenced by social interactions and the tools provided by the culture (Vygotsky, 1962). The two beliefs complement each other and provide a comprehensive view of teaching and learning by providing a holistic view of how children acquire knowledge in different contexts.

a. Active Learning versus Social Interaction

Piaget's theory emphasizes that children actively construct their knowledge through interaction with the environment and through distinct cognitive stages. For example, in the concrete operational stage, children develop the ability to think logically about concrete events, which means that teachers should provide opportunities for hands-on learning experiences, such as science experiments, to foster development (Piaget, 1950). On the other hand, Vygotsky's sociocultural theory suggests that cognitive development is significantly influenced by social interaction and cultural context. He introduced the concept of the Zone of Proximal Development (ZPD), which refers to tasks that a child cannot complete independently but can perform with the help of more knowledgeable individuals, such as a teacher or peer (Vygotsky, 1962). In teaching, the theories complement each other by suggesting that children need independent discovery (as emphasized by Piaget) and social guidance (as emphasized by Vygotsky) to maximize learning. For example, a teacher may provide a child with an activity they can perform independently, like sorting objects, which aligns with Piaget's emphasis on active learning. However, when the child faces challenges, the teacher can provide scaffolding (Vygotsky's ZPD) to help the child complete the task, thus fostering deeper learning through social interaction.

b. Learning through Interaction and Culture

Vygotsky's theory stresses the importance of cultural tools, language, and social interaction in learning. He believed that cognitive development is not just an internal process but is deeply embedded in cultural contexts and influenced by interactions with others. For example, Vygotsky argued that language is a central tool for cognitive development, as it allows for communication, reflection, and problem-solving (Vygotsky, 1962). Teachers apply this by encouraging collaborative activities such as group discussions or peer tutoring, which provide opportunities for students to share ideas and language, thus enhancing their cognitive development.

Piaget's theory, while acknowledging the importance of social interaction, places more emphasis on individual learning. However, in a classroom setting, Piaget's idea of cognitive conflict, where students encounter challenges that require them to adapt to their thinking, can complement Vygotsky's focus on social interaction. For instance, students might encounter conflicting views during group work, which forces them to reorganize their understanding and build new cognitive structures (Piaget, 1950). The scenario reflects how Piaget's focus on cognitive conflict can be integrated with Vygotsky's social learning approach.

c. Scaffolding and Developmental Stages

One clear example of how the theories complement each other is the application of scaffolding, a concept rooted in Vygotsky's ZPD, in the context of Piaget's stages. Vygotsky emphasized the importance of guidance in the ZPD to help children perform tasks they cannot complete independently. For example, in teaching mathematics, a teacher may guide a student through solving a problem and providing support as needed. As the student becomes more competent, the teacher gradually withdraws support, allowing the student to become more independent (Vygotsky, 1962). Piaget's stages suggest that children of different ages can handle different cognitive tasks. For instance, a child in the preoperational stage (around ages 2-7) might struggle with tasks requiring logical thinking, such as conservation tasks, which Piaget identified (Piaget, 1950). In this case, a teacher can use scaffolding by providing concrete examples or visual aids to help the child understand abstract concepts. As the child matures and enters the concrete operational stage, the teacher can reduce scaffolding and encourage more independent thinking, aligning with Piaget's stage theory.

In teaching and learning, Piaget's Cognitive Theory and Vygotsky's Sociocultural Theory work together to provide a well-rounded understanding of how children develop cognitively. Piaget's emphasis on individual cognitive development through active learning complements Vygotsky's focus on social interaction and cultural context. Teachers can apply both theories by offering students opportunities for hands-on exploration (Piaget) while engaging them in collaborative learning and providing scaffolding (Vygotsky).

3. Research Methodology and Data Collection

The study adopted a qualitative random sampling approach through critical lesson observation.

Qualitative random sampling is a technique used in research to select participants or cases to ensure diversity and capture a wide range of perspectives. The approach is employed alongside critical observation, which involves actively engaging with the study context to interpret social phenomena through a lens that questions established assumptions (Creswell & Poth, 2018). Critical observation encourages research to examine the overt and subtle dynamics within a given environment, fostering a deeper understanding of the subject's complexities (Flick, 2020). By combining qualitative random sampling with critical observation, the paper gives rich, contextually grounded data that offers insights into pedagogical practices while remaining open and unbiased to emerging themes and findings.

3.1 Data collection

The study collected data by randomly selecting five YouTube classroom pedagogy videos and observing through the lens of Jean Piaget's Cognitive Theory and Lev Vygotsky's Sociocultural theory. The five selected videos include a writing lesson at the Rankin County School District, a Kindergarten Interactive Writing Lesson by Courtney Chan, a First Grade Literacy Lesson by Mr. A, a Science Life Cycle of Plants Kindergarten Lesson by Prudence Jamie Heusser, and 11th Grade Mathematics lesson at Massachusetts DESE.

4. Data Analysis and Discussion

The chapter systematically applies the logical technical lens of Piaget's and Vygotsky's Theories in five observed lessons ranging from kindergarten through 11th-grade mathematics to evaluate and interpret the data without bias. The process is crucial in organizing and modeling the data to identify meaningful relationships and make informed conclusions (Field, 2023). Also, the chapter interprets results in discussions about the significance and application of Piaget's and Vygotsky's Theories in the observed classroom lessons (Brysbaert & Rastle, 2023). The discussions provide deeper insights into the findings and help frame future research.

Observed Lesson I *(Elementary Writing Lesson at Rankin County School District)*

At the beginning of the observed lesson (YouTube), the teacher engaged the students by using Activating Prior Knowledge. The activation of prior knowledge enhances the learning process by making new material more meaningful and more accessible to retrieve (Bransford, Brown, & Cocking, 2000). Connecting new information to prior knowledge allows students to integrate and organize ideas more effectively, which is central to cognitive learning theory (Eggen & Kauchak, 2022, p. 153). For example, in the observed video, the teacher reviewed the previous writing lesson on "Running" with the students, which had an introduction, materials, and the body on how to run. She also asked students questions on "running" to engage and activate them into the day, which cognitive perspective theory encourages.

During the observed lesson, the teacher used a brainstorming method that aligns with cognitive perspective theory. Research shows that structured stages in brainstorming help focus students' cognitive efforts on understanding and solving issues meaningfully (Al-Samarraie & Hurmuzan, 2018). The collaborative nature of brainstorming can lead to a

broad range of perspectives, promoting more profound understanding and critical reflection among students (Paulus et al., 2006). For example, the teacher paired students to brainstorm individually during the lesson. When Taylor was paired with Maylee, they helped each other discuss by sharing what they knew about gymnastics and bats. Andrew and Stella were also paired to discuss dogs (puppies) and leaves. This brainstorming process made the students understand the topic they were supposed to write about faster without wasting too much time reading from books, which made their writing easier. The information from brainstorming and applying it aligns with cognitive perspective theories, highlighting the importance of active learning and application for deeper understanding.

Moreover, the teacher encouraged Critical thinking and scaffolding, which supports cognitive learning theories. Critical thinking enhances writing skills and prepares students to approach real-world texts critically, fostering transferable critical thinking skills applicable beyond academic settings (Wilson & Dahl, 2022). Cognitive approaches aim to nurture well-rounded, thoughtful writers capable of tackling complex ideas with insight and clarity by focusing on interactive, critical exercises. Effective cognitive learning involves scaffolding, where teachers provide temporary support that enables students to perform tasks they could not accomplish independently, gradually removing this support as students gain competence (Santrock, 2023, p.58). For example, after the teacher paired students to brainstorm in the observed lesson, she separated them to have individual work. She encouraged them to keep quiet so that they could focus and think individually to develop proper writing using the already brainstormed clues. She also assisted them individually in staying on track and discussed some critical ideas on the topic to enhance writing, assuring them to visit later.

Furthermore, graphic organizers, such as concept maps and images, help students visualize relationships between different topics and concepts. Cognitive theory emphasizes that organizing information into meaningful structures aids in encoding it into long-term memory (Mayer, 2017). For example, during the critical thinking period, the teacher checked on individual students to see how well they wrote on their topics. She encouraged a student to guess from images she showed from the beach. The numerous supplies available in the classroom environment help students visualize and interpret cognitive perspective theory.

Finally, during the writing lesson, the teacher encouraged metacognition through reflection and feedback, which is what the cognitive perspective theory insists on. The lesson's conclusion, where students shared their work and received feedback, reflects the cognitive emphasis on metacognition, or the process of "thinking about thinking" (Flavell, 1979, p. 906). This activity encouraged students to reflect on their writing process, assessing their work and the steps they took to complete it. The teacher also allowed some students to step forward and read what they wrote, which helped prepare young students for public speaking and academic confidence.

Observed Lesson II *(Kindergarten Interactive Writing Lesson)*

The teacher started the lesson by revising the previous knowledge concerning what the students knew and had spoken previously on grasshoppers. According to Cognitive theory, if

the new information is about existing knowledge, it is easily assimilated; if not, prior knowledge may need to be adjusted to make sense of it (Jean Piaget, 1952), which the teacher did. Also, Strategies that activate prior knowledge are essential for self-regulated learning, as they help students approach new material with an understanding of how their existing knowledge relates to the topic (Schraw et al., 2012). The teacher then introduced the topic for the day by showing a book with a big grasshopper at the back and told students that they would write some sentences about grasshoppers. She started by showing grasshopper images with written sentences below and encouraged students to read together loudly and repeatedly, "grasshoppers are insects," to ensure mastery before adding a sentence.

Piaget's Cognitive theory emphasized the importance of active learning and the role of repetition in developing cognitive structures. His theory aligns with the idea that learners must repeatedly engage with materials to internalize concepts fully. The scholar suggests that the goal of education is not to teach knowledge but to teach how to learn and use one's mental structures" (Piaget, 1952). According to Vygotsky, multimedia tools can aid cognitive development when used repetitively. What a child can do with assistance today, she can do by herself tomorrow (Vygotsky, 1978). He believes audiovisual materials allow learners to access social and cultural knowledge through repeated interactions, facilitating a more profound understanding. These show that the teacher's observed interactive writing lesson supports the descriptions of cognitive theory.

In brainstorming, the teacher began to engage the students by asking them what they could see from the image. Catherine: They were jumping. Tanya: They were brown. Mia: They have dots on them. Jasmine: They have black and brown dots. In the form of scaffolding, which Jean Piaget and Lev Vygotsky believe in, the teacher then led the students to use all they had said about the grasshoppers to form more sentences by saying, "Grasshoppers are insects. They are black and brown". After the kids repeated their new sentences formed through the guidance of the teacher and learning materials, the teacher asked each student to write either a word or part on the marker board to complete the sentence "They are black and brown". Vygotsky emphasizes that scaffolding is crucial in helping learners progress within their ZPD, ensuring they can eventually accomplish tasks independently. The teacher's role is to facilitate the child's development by providing support within the child's zone of proximal development" (Vygotsky, 1978). While Piaget did not use the term scaffolding, his work on cognitive development focuses on the role of interaction, guidance, and support in learning. Piaget's concept of "assimilation" and "accommodation" about cognitive development parallels the notion of scaffolding, as learners need external help to adapt their schemas.

In the form of a recap, the teacher asked the students to finally draw grasshoppers individually. She encouraged them to write the sentences below their drawing. In the form of positive feedback, which again aligns with Jean Piaget's and Lev Vygotsky's Theories, the teacher asked the students to touch their backs and say to themselves; I am such a great writer. Piaget's cognitive theory suggests that positive feedback and rewards can encourage the construction of knowledge and understanding in children. The most important function of education is to create individuals capable of doing new things, not simply repeating what

other generations have done"(Piaget, 1952). Through others, we become ourselves (Vygotsky, 1978). The quote reflects how positive feedback from others, such as teachers or peers, shapes and strengthens a child's learning process, reinforcing the value of social encouragement in cognitive development.

Observed Lesson III *(Literacy Lesson First Grade)*

In the observed lesson, the teacher introduced the topic as a warm-up question: Is our world the same as it was long ago? He asked the students to repeat the question loudly. He quickly reviewed the words in the background knowledge with the students. I am thinking of a word that means something you do to relax, like watching TV, going shopping, reading books, or doing something you do for fun to relax. Kids: Entertainment. This is a word that is not happening now, and it is not happening a couple of days from now, but it has happened already. It happened over a century ago; it is not present or future. Kids: Past. This word happened one hundred years ago; it has a soft "c" sound at the beginning. Kids: Century. The critical thinking approach used by the teacher at the beginning of the Literacy Lesson for first graders is what Piaget's and Vygotsky's theories preach. In teaching, Piaget's cognitive theory highlights the importance of providing learners with opportunities for hands-on learning, problem-solving, and intellectual challenges that encourage them to think critically and adapt to new information (Piaget, 1952). Critical thinking, according to Piaget, emerges when students are encouraged to explore, question, and test ideas actively rather than being passive recipients of information.

Regarding critical thinking, Vygotsky highlighted the importance of scaffolding, where more knowledgeable individuals (e.g., teachers or peers) support learners in solving problems they cannot yet solve independently. This support helps students stretch their cognitive abilities and develop higher-order thinking skills. From Vygotsky's perspective, critical thinking is developed through guided interactions and collaborative problem-solving. Engaging in dialogue encourages learners to evaluate, reflect, and critique ideas, developing critical thinking skills.

Also, in brainstorming, the teacher asked the students to talk to their paired partners about what had changed. Were there cars a long time ago? Did people have telephones a long time ago? The teacher followed up on each group and asked several questions like, were there televisions long ago? Did they have remote controls a long time ago? After a while, students were asked to pay attention and share what they had discussed in groups with the class. Joseph: In the past, there were no telephones. The teacher repeated the sentence with the entire class. Whether or not the teacher is aware, using the brainstorming approach supports Piaget’s and Vygotsky's theories. From Piaget's perspective, brainstorming is valuable because it encourages learners to engage in active exploration and cognitive conflict (Piaget, 1952). When students brainstorm, they are prompted to reflect on their existing knowledge, make connections, and challenge their assumptions. This process supports cognitive growth by promoting the assimilation and accommodation of new ideas, which Piaget believed are crucial for cognitive development. For Vygotsky, brainstorming activities in a social setting

are potent because they allow dialogue, where students can share, refine, and challenge each other's ideas. Dialogue helps learners extend their thinking beyond what they can do individually. Brainstorming also fosters critical thinking as students negotiate meaning, learn from peers, and incorporate diverse perspectives into their understanding (Vygotsky, 1978).

Moreover, during the observed lesson, the teacher showed images through multimedia with different descriptive details like clothes, cameras, and paintings showing the past, present, and future for students to predict. Image one: Students, this is the past. Image two: Students: present. Image three: Students: future. Then, the teacher asked the students to discuss in groups again the differences they could identify from the three descriptive pictures and what each represents. In the form of a question, the teacher asked the students to give a sentence to explain a difference in the past, present, and future based on the pictures. Maria: At present, the mom is cooking on a stove. Mohammed: In the past, she was using fire. The teacher now asked each student to write their predictions about a story they would learn based on what was discussed in the class. Ben: The story talks about how homes were different; in the past, everybody lived in one room, and in the present, houses have many rooms. Ben: Long ago, people planted vegetables, and today, people go to grocery stores like Walmart for vegetables. The use of displays by the teacher aligns with what Piaget and Vygotsky emphasized in their theories.

Both Piaget's and Vygotsky's theories acknowledge the importance of active engagement in learning but offer different perspectives on how multimedia can support engagement. Piaget views multimedia as supporting cognitive development through exploration and interaction with the environment, encouraging learners to construct their knowledge at different stages of development (Piaget, 1952). Vygotsky emphasizes the role of social interaction and scaffolding, suggesting that multimedia can serve as a tool for collaborative learning and providing learners with the support they need to advance their understanding within their Zone of Proximal Development (Vygotsky, 1978). In closure, the teacher asked the students to write their opinions on the topic for the day, whether they would prefer to live in the past or present, by giving two reasons.

Observed Lesson IV *(Science Life Cycle of Plants Kindergarten Lesson)*

During the observed kindergarten science lesson, the teacher started by showing an object and asking; raise your hand and tell me what this is. Scotty: It is a plant. The teacher asked the students to tell her what they could notice about the plant. Students: It has a leaf on it. The teacher reached the students to touch it and told them it was a calla lily plant with no flower on it. The teacher asked the students what they remembered about what they had previously discussed on the life cycle, like butterflies. Tatum: Plants are living things. Student: They get their food from the sun. In the display form, the teacher showed on the board sowing seeds, soil, sprouts, stems, bees, leaves, roots, and flowers.

According to Piaget, learning occurs through assimilation, which integrates new information into existing schemas, emphasizing the importance of revising previous knowledge. Piaget argued that learners must actively engage with the world around them, exploring and

questioning their surroundings to trigger cognitive change. The process called equilibration is what Piaget believes: when learners encounter new information that does not fit into their existing cognitive structure, they must revise their thinking (Piaget, 1952). Vygotsky emphasized the social and cultural aspects of learning, mainly through interactions with more knowledgeable others, such as teachers and peers. For Vygotsky, the learning process is mediated by language and the social environment, and questions play an essential role in this social interaction. His introduction of Zone of Proximal Development (ZPD) suggests that learners can accomplish tasks they cannot do independently through guided interaction (Vygotsky, 1978). In this context, starting the lesson with questions on the plant object and what students remember about the previous lesson from the science teacher allows learners to negotiate meaning and expand their understanding within their ZPD. Teachers or peers can scaffold learning by assisting or asking thought-provoking questions, encouraging learners to revise their existing knowledge and think more deeply. Vygotsky emphasized that interaction helps bridge the gap between what a learner knows and what a learner can learn with support.

In addition, the teacher used images to demonstrate how bees move from one flower to another by transferring pollen grains, known as pollination. Afterward, she showed a relevant video, "Let's Learn About Plants," singing about growing plants so students could pay attention, listen, and sing along. She followed up by asking students what they saw from the video. Scotty: I saw fruit. Student: Plants need food, sun, and water to grow. Mary: They need water and sunlight. The teacher showed another video, "Pollination," that sings about pollination. She asked students to mention one creature of pollination according to the video watched. Mary: Bees. Gabby: Butterflies. Through experimentation, the teacher gave each student a bowl with soil inside and gave three seeds and water to each student to spray the water on. In a form of discussion and brainstorming, she asked the class to guess some important reasons why we grow plants. Students: Because we get food, strawberries, fruits, and vegetables.

Using a multimedia display (images, videos) and brainstorming (group discussion) approach by the science teacher aligns with both Piaget's and Vygotsky's theories. Jean Piaget's cognitive development theory emphasized active learning, where learners use materials and experiences to build cognitive structures (schemas). Multimedia can be seen as a tool that supports active engagement. According to Piaget, learners construct knowledge by interacting with their environment, and multimedia, through visual, auditory, and interactive elements, can facilitate this by providing varied stimuli that stimulate cognitive development (Piaget, 1970). In this context, the teacher's use of images and two relevant animated videos provide learners with concrete experiences that help them form mental representations of abstract concepts, aligning with Piaget's views on assimilation and accommodation. Lev Vygotsky's theory of the Zone of Proximal Development (ZPD) suggests that learners can achieve higher levels of understanding with guidance from more knowledgeable others (Vygotsky, 1978). In this context, the proper display of videos and images collaboratively and guidance from the teacher enhance the ZPD by offering scaffolding and providing learners with tools and resources to advance their thinking.

Also, collaborative teaching and learning processes enhance cognitive development and reinforce the importance of communication. Both Piaget and Vygotsky acknowledge the importance of social interaction and dialogue in cognitive development. For Piaget, brainstorming encourages the active construction of ideas, allowing learners to test and refine their concept understanding (Piaget, 1970). For Vygotsky, brainstorming promotes social learning as learners exchange ideas, negotiate meanings, and help each other progress through their ZPD (Vygotsky, 1978). In closure, students were asked to color, cut, and arrange the process of planting a seed using the images of seed, sprout, root, and stem. Also, they were to take their planted seeds home and keep watering to avoid dying.

Observed Lesson V *(11th Grade Mathematics)*

During the observed 11th Grade Mathematics lesson at Massachusetts DESE, the Teacher began with a question on a displayed image: "Does anybody know who this gentleman is?". Danny: That is Michael Phelps. Teacher: What is he famous for? Student: He is famous for winning eight Olympic gold medals at the Beijing Olympics and has the record for most Olympic medals of all time. Teacher: Awesome. I take it as if you are a swimmer. Student: A little bit. The Teacher then asked the class: If you were going to swim in the 2016 Olympics, what would you need to know about Michael Phelps? Student: You do not need to know anything because he is retired. Teacher: Okay, if you were still going to be in the 2016 Olympics and wanted to win a medal, what would you need to know? Shelby: The average speed he usually goes, and you would want to try to beat his speed by practicing and getting faster. Teacher: Excellent, you need to know how fast he speeds. So, you may want to predict how fast he will go so that you will know how fast you need to swim.

Regarding digital displays from the mathematics teacher to trigger learning, Piaget's cognitive theory views them as tools that enhance learning only if used in ways that align with the learner's developmental stage. Jean Piaget's theory of cognitive development emphasizes that children learn through active interaction with their environment and construct knowledge through stages of development (Piaget, 1952). Piaget focused on how learners construct knowledge through concrete and abstract interactions with the world (Piaget, 1952). He believed that children move through stages, from sensorimotor (for younger children) to formal operational (for older children), and their ability to understand digital content would vary based on these stages.

Lev Vygotsky's theory, on the other hand, emphasizes the importance of social interaction, cultural tools, and the zone of proximal development (ZPD) in learning (Vygotsky, 1978). He views digital displays as tools to help scaffold learning, mainly when used with social interaction or collaborative learning. According to Vygotsky, learning occurs most effectively within the ZPD, the difference between what a learner can do independently and what they can do with guidance from a more knowledgeable other (Vygotsky, 1978). In the context of digital displays, tools such as educational apps, simulations, and multimedia can serve as scaffolds that provide the necessary support to help learners accomplish tasks they cannot yet complete on their own. These displays can help to mediate learning by presenting information

in various formats, such as text, images, and sound, which are more engaging and accessible to students from diverse cultural backgrounds (Vygotsky, 1978).

Also, the warmup question used by the Teacher at the beginning of the lesson, seeking students' previous relevant knowledge on the image, aligns with what Piaget and Vygotsky's theory preaches. Piaget suggested that when learners encounter new information, they first try to assimilate it into their existing schema. If the new information does not fit, they must accommodate by adjusting their schemas to integrate the new knowledge (Piaget, 1952). In Piaget's view, reviewing previous knowledge would help students strengthen their schemas, making it easier to assimilate new information effectively.

According to Vygotsky, reviewing previous knowledge is critical, which helps establish the learner's current level of understanding. Teachers can better scaffold new learning within the ZPD by understanding what a student already knows. This means the Teacher can identify the gaps in knowledge and provide the necessary support to help the student advance to the next level of understanding (Vygotsky, 1978). The review of previous knowledge, therefore, allows for effective scaffolding of learning experiences. Vygotsky emphasized that learning is best supported through social interaction, such as collaboration with peers or teachers. Reviewing prior knowledge in the classroom allows students to discuss what they already know, thus creating a shared foundation. Teachers and peers can use this shared knowledge to provide scaffolding, guiding learners to more complex understandings (Vygotsky, 1978). The social aspect of reviewing helps reinforce the learning by giving students opportunities to articulate their prior knowledge and engage with others.

The Teacher continued the lesson by introducing the topic for the day: Today, we will look at the 100-meter dash for the men's 100-meter dash. She then gave data to all students with time and speed for the men's 100-meter dash from 1900-1996. I want everyone to have private thinking time about this data individually. Think about how you are going to graph this. Think about your X and Y axis, labels, and everything. After private thinking, we will do the work in groups. After a while, the Teacher asked students to be in groups and decide how they wanted to set up their graph and scatter plot, come up with the best correlation coefficient, and estimate the correlation coefficient. During the group discussion, the Teacher visited each group and provided support, ensuring they stayed on track. In the form of a guide, she asked students to guess how they could predict the graph would be a straight line. Student: There is no curve.

In Vygotsky's framework, critical thinking develops when learners are guided through tasks beyond their current abilities within their ZPD. The Teacher or peer provides scaffolding to help students think critically and solve problems they cannot independently solve (Vygotsky, 1978). The ZPD involves a dynamic interaction where learners are challenged to think at a higher level, with guidance and support, promoting critical thinking. Piaget also emphasized that children's thinking evolves through distinct stages: sensorimotor, preoperational, concrete operational, and formal operational (Piaget, 1952). Critical thinking skills, such as abstract reasoning, problem-solving, and logical analysis, emerge later, particularly in the

formal operational stage (around ages 12 and up). In this stage, learners can think hypothetically, systematically analyze situations, and engage in abstract thought. The mathematics teacher portrayed critical thinking, which the two theories encourage by instructing the students to think privately about the data given.

In scaffolding, the teacher guided the students during group discussion by visiting each group and providing support, ensuring they stayed on track and asking students to guess how they could predict if the graph would be a straight line. According to Vygotsky's theory, scaffolding is a key concept where a teacher or peer gives temporary support to help learners accomplish a task they cannot complete alone. As students progress, the teacher gradually removes the support, hence "scaffolding", allowing the student to eventually perform the task independently. The scaffolding process is crucial for developing critical thinking skills because it helps learners engage with more complex, abstract concepts and teaches them how to approach problem-solving in a structured way. Through scaffolding, learners are prompted to consider different viewpoints, evaluate evidence, and make connections, all of which are central to critical thinking (Vygotsky, 1978). According to Piaget, learners should be given opportunities to explore concepts independently, through hands-on activities, or through tasks that challenge their existing cognitive structures, thus promoting critical thinking by confronting cognitive conflict and requiring students to reconcile new information with their existing knowledge (Piaget, 1952).

Afterward, the mathematics teacher asked students to show their answers. Answers: (-.987, -.974, -.85, 957, 965). She then asked, "Who can tell me why everybody has negative? Student: The line is going down. She then asked Riley to show his graph to the class. She asked why the group chose the X-axis to represent years. Riley: Because it was an independent variable, and the time depends on the year, not the year dependent on the time, the group discussed using it that way. She asked another group, "Why did you use two digits for your years? Parker: It was easier writing than writing out 1900 to simplify it. The Teacher asked, how can we check our graph using technology?" Amanda: You can use a calculator to start. The Teacher then let us use a calculator and data to draw our start. She asked how we could test our correlation coefficient. Student: You click start and arrow over to count and go to the line. Teacher, let us do linear regression and see who got the closest answer. Start, calculation, and linear regression, answer; (-.974).

The mathematics teacher's use of questions and answers during the lesson supports Piaget's and Vygotsky's theories. Piaget's constructivist view suggests that learning is an active process where learners build on their prior knowledge. In this framework, the Teacher's role is to ask open-ended questions that encourage exploration and problem-solving. The questions help students connect new and existing knowledge, promoting a more profound understanding. Piaget believed that students should engage in self-directed learning, and thus, questioning should encourage students to think independently and develop their reasoning abilities (Piaget, 1952). For Piaget, cognitive development happens when learners experience a state of disequilibrium or cognitive conflict when they encounter new information that does not fit their existing mental structures (schemas). Questions in the classroom can provoke this

cognitive conflict, prompting students to accommodate new ideas and refine their understanding (Piaget, 1952).

For Vygotsky, questions and answers are fundamental to guided interaction, where teachers and peers help learners develop new cognitive abilities. Vygotsky emphasized the importance of dialogue in the learning process. Questions are a tool for engaging students in dialogue, which helps them articulate their thoughts, reflect on their learning, and engage in higher-order thinking. According to Vygotsky, language is not only a tool for communication but also a tool for thinking. When teachers ask questions, they encourage students to verbalize their reasoning, thereby internalizing the thought processes necessary for critical thinking (Vygotsky, 1978). Vygotsky also believed that questioning is essential for guided discovery. Teachers can use questions to guide students toward discovering answers or solutions, promoting critical thinking and problem-solving. In this process, questions help learners navigate the problem-solving steps, allowing them to reach conclusions with some autonomy while benefiting from a teacher's or peer's guidance (Vygotsky, 1978). In the form of closure, the Teacher asked students to predict the winning time for the 100-meter dash for the gold medal-winning time in the 2020 Olympics.

5. Findings and Conclusion

The analytical description reveals that the classroom observations conducted through the lens of Piaget's Cognitive Theory and Vygotsky's Sociocultural Theory illustrate significant educational practices aligned with both theories. The analysis of the five selected YouTube classroom pedagogical videos demonstrates that Piaget's emphasis on hands-on, active learning is evident, with teachers implementing strategies that promote exploration and problem-solving. The approach engages students at their developmental stages, making learning more relatable and compelling. Vygotsky's influence is seen in scaffolding techniques, wherein teachers provide support tailored to students' needs, fostering their capabilities within the Zone of Proximal Development (ZPD). The method encourages collaborative learning and peer interaction, enriching the educational experience.

Also, the observed lessons highlighted the importance of critical thinking and metacognitive strategies, with teachers encouraging students to reflect on their thought processes and writing abilities. This aspect supports students' development of deeper understanding and retention of knowledge. The analysis, therefore, reveals how integrating Piaget's and Vygotsky's theories provides a comprehensive framework for classroom pedagogy. The combined insights from both cognitive and sociocultural perspectives allow educators to create dynamic, engaging, and developmentally appropriate learning environments. Such integration enhances student understanding and retention and fosters an atmosphere conducive to critical thinking and collaborative learning.

Ultimately, the findings underscore the importance of recognizing how cognitive growth and social context interact in educational settings, providing valuable implications for future teaching practices. Educators are encouraged to apply the theoretical frameworks synergistically to optimize student learning outcomes. By embracing individual and social

learning principles, teachers can significantly improve educational experiences, ensuring they are culturally responsive and tailored to diverse learner needs.

5.1 Conclusion

In conclusion, the study underscores the significant impact of Jean Piaget's Cognitive Theory and Lev Vygotsky's Sociocultural Theory on modern educational practices. Through qualitative observations of classroom pedagogy showcased in five selected YouTube videos, the research reveals that integrating the theoretical frameworks enhances teaching strategies, fosters student engagement, and promotes meaningful learning experiences. The findings illustrate how active learning methods, rooted in Piaget's emphasis on hands-on exploration, coexist harmoniously with Vygotsky's focus on social interaction and scaffolding. Educators can nurture critical thinking skills and foster a deeper understanding of content by allowing students to engage in collaborative activities and reflect on their thinking processes. The dual application of the theories supports individualized learning pathways and promotes a culturally responsive and inclusive classroom environment.

Lastly, the study highlights the importance of adapting instructional methods to meet the diverse needs of students, ensuring that learning experiences are developmentally appropriate and socially engaging. As educators navigate the complexities of teaching in diverse settings, the principles of Piaget and Vygotsky offer valuable insights for improving pedagogical practices. By embracing the synergies between cognitive development and sociocultural contexts in educational psychology, teachers can create dynamic learning environments that empower students to thrive academically and socially. Future research should continue to explore the practical applications of the theories, further bridging the gap between theoretical insights and classroom realities, thereby enriching the education landscape for all learners.

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