

## Rapprochement between Piagetian and Vygotskian Theories: Application to Instruction

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### Abstract

*This concept paper was intended to establish rapprochement between Piaget and Vygotsky by comparing their developmental theories and also examining how their educational extensions can be applied in promoting students' learning in Basic Education Programme in Ghana. Piaget's proposition that cognitive development from infant to young adult occurs in four universal and consecutive stages are presented. Aspects of Piaget's theory emphasized by educators are also presented and educational practices inspired by this theory are outlined. Vygotsky's belief that socio – cultural environment is critical for cognitive development is presented, and his two concepts of cognitive learning zones - The Zone of Actual Development (ZAD) and the Zone of Proximal Development (ZPD) are also noted. Finally, the two theories are compared and their applications in education delivery are examined. Even though Piaget and Vygotsky hold different views concerning developmental psychology, it is recommended that the use of both theories in classrooms is beneficial. Teachers should have a solid understanding of Piaget's and Vygotsky's theories, and students should be provided with more opportunities to play and learn with peers.*

**Keywords:** *Developmental psychology, cognitive psychology, constructivist theory, cognitive structures, assimilation, accommodation, disequilibrium, socio-cultural environment, zone of actual development, zone of proximal development.*

### 1. Introduction

There is disagreement among researchers and educators as to the role of developmental psychology and its application in the elementary classrooms (Blake & Pope, 2008). It is widely accepted in the educational field that most children must go through the process of learning to think and thinking to learn (Blake & Pope, 2008). However, methods and approaches to teaching have been greatly influenced by the research of Jean Piaget and Lev Vygotsky. Both have contributed to the field of education by offering explanations for children's cognitive learning styles and abilities. While Piaget and Vygotsky may differ on how they view cognitive development in children, both offer educators good suggestions on how to teach certain material in a developmentally appropriate manner.

The study of age – related changes, termed Developmental Psychology, examines the psychological process of development, which means it describes the sequence of biological, cognitive, and socio-emotional changes that humans undergo as they grow older (Blake & Pope, 2008). It describes the growth of humans, which consists of physical, emotional, intellectual, social, perceptual, and personality development, from birth to death. Also, it investigates the processes that lead to age-related changes and transitions between successive developmental states. Developmental psychology was initially concerned with the children, gradually expanding to adolescents and the aging individual. By understanding how and why people change and grow, we can help people live up to their full potential. Cognitive psychology focuses on studies of mental processes, which include how people think, perceive, remember, and learn (Blake & Pope, 2008). Its core focus is on how people acquire, process, and store information. It is advantageous for teachers to understand cognitive psychology because it can help them improve their teaching and student learning. Teachers become more cognizant to how people process, learn, and remember information, which helps them plan more effective lessons and create positive learning environments for their students. By using appropriate developmental instructional techniques, teachers have been able to increase the test scores of children in public schools (Auger, & Rich, 2007).

Constructivist theory proposes an exploratory approach to learning, focusing on the individual learner and their

comprehension in relation to states of cognitive development. The teacher is not a distributor of knowledge but a facilitator who provides an appropriate learning environment and encourages the child to formulate ideas, discover concepts and think independently. Social constructivism maintains that knowledge is constructed by an understanding of social and cultural encounters and by the collaborative nature of learning. Social constructivist theory emphasizes the significance of adult tuition with the teacher occupying an active role. The purpose of this study was to examine the application of the theories of Piaget and Vygotsky to promote student learning in the current elementary education programmes in Ghana. First, we shall take a look at Piaget's theory, and then followed by Vygotsky's theory of cognitive development.

## 2. Piaget's Theory

Cognitive structures, which are "basic, interconnected psychological systems that enable people to process information by connecting it with prior knowledge and experience, finding patterns and relationships, identifying rules, and generating abstract principles relevant in different applications", mattered to Piaget (Garner, 2008, p.32). He believed in operative knowledge, which implies that change and transformation produce knowledge. His theory purports to process of coming to know, and the stages we move through as we gradually acquire this ability (Blake & Pope, 2008). Piaget "belongs to the constructivism perspective that sees learning as constructing" (Dahl, 1996, p.2). To Piaget, individuals must adapt to their environment. According to him, adaptation is an organism's ability to fit in with its environment. He described two processes for adaptation; assimilation and accommodation (Dimitriadis & Kamberelis, 2006). Assimilation is the process of using or transforming the environment so that it can be placed in preexisting cognitive structures. Accommodation is the process of changing cognitive structures in order to accept something from the environment. "It changes the schema, so it can increase its efficiency" (Campbell, 2006, p. 10). To Piaget, the developmental ideal is a balance between assimilation and accommodation, which is also known as equilibrium. Piaget believed when a balance between children's mental schemas, which is a "mental image produced in response to a stimulus that becomes a framework or basis for analyzing or responding to other related stimuli" and an external world has been reached, children are in a comfortable state of equilibrium (Agnes, 1999, p. 128). Thus, students have already mastered what has been taught and have confidence in their abilities to do or perform the assigned task. During this time, students are not in the process of acquiring new information or learning. Disequilibrium occurs when children come across new environmental phenomena; these new environmental phenomena, however, often do not fit exactly into children's mental schemas. Students are drawn towards disequilibrium because of their curiosity. Teachers should use disequilibrium to motivate their students because it allows for changes in students' mental structure. Piaget proposed that cognitive development from infant to young adult occurs in four universal and consecutive stages: sensori- motor, preoperational, concrete operational and formal operational (Woolfolk, 2004). The child in the sensori-motor stage falls between the ages of zero and two years. Children in the sensori-motor stage learn by using their five senses and develop object permanence, which is an understanding that an object exists even if it is not within the field of vision (Woolfolk, 2004). Children in the sensori-motor stage also experience egocentrism because they fail to understand how someone else's point of view might be different from their own, or they fail to coordinate their point of view with other person's (Campbell, 2006).

The preoperational stage spans ages two through seven. Piaget stated that during this stage, the child has not yet mastered to ability of mental operations. In this stage, the child still does not have the ability to think through actions (Woolfolk, 2004). Children in this stage continue to be egocentric, meaning they assume others share their points of view (Woolfolk, 2004). Because of egocentrism, children in this stage engage in collective monologues, in which each child is talking, but not interacting with the other children (Woolfolk, 2004). He held that preoperational children do not just know "more" than sensori-motor children. Rather, preoperational thinking is organized differently from cognition in the earlier stage. According to Piaget, cognitive development is more than quantitative change in how much children know; it also involves qualitative change in how children think. During this period, children acquire a mental storehouse of images and symbols, especially spoken and written words and are able to do one-step logic problems, develop language, continue to be egocentric, and complete operations.

The concrete operational stage begins around age seven and continues until approximately age eleven. During this time, children gain a better understanding of mental operations. Children begin thinking logically about concrete events, but have difficulty understanding abstract or hypothetical concepts (Piaget, 1983).

Children in the concrete operational stage were fairly good at the use of inductive logic (Sanrock, 2008). Inductive logic involves going from a specific experience to a general principle. On the other hand, children at this stage have difficulty using deductive logic, which involves using a general principle to determine the outcome of a specific event. One

of the most important developments in this stage is an understanding of reversibility, or awareness that actions can be reversed (Santrock, 2008). As an example, a child might be able to recognize that his or her dog is a Labrador, that a Labrador is a dog, and that a dog is an animal (Santrock, 2008).

The formal operational stage begins approximately age twelve and lasts into adulthood. During this time, people develop the ability to think about abstract concepts. Skills such as logical thought, deductive reasoning, and systematic planning also emerge during this stage. Piaget believed that deductive logic becomes important during the formal operational stage. Deductive logic requires the ability to use a general principle to determine a specific outcome. This type of thinking involves hypothetical situations and is often required in science and mathematics (Santrock, 2008). While children tend to think very concretely and specifically in earlier stages, the ability to think about abstract concepts emerges during the formal operational stage (Santrock, 2008). Instead of relying solely on personal experiences, children begin, to consider possible outcomes and consequences of actions (Santrock, 2008).

### 3. Piaget's Impact on Education

Piaget's focus on qualitative development had an impact on education. While Piaget did not specifically apply his theory to education, many educational programmes are built upon the belief that children should be taught at the level for which they are developmentally prepared (Santrock, 2008). In addition to this, a number of instructional strategies have been derived from Piaget's work. These strategies include providing a supportive environment, utilizing social interactions and peer teaching, and helping children see fallacies and inconsistencies in their thinking (Driscoll, 1994).

### 4. Problems with Research Methods

Much of the criticism of Piaget's work is in regards to his research methods (Agnes, 1999). A major source of inspiration for the theory was Piaget's observations of his own three children. In addition to this, the other children in Piaget's small research sample were all from well – educated professionals of high socio-economic status (Agnes, 1999). Because of this unrepresentative sample, it is difficult to generalize his findings to a larger population.

Other research has disputed Piaget's argument that all children will automatically move to the next stage of cognitive development as they mature. Some studies suggest that environmental factor may play a role in the development of formal operations. Even though there are a few piagetians, most can appreciate Piaget's influence and legacy. Piaget's work generated interest in child development and had an enormous impact on future of education.

### 5. Vygotsky's Social-cultural Theory

Vygotsky believed that socio-cultural environment is critical for cognitive development. His work was influenced by the Marxist theory of "..... historical changes in society and material life produce changes in human nature" (Huiitt, 2000, p. 2). Vygotsky emphasized the roles of social interaction and instruction. "He proposed that development does not precede socialization, but rather social structures and social relations lead to the development of mental functions" (Huiitt, 2000, p. 22).

Vygotsky developed two concepts of cognitive learning zones – The Zone of Actual Development (ZAD) and the Zone of Proximal Development (ZPD) (Daniels, 2001). The Zone of Actual Development occurs when children can complete tasks on their own. There is nothing new for the children to learn. In this zone, the children are independent (Daniels, 2001). The Zone of Proximal Development, on the other hand, requires adults or peers to provide assistance to students, who cannot complete the assigned task without help. The ZPD is the expanse between the children's level of development and their potential development level, in collaboration with more competent individuals (Daniels, 2001). Social interaction therefore, supports the children's cognitive development in the ZPD, leading to a higher level of reasoning (Daniels, (2001). In the ZPD, the parent or older child's role is to support the child's effort with scaffolding, that is, to provide learning opportunities, materials, hints, and clues when the child gets stuck (Bruner, 1978). A key feature of effective scaffolding is that the parent provides only as much support as the child needs; once skills are mastered, the parent withdraws the "scaffold" or support (because that particular support is not needed).

Vygotsky stated that language has two functions. Inner speech is used for mental reasoning and external speech is used to converse with others, and according to Vygotsky, these operations occur separately. Indeed, before the age of two a child employs words socially; they possess no internal language. Once thought and language merge, however, the social language is internalized and assists the child with their reasoning. Thus, the social environment is ingrained within

the child's learning (Bruner, 1978).

## 6. Comparing the Two Theories

After the theories of Piaget and Vygotsky have been examined, a comparison of their theories can be made. Piaget advocates learning as construction, whereas Vygotsky believed in "the activity theory perspective that sees learning as appropriation" (Dahl, 1996, p.20). Piaget's theory refers to qualitative periods or stages of development. Piaget's theory encourages hands-on learning. Vygotsky accepted, "the activity theory but calls attention to knowledge that is created in a negotiation/interaction among people and that people appropriate knowledge" (Dahl, 1996, p. 9). Vygotsky's theory promotes gradual changes using social contact and language which gradually changes with development (Utah Education Network, 2005). He believed the learner constructed his or her own knowledge by interacting with other individuals.

## 7. Application of the two Theories in Education

### 7.1 Applying Piaget's Theory in Education Delivery

By applying Piaget's theory in the classroom, both teacher and students benefit in several ways. Teachers develop a better understanding of their students' thinking. They can also align their teaching strategies with their students' cognitive level (i.e. motivational set, modelling, and assignments). The goal of the teacher is to help the students construct knowledge. Conservation of constancy, as defined by Garner (2008), "is the ability to understand how some characteristics of a thing can change, while others stay the same" (p. 34). In other words, it is the realization that even though an object can be changed physically, some of the characteristics for that object remain the same. For example, if you give students modelling clay and tell them to mold it, the shape will change, but the colour of the modeling clay will remain the same. Conservation of constancy "identifies relationships and makes sense of physical and abstract information" (Garner, 2008, p. 47). Educators create, implement, and assess the curriculum being taught, assuming throughout the process that students can conserve constancies. If students lack this ability, they will not benefit academically because they have limited concrete sensory data and literal interpretations. Thus, "they will experience difficulty in thinking abstractly, problem-solving, planning, and discern relevance" (Garner, 2008, p.35). For example, if the student is studying fractions, he or she may not be able to recognize that one-third and three-ninths are equal. To enable students develop their conservation skills, teachers should provide their students with opportunities to recognize similarities and differences at both the physical and abstract levels (Garner, 2008).

### 7.2 Applying Vygotsky's Theory in Education Delivery

The central topic of Vygotsky's theory was the Zone of Proximal Development (ZPD), which uses social interaction with more knowledgeable others to move development forward. A more capable person, such as teacher or peer, provides assistance to the student; the student is able to complete the task, with this assistance. Students, who are in the ZPD, need active teaching. "It is a waste of time to teach kids what they already know and what they cannot do even with assistance" (Utah Education Network, 2005, p. 11). Therefore, Vygotsky's theory promotes the belief, "What is learned must be taught" (Wilhelm, 2001, p. 8). Teachers should be explaining, modelling, and using guided practice in the classroom. By modelling what they want their students to do, students will be better able to work through their assigned tasks. Think-alouds, an instructional strategy that allows students to talk through new steps of an endeavour aloud, can be used with Upper Primary and Junior High School students in Ghana, who are in the ZPD. This strategy assists students' thinking about how they make meaning. During think-aloud, student listens to a skilled reader using "strategies to comprehend text and their teachers' thinking become visible to them" (Beers, 2003, p. 43). Students need time to try out various strategies, so they can develop answers or responses. At the same time, teacher questioning techniques should guide the social interactions implicitly. Think-aloud help teachers to determine why and how students are experiencing difficulty in reading.

When a teacher uses Vygotsky's theory to guide his or her instruction, he or she should engage the students in scaffolding, small groups, cooperative learning, group problem-solving, cross-age tutoring, assisted learning, and/or alternative assessment. Scaffolding is "a form of adult assistance that enables a child or a novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted effort" (Wood et al, 1976, as cited by Daniels,

2001, p. 107).

In today's classrooms, teachers need to design lessons that empower students to "make meaning through mindful manipulation of input" (Fogarty, 1999, p. 78). Thus, school administrators need to provide teachers with the effective professional development and supplies they need to be effective. By successfully incorporating Piaget's and Vygotsky's theories into the classroom, developmental psychology in basic education in Ghana can positively impact students achievement. "When our students have the cognitive foundation to learn how to learn, they can discover what else is "out there" in our world ..." (Garner, 2008, p. 38). In order to apply the theories of Piaget and Vygotsky to present day school systems, one would need to restructure schools significantly.

## 8. Conclusion

When Piaget's and Vygotsky's theories are incorporated into teaching strategies in basic school classroom, student learning is likely to increase. There are various ways for teachers to implement developmental psychology in basic school classrooms. Even though Piaget and Vygotsky hold different views concerning developmental psychology, the use of both theories in classrooms is beneficial. Teachers should have a solid understanding of Piaget's and Vygotsky's theories, and students should be provided with more opportunities to play and learn with peers.

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