

## Constructivist Theories of Piaget and Vygotsky: Implications for Pedagogical Practices

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**Abstract.** Learning theories offer a pedagogical framework for understanding the process of learning and assisting the process of teaching. Actually, a set of learning theories are found to be effective; some of which is constructivism. The basic assumption of constructivism which distinguishes it from the rest of theories of learning is that knowledge is constructed depending on various and previous experiences. Unfortunately, sometimes some teachers shift their attention to other theories and teaching practices that do not take into account the students' personal learning and therefore active knowledge construction. In accordance with the underlying principles of constructivism, two polar views exist: Jean Piaget Theory and Lev Vygotsky Theory. Given this, this paper aims first at finding out the differences between these two main constructivist theories and how they complement each other; further, it aims to provide teachers with the principles of these two theories to be applied in some educational settings.

**Keywords:** constructivism; cognitive constructivism; social constructivism; pedagogical implications

**ملخص.** توفر نظريات التعلم إطارا تربويا لفهم عملية التعلم و تدعيم عملية التدريس. في الواقع هناك مجموعة من نظريات التعلم وجدت أنها فعالة ومن بينها البنائية. الافتراض الأساسي والأهم للبنائية الذي يميزها عن بقية نظريات التعلم هو أن المعرفة لا وجود لها مستقلة عن المتعلم ولكن يتم بناؤها اعتمادا على تجارب مختلفة و سابقة. لكن للأسف في بعض الأحيان بعض المعلمين يحولون انتباههم إلى نظريات وممارسات تدريس أخرى لا تأخذ بعين الاعتبار التعلم الشخصي للطلاب أي البناء الفعال للمعرفة. وفقاً للمبادئ الأساسية للبنية ، توجد رؤيتان رئيسيتان: نظرية جان بياجيه ونظرية ليف فيجوتسكي. بالاعتماد على هذا يهدف هذا المقال أولاً إلى إظهار الاختلافات بين نظريتي البنائية الرئيسيتين وكيف يكمل كل منهما الآخر علاوة على ذلك يهدف إلى تزويد الأساتذة بمبادئ هاتين النظريتين ليتم تطبيقها في بعض البيئات التعليمية.

**الكلمات الدالة.** البنائية، البنائية المعرفية، البنائية الاجتماعية، متضمنات بيداغوجية

## **Introduction**

The field of education has gone through a notable movement regarding the nature of human learning and the circumstances that best have a say in the different aspects of human learning. This significant change started from behaviorism to cognitivism and now to further theories. Recently, one of the effective views which has captured the researchers' and teachers' interest in the educational sphere is a perspective known as constructivism. In spite of the fact that it recommends a new conceptualization about the process of learning, it continues to be a prevailing program in many educational fields, and it inspires further researches and insights. As any theory, constructivism was not set forth by a lone voice; there were several theorists. The two most distinguished ones who are often compared, for they both acknowledge the active role of humans in the construction of knowledge, are Piaget (cognitive constructivism) and Vygotsky (sociocultural constructivism). The disparity between them lies in the way knowledge is constructed. According to Piaget, knowledge is produced in the learner's mind while he is organizing his experiences and cognitive structures. Vygotsky, however, considers that knowledge is produced through social and cultural interactions. For the purpose of this paper, both previous views of constructivism are discussed, because we try to display that knowledge is both a cognitive and social process. Most importantly, the paper attempts to suggest some pedagogical implications for students and teachers, based on a teaching experience.

### **1. Constructivism**

Reviewing the available literature about constructivism, it would be folly to assign a limited and inclusive definition of what constructivism actually is; it has a wide range of different understandings. Within the educational context, there are some philosophical meanings as well as personal meanings advocated by some theorists. This concept has been frequently defined as the philosophy of learning established on the premise that when one reflects on his previous experiences and learning environment, he constructs his own new understanding of the world he lives in. For example, Naylor and Keogh (1999, p. 93) defined constructivism as a perspective in which the basic standards are that "learners can only make sense of new situations in terms of their existing understanding. Learning involves an active process in which learners construct

meaning by linking new ideas with their existing knowledge”. Flynn, Mesibov, Vermette, and Smith (2004) on their part defined constructivism as a theory which is about “facilitating the learner to go beyond simple recall (memorization) toward understanding, application, and competence” (p. 113). Similarly, Brooks and Brooks (1993) regarded constructivism as a theory which is related to learning; they said “constructivism is not a theory of teaching, it is a theory about knowledge and learning (...) the theory defines knowledge as temporary, developmental, socially and culturally mediated” (p. vii).

Based on the different definitions available also in the literature, the following are some guidelines, presented by Fox (2001, p. 24), which identify the epistemological features of constructivism and help in clarifying its meaning. They are as follows:

- 1- Learning is an active process.
- 2- Knowledge is constructed rather than innate or passively absorbed.
- 3- Knowledge is invented not discovered.
- 4- All knowledge is personal and idiosyncratic.
- 5- All knowledge is socially constructed.
- 6- Learning is essentially a process of making sense of the world.
- 7- Effective learning requires meaningful, open-ended, challenging problems for the learner to solve.

Constructivism, therefore, recognizes that knowledge is actively produced by learners in response to interactions with their existing knowledge and environment. This implies that the teacher does not dispense knowledge, but provides the learners with the opportunities and incentives to construct it.

In accordance with the underlying principles of constructivism, according to Richmond and Striley (1996), two polar views exist. The first one focuses on the interplay between the child mind and society as a basic process of the cognitive development. According to this view, the social interaction and language are not afforded a fundamental interest. As for the second view, theorists claim that the child cognitive development occurs through the social interaction and that language has a crucial role in knowledge construction, because it constitutes one of the cultural aspects, and therefore it is indispensable for thinking and social interactions. Social constructivism

also views science learning as the product of the learner's ideas and the outcomes of the interactions between the learners or with their teachers. Appleton (1997) identified that the origin of the constructivism theory can be traced back to three main fields: Development Psychology of Piaget (1978), Cognitive Psychology of Piaget, and Social Constructivism of Vygotsky (1978) (p. 304).

### 1.1 Piaget Theory of Cognitive Development

Jean Piaget is a Swiss expert who is famous of his studies of the intellectual growth of children and his influential theory of cognitive development. He is considered as the founder of constructivism, as it is derived from the field of cognitive psychology which is based on his work (Sridevi, 2008). Piaget allocated his entire time to respond to the question of how do individuals acquire and develop knowledge? His studies spread out over nearly sixty years investigating untiringly children thinking and reasoning at special stages. Piaget named his theoretical propensity to the study of cognitive development "genetic epistemology", because he was first and foremost interested in how an organism adapts to its environment (Klahr, 2012). In other words, his theory centralizes on an evolutionary epistemology which explains the development of the mind as a biological subject; moreover, it displays the adaptive function of cognition.

A further focal point which is unique in Piaget's theory is intelligence; it constitutes the core of his theory. According to Chen and Siegle (2000), Piaget started from the assumption that "human intelligence is a biological adaptation of a complex organization to a complex environment" (p. 95). Thus, the individual's understanding of a given situation is part of the adaptation of that situation, and the cognitive development is the individual's intelligence in making equilibration of the cognitive structures.

#### 1.1.1 Piaget's Stages of Cognitive Development

Piaget suggested four different stages of typical cognitive development from infancy to adulthood. He claimed that all individuals should undergo each stage to reach the next level of cognitive development. These stages are:

**Sensory Motor Stage:** the first chief period in Piaget's theory starts from birth to about 2 years of age. In this stage, according to Pressley and McCormick (2007), the infants' schemes are simple and action-oriented; infants just use their senses with some physical

actions to form these schemes. As for intelligence, it is related to the activities made by the infant who constructs his understanding of the world through environment rather than his mind.

**Preoperational Stage:** for Pressley and McCormick (2007), this stage is generally related to pre-school years. In this stage, children start to develop cognitive structures termed ‘symbolic schemes’; in other words, they can represent ideas and objects using symbols like language, mental images, and gestures. This **preoperational stage** is so called because there is as yet no operational thinking, which means that children thinking is still not entirely reasonable and children at that period cannot grasp complex concepts.

**Concrete Operational Stage:** the third main period in Piaget’s theory relates to the elementary-grade years. One important characteristic of this stage is the appropriate use of cognitive operations to solve problems of concrete objects (Pressley & McCormick, 2007). This implies that children are still far to perform higher thinking tasks.

**Formal Operational Stage:** this stage starts generally from early adolescence; the individuals at this time begin abstract thinking. (Pressley & McCormick, 2007)

### 1.1.2 Processes of Cognitive Development

Cognitive development, according to Piaget, is achieved through three interrelated processes: organization, adaptation (assimilation and accommodation), and equilibration (Gupta &Frake, 2009). For Piaget, every act an individual makes is cognitively organized and then adaptation provides the means for change. In order to understand the processes of organization and adaptation, three concepts have to be understood as well: first, *schemata* which are “the cognitive or mental structures by which individuals intellectually adapt to and organize the environment” (Wadsworth, 1989, p. 10); second, *assimilation* which is the external world that is interpreted in the form of current schemes (Gupta &Frake, 2009); third, *accommodation* which is explained as «old schemes are adjusted and new ones created to produce a better fit with the environment” (Gupta &Frake, 2009, p. 20).

To elaborate, as Gupta and Frake (2009) explained, organization is the process by which the child links existing schemes into new and more complex schemes to produce

an interconnected cognitive system. For example, firstly children can suck and grasp, but they cannot combine these two acts. After a period of time, they can coordinate both of the acts. Piaget explains the occurrence of this as higher level organization of two basic schemes: sucking and grasping. This generation of schemes through the processes of assimilation and accommodation is called *adaptation*. Finally, changing the existing knowledge is based on new knowledge equilibration. Gubta and Grake (2009) explained thoroughly this last process as follows:

When children are not changing very much they assimilate more than they accommodate, a state Piaget refers to as cognitive equilibrium. However, during times of swift cognitive change (when new information does not match current schemes) and they swift from assimilation to accommodation: children are in a state of disequilibrium (cognitive discomfort). Once schemes have been modified children shift back to assimilation, using new structures until they need to be modified again. Piaget called this back and forth process *equilibration* (p. 20).

## 1.2 Vygotsky Theory of Sociocultural Development

Vygotsky is a Russian psychologist who is well known for his theory that emphasizes the contribution of social and cultural factors to the cognitive development of the individual. His theory got known in the west lately as his new concepts and ideas had emerged in the fields of educational and developmental psychology. Alves (2014, p. 25) stated that Vygotsky's work was highly impacted by Karl Marx and Friedrich Engels, by Charles Darwin's evolutionism, and by Spinoza's dynamic perceptions of universal development. Being influenced by the ideas of these philosophers, Vygotsky identified five different principles that should guide epistemological research:

- 1- Psychology is the science of a historical human being.
- 2- Higher psychological processes originate in social action.
- 3- There exist three distinct classes of mediators: signs/instruments, individual acts, and interpersonal relationships.
- 4- Specific functions as well as social reality emerge from transformational acts or work.

5- There exists a fundamental unity between body and mind—that is, people are global beings. (Alves, 2014, p. 25)

The central concept of Vygotsky theory is that the development of the individual cognitive is based first on social interaction. Vygotsky (1978) said “every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter psychological) and then inside the child (intra psychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts” (p. 57). The nature of learning through social interaction therefore is cooperative. The learner should not be separated from his environment, but should be encouraged to integrate with other learners, teachers or other sources of knowledge such as books, journals, computers ...etc. These interactions provide the learner with the language used for learning communication. The teacher's main role here is a facilitator or a mediator who just coordinates the learner's concepts. According to Derry (2014), Vygotsky differentiates between two sorts of concepts, specifically between what he called ‘everyday concepts’ or ‘spontaneous’ and ‘scientific concepts’. These concepts have their precise meaning and are learnt through different contexts. While everyday concepts “are those that are learnt spontaneously in daily life” (Derry, 2014, p. 38), scientific concepts “are those learnt through formal instruction” (Derry, 2014, p. 38). Further, everyday concepts are formed from concrete experiences to abstract experiences; however, scientific concepts take the opposite direction. The learner, for example, adapts everyday concepts in the school where he learns the scientific concept, and simultaneously he has to learn scientific concepts on the basis of concrete examples’ application (everyday concepts). Accordingly, both directions are crucial for understanding and constructing knowledge.

Vygotsky theory was also an attempt to explain the contribution of three factors in the cognitive development of the individual. These factors, according to Oakley (2004, p. 38) include: culture, language, and zone of proximal development.

**Culture:** Oakley (2004) explained that Vygotsky considers culture and social environment as crucial elements in the construction of human knowledge. The society where the individual lives in and the social settings where he is part of are the constituents which determine what the individual learns about the world and acquires as

knowledge. Therefore, the child learns through social interactions, but also through elements of his own culture such as language, songs, and arts.

**Language:** For Vygotsky, Oakley (2004) again explained, language is indispensable in the learning process. He considered that there is a close relationship between language development and cognitive development. The individual could encode and represent the world through the contribution of language. Vygotsky explains that before the age of 2 years, children language and thought are separate processes because language at that period is used just for social purposes and is not linked to inner thought. However, by the age of 2 years, language and thought become related processes, and therefore language begins to constitute a crucial role in cognitive and social development.

**Zone of Proximal Development:** The term *Zone of Proximal Development*, according to Vygotsky (1978), refers to “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86). The concept of scaffolding which is central to many recent accounts of teaching and learning share the same meaning and it is synonymous, in literature, with Vygotsky’s concept of zone of proximal development (Stone, 1998). One of the most important aspects of scaffolding, Stone identified, is the role of the knowledgeable person who provides the learner with guidance in order to progress and achieve the difficult tasks.

## **2. Pedagogical Implications of Piaget and Vygotsky Constructivism**

Vygotsky and Piaget theories stimulated a wide range of researches in the world with numerous leading theoretical perspectives today derived from their theories. The numbers of concepts which are associated with their theories are widely used in education; accordingly, in this section some of these concepts’ applications are to be introduced.

### **2.1 .Pedagogical Implications of Piaget Theory**

The influence of Piaget theory in educational fields can be seen in a variety of instructional practices. The following are some applications’ examples:



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- For Piaget, the main goals of education in general is to have creative and innovative individuals who are capable to take initiatives to do things instead of repeating what other generations have achieved. Furthermore, Piaget theory is a call to form critical generations which find out things themselves instead of accepting whatever given by others. To this end, during the initial stages of learning, teachers should provide rich environment for the exploration of any field, because if the learners feel safe, accepted and free, they will approach the learning process straightforwardly. In this case, the teachers may involve interesting materials to encourage them get active and constructors of their own knowledge through their experiences which require the processes of assimilation and accommodation.

- Teachers should act as ‘guides on the side’ who just provide the learners with the opportunities to test their current level adequacy. Ashton and Gregoire-Gill (2003) quoted Piaget words as regards the role of teacher in the classroom as follows: “what is desired is that the teacher ceases being a lecturer, satisfied with transmitting ready-made solutions; his role should rather be that of a mentor stimulating initiative and research” (p. 102). That is to say, based on Piaget theory, the teacher’s role should be seen indirectly; for example, he implicitly lets the learners structure their own knowledge themselves through encouraging them to interact with the materials selected and reflective thinking,

- Piaget’s stages of cognitive development can be used in different ways, for example as general guides to sequential curriculum design. If we are to design a particular subject matter, then the organization of the content should be a sequence that is compatible with the learners’ cognitive abilities. In other words, programs should be set according to the actual level of learners, and teaching strategies should be aligned with the learners’ cognitive level.

- Each learner’s cognitive schemas are regularly being revised through the process of assimilation and accommodation to make use of new input. The result is that no two individuals can ever be similar in the level of readiness for a given experience, and thus learning takes place in many different forms. The recommendation here is that teachers should take into account the learners’ differences in performing tasks and activities. As a starting point, the teachers may take time to get to know each student preferences, dislikes, weaknesses, and strengths so that the instruction leads to brilliant results.

- Piaget's views can be applied in the process approaches to learning. Unlike the product approaches where the learners do just receive and follow the instructions to perform the tasks and therefore get graded, the process approaches require reflection and focus on the cognitive aspects of learning and knowledge construction. The expected outcomes in the classroom, in this case, are enduring differentiation and individualization; that is, the learners are expected to compare their own actual achievement to their previous achievement rather than comparing themselves to their peers. Consequently, learning will successfully take place.

- Piaget's theory encourages teachers also to not focus too much on teaching concrete and less complex matters as they move forward advanced levels, but to invoke the learners' abstract thinking about the world. This would be helpful for the learners in the sense that it develops multiple skills that will assist them to deal with more complex learning matters.

- Learners should be encouraged to experience different materials and assisted to discover or even more construct their concept for themselves. Technology may play a central role in offering the learners such opportunities. Though technology, in some cases, is considered as a source of distraction for the students, it can have a significant role. If it is utilized appropriately for educational purposes; it can facilitate their learning, motivate and provide them with good interaction and reception of information.

- The basic teaching techniques that the teachers may focus on and that are associated with Piaget theory for different educational settings may cover the following: problem-based learning, discovery learning, cognitive strategies, and project-based learning. These techniques, actually, can be taken as helpful in the sense that they increase the learners' long term knowledge retention, demonstrate the students' styles and strategies, and make them in a constant commitment to achieve different tasks and therefore make the learning more profound.

- Piaget theory is also important as to evaluation. Teachers should take into account Piaget's view that the individual cognitive development does not take place immediately; therefore, the learners' progress may appear after a given period. Teachers should not think that because something was introduced that the learners should promptly learn and apply it.

## 2.2 Pedagogical Implications of Vygotsky Theory

The sociocultural perspective has performed implications for pedagogy as well. Some of these implications which can enrich the social setting of teaching and learning are presented below:

- One of the most important applications of Vygotsky theory that can be seen is the principle of peer-peer interaction. Teachers today tend to recognize the significance of peer-peer interaction for many reasons as follows:

- Learners may get aware of the importance of some activities which seem equally important to their peers.

- Peers may constitute models for other learners who are still developing some skills.

- Peers' explanation of particular points can be more effective than that of the teachers, because peers are likely to have the same level of understanding.

- When working in different cognitive stages, less advanced peers may get ideas and correct their miscomprehension from the more advanced peers.

- Considering the concept of zone of proximal development, teachers should know the limits of their students and teach them according to these limits, no further. In other words, the teacher may provide activities that are just slightly beyond the learners' actual competence, based on their existing abilities. However, if the teacher gives challenging activities which are above the level of possible understanding, the learner will be confused, loose interest, and no learning will take place.

- It is very important that the teacher should be aware of the zone of proximal development of each learner so that he can help him/her properly and according to his individual needs. When the teacher interacts regularly with his learners, he could determine exactly what the learners can achieve alone and by assistance. Reconsidering this, the teacher should treat the learners differently and do not administer standardized instructions regularly.

- Based on the socio-cultural view, teachers should not look at the learners deviations from some norms as indication of failure, but as attempts made by the learners to create new identities and gain self-regulation. Similar to Piaget theory application, in the initial stages of learning, the learners should be given the opportunities to take risks

until they come to the stages where they adjust and correct their understanding by themselves.

- The evident implication of Vygotsky theory principles in education is in task-based approach. Teachers could emphasize the significance of social and collaborative aspects of learning through focusing on how learners accomplish tasks and how the interaction between them scaffold and help them. Other opportunities are available for teachers as to encourage socially mediated learning in their classrooms. They can assign projects which make the learners seek out professionals and experts in order to achieve the assignment in a good way.

- One of the important aspects of zone of proximal development also is scaffolding. The teachers may use some techniques of scaffolding such as dividing the task into simple steps, providing guidelines, cues, examples, handouts, questions, visual aids...etc. However, they should take into account that it is not prudent to use the same scaffolding techniques in different situations, because this depends on the context encountered such as the type of task, the learners' level, time... etc.

- In Vygotsky theory, tools are viewed as having extended human ability to reach the objectives of an activity. To this end, teachers may incorporate educational technology as tools embedded in learners' activity. For example, teachers can create lessons that require the learners to work in groups using a computer. Or they can allow the students to use e-mails and Internet as tools for creating dialogues, discussions and debates. Through these tools, the learners access many types of information resources that can help them synthesize, think, analyze the course materials ...etc. What teachers should ensure is that incorporating technology has to make the learners active, not passive.

## **Conclusion**

The purpose of this paper is to ground education in the general developmental framework provided by Piaget and Vygotsky and to suggest some applications that can be recommended based on these theoretical frameworks. Though Piaget and Vygotsky hold distinct views as regards developmental psychology, incorporating both theories in education is beneficial. As has been detailed earlier, Piaget theory emphasized the crucial

role of biological factors in the development of higher mental activities. Vygotsky did not deny the personal attempt and individual function; but he overestimated the mediation of social practices and cultural artifacts, with language being an indispensable sign system.

Vygotsky and Piaget have greatly contributed to the theory and practice of education. The implication of their theories is that the learner's initiative and self determination should not be hindered by educational instruction. The essence of the cognitive theory is to make of the learner a creative individual who builds his knowledge himself and has confidence in his ability to perform the assigned task. Teachers, according to Piaget theory, should use equilibrium to motivate the learners, and therefore make a change in their mental structures. In socio-cultural theory, learning is seen as a social event that should take place due to group works and cooperation with more capable individuals. In a nutshell, teachers should encourage constructivist pedagogy in their classrooms, if autonomy, initiative, and leadership are to be promoted and abundant shift in education is to be reached.

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