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Relevance of Constructivism in Today's Learning Environment

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Abstract
Theory of constructivism is defined as active construction of new knowledge based on a learner's experiences. Constructivists see learning as a situational activity where learners are active, in control of and at the centre of the learning. Social interaction plays an important role in learning. Piaget postulates that children pass through a series of stages for their cognitive development - sensorimotor, pre operational, concrete operational and formal operational. The chief development mechanism is *equilibration*, which helps to resolve cognitive conflicts by changing the nature of reality to fit existing structures or changing these structures to make place for reality. Vygotsky's socio-cultural theory emphasises the social environment as a facilitator of development and learning. A key concept given by him is the zone of proximal development (ZPD), which represents the amount of learning possible by a student, given proper instructional conditions.

Keywords: Constructivism, Piaget, Vygotsy, Self-regulation

Introduction
Today, a number of pedagogical researchers have shifted towards a focus on learners instead of talking about how knowledge is acquired. Constructivism is a psychological and philosophical perspective emphasising that people construct much of what they learn and understand. There are a number of perspectives found under the learning theory umbrella of constructivism. Constructivism approach can be found in experiential learning, self-directed learning and reflective practices. These learning strategies clearly show that the focus is squarely on the learner's construction of knowledge within a social context. Many researchers question the assumptions made by cognitive psychologists (Greeno, 1989). One of the assumptions is that thinking resides in the mind rather than developing through interactions with people and situations. Second assumption challenged is that the processes of thinking and learning are uniform across people and situations. Thirdly, thinking develops from knowledge and skills gained in formal instructional settings, instead of developing from one's own experiences of the world.

Discussion
Constructivists do not accept these assumptions because individuals construct their thinking as a result of various experiences (Bredo, 1997). Constructivism does not propound that learning principles that exist are are only to be discovered, but rather, that learners create their own learning (Packer & Goicoechea, 2000). Constructivists reject the notion that scientific truths exist. They argue that no statement can be assumed as true but rather should be viewed with reasonable doubt (Schunk, 2008). Knowledge is not the truth but a working hypothesis which keeps changing with changing experiences. It can't be imposed from outside but develops from within. A person's constructions are true to that person only, they may not be relevant for the others, who have their own beliefs and experiences of situations (Cobb & Bowers, 1999). All knowledge therefore is subjective and personal, situated in contexts (Simpson, 2002).
Constructivism contrasts with conditioning theories that stress the influence of the environment on the person as well as with information processing theories that place the

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locus of learning within the mind with little attention paid to the context in which it occurs (Bandura, 1986). A key assumption of constructivism is that people are active learners and develop their own knowledge (Geary, 1995). It also differs on how much they ascribe knowledge construction to social interactions with teachers, peers, parents and others (Bredo, 1997). However, constructivism has deeply influenced educational thinking about curriculum and instruction. It emphasises on integrating the various subjects into a single whole so that students study with multiple perspectives, constructing their own knowledge. For example, studying about the geographical landscape of mountainous topography, the students can study them cartographically from an atlas first, then have excursions to have first hand experience, sing songs pertaining to mountains, study the people who live there and their lifestyles, to understand holistically how the mountains make for an important geographical feature. They can read about the folk tales of mountains, look at the costumes worn by people there, the food they eat and the houses they live in. This will give them a holistic approach towards understanding the mountain landscape.

Constructivism assumption is that teachers should not teach in the traditional way of delivering instruction to a group of students. Various activities, including observations, collecting data, generating and testing hypotheses and working collaboratively with peers makes students' learning self-regulated. By exploring their own interests, students go beyond the basic requirements of learning, as perceived by a traditional way of teaching (Bruning et al., 2004). Constructivism is not a single viewpoint but an amalgamation of different perspectives. *Exogenous constructivism* refers to the idea that knowledge is acquired by a reconstruction of structures that already exist (Moshman, 1982; Philips, 1995). In contrast, *endogenous constructivism* emphasises that knowledge develops through a cognitive ability of abstraction, which is similar to Piaget's theory of cognitive development. Between these two extremes ideas, lies *dialectical constructivism* which believes that knowledge derives from people and environment interactions. It is compatible with Bandura's social cognitive theory. Each one of these perspectives is useful for teachers. Exogenous views are relevant when we want to know how accurately learners perceive the structure of knowledge within a domain. The endogenous perspective is relevant when we explore how learners develop from novices to competent learners. The dialectical view is useful for challenging students' thinking through various interventions. However, a core concept of constructivism is that thinking and learning are situated in physical and social contexts (Anderson et al., 1996). An example of constructivism is teaching map skills in classroom or in the actual environments. When students actively practice in real environment, they understand maps better. This not only challenges their own thinking but also forces them to rearrange their beliefs. This gives learners greater control on their own learning and feeling of self-efficacy (Schunk, 2002).

According to Piaget, cognitive development depends on four factors - biological maturation, experience with physical environment, interaction with social environment and equilibration (Schunk, 2001). The first three affect the fourth. Equilibration refers to adaptation between cognitive structures and the environment (Duncan, 1995). It is the

central tenet of cognitive development. It synchronises mental and physical environmental reality. Learners achieve equilibration through the processes of assimilation and accommodation, which are complementary processes. Learning occurs when children experience cognitive conflict and engage in assimilation and accommodation. However, the conflict should not be so large that it hinders equilibration. Learning will be most optimal when the conflict is small and information is partially understood already. Clearly, learning is limited by developmental constraints (Brainerd, 2003). It is no surprise then, the children who grow up in war-torn countries or strife-ridden families, do not learn easily. On the other hand, children growing up in stable circumstances with very low conflict of any kind, learn faster. Teachers can make the classroom environment conducive even if she doesn't have direct control on the child's family environment. Teachers need to know how their students are thinking so that they can introduce cognitive conflict at a reasonable level where students can deal with it through the processes of assimilation and accommodation. Development occurs only when environmental inputs do not match students' cognitive abilities. Learning material should neither be so easy that it gets readily assimilated, nor should it be so difficult that it precludes accommodation (Schunk, 2008).

Piaget concluded from his research that children's cognitive development passed through a fixed sequence which he called stages. These stages are Sensorimotor (Birth to 2 years), Pre-operational (2 to 7 years), Concrete operational (7 to 11 years) and Formal operational (11 years to adulthood) (Vygotsky, 1978). These were defined by how children viewed the world. Progression from one stage to another is not a matter of continuous blending. The stage of cognitive development at which a child is, depends on the preceding development. That is why the age at which a particular child would be on a particular stage will vary from one to another. In the sensorimotor stage, children's actions are spontaneous for attempting to understand the world. For example, children learn fast that a ball is for throwing and a bottle is for sucking. Children continue to actively equilibrate and towards the end of this stage, they develop a sufficient level of cognitive development to progress to the next stage (Wadsworth, 1996). Pre-operational children are able to imagine the future and reflect on the past. They are also able to think in more than one dimension at a time. They have difficulty distinguishing fantasy from reality and that is why they believe in cartoon characters that they see. Language development is faster and children realise that the peers think and feel differently from them. Hence, they become less egocentric (Schunk, 2002). The concrete operational stage dramatically changes children's language and basic skills. They are also able to do some abstract thinking, for example, understanding why they must be honest. They are also able to draw upon their own perceptions and do not always get swayed by others. In the formal operational stage, children are also able to think hypothetically and imaginatively. Their reasoning ability develops and they are able to think multi-dimensionally.

Like Piaget's theory, Vygotsky also gave a constructively theory. However, the latter places more emphasis on social development as a facilitator of development and learning (Tudge & Scrimsher, 2003). He stresses on the inter-personal activities, during which children transform their

expectations based on their knowledge and recognise their mental structures. The theory illuminates the point that context is very important for any learning and development, in which people, objects and institutions play an important role. Vygotsky was interested in children with mental and physical disabilities and he believed that their learning trajectories were very different as compared with those children without such challenges. Social activity helps explain changes in consciousness (Kozulin, 1986; Wertsch, 1985). Children learn from everything they see and experience - language, symbols, school spaces, cars, machines, other children. Cognitive changes occur when children mentally transform these interaction into new learning (Bruning et al., 2004). Therefore, mediation is the key mechanism in learning. Vygotsky believed that language develops from social speech, to private speech and to inner speech (Meece, 2002).

A key concept is the *zone of proximal development* (ZPD) defined as "the distance between the actual developmental 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 (Vygotsky, 1978). It is the difference between what children can do on their own and what they can do with other people's assistance (Hogan & Tudge, 1999). It represents the amount of learning possible by a student given the proper conditions (Puntambekar & Hubscher, 2005). It is primarily a test of a student's developmental readiness or intellectual level in a specific domain (Bredo, 1997). It shows how learning and development are related (Campione et al., 1984). In the ZPD, a teacher and the learner work together on a task that the learner could not perform independently because of the difficulty level (Belmont, 1989). As teacher and learner start sharing tools of cultural interaction, it produces cognitive changes (Bruning et al., 2004). However, children do not acquire knowledge passively but bring their own understandings for constructing meanings and integrating them to their experiences (Rogoff, 1986). Once a child masters the process of language, counting and writing, the next step is to self-regulate thoughts and actions (Schunk, 2008).

In a learning situation, a teacher initially might do most of the work, after which the teacher and the learner share responsibility. As learner becomes more competent, the teacher gradually withdraws the scaffolding so that the learner could perform independently (Campione et al., 1984). Scaffolding keeps the learners in ZPD and slowly students start learning within the zone. Another application that reflects Vygostky's ideas is *reciprocal teaching*. It involves an interactive dialogue between a teacher and small group of students. It comprises social interaction and scaffolding as students gradually develop skills. One more area where Vygostky's ideas are applicable is *peer collaboration*. When peers work together, social interactions serve as learning experiences. Research shows that such groups are more effective when each student attains competence before they progress to the next task (Slavin, 1995). *Apprenticeship* is yet another area relevant to Vygotsky's theory (Radziszewska & Rogoff, 1991). Novices work closely with experts in joint work related activities. In schools, it works well, when young teachers develop a shared understanding of important processes and integrate this with their current understanding. Pupil

teachers work with experienced teachers in schools and when they are on the job, they are paired with them to be mentored, till they are on their own. Similarly, students conduct research with professors in universities till they acquire competence to conduct independent research (Mullen, 2005).

In Vygotsky's theory, self regulation involves the coordination of cognitive processes such as planning, synthesising and forming concepts (Henderson & Cunningham, 1994). It involves gradual internalisation of language and other concepts. Young children primarily respond to the directions of the others. Through the use of private speech and other cognitive tools, they internalise directions to self regulate their behaviours in different situations (Schunk, 1999). It is important to understand how learning environments should be created for students. How students are to be grouped for instruction, how work is to be evaluated, how authority must be established in the classroom, and how teaching time is scheduled - are some of the contextual factors within the ambit of constructivism. There are many factors that need to be considered for greater understanding of learning process (Marshall & Weinstein, 1984; Roeser at al., 2009). *Dimensionality* is an important aspect (Rosenholtz & Simpson, 1984). Unidimensional classrooms have a few activities which can test only a limited range of students' abilities. All students work on similar tasks and the more or less consistent daily teaching-learning environment produces a consistent performance for each student. Here, the student autonomy is low and teacher direction is high. Materials and assignments are uniform for everyone. There is neither self-regulation nor motivation. On the other hand, multidimensional classrooms have an array of activities which allow for diversity in student ability. Students get a fair degree of autonomy to choose the activities and their pace, there is little supervision, unless it is for motivation and greater flexibility.

Besides, task dimension, there are other factors also in the classroom which affect learners' perception, motivation and learning. How much authority students have to control and develop their own learning is a relevant point. When students get opportunities for decision making, leadership roles and peer tutoring, they tend to develop higher self-efficacy. Rewards, incentives and appreciation have important consequences for motivated learning (Schunk, 1995). When students are recognised for their efforts and achievement, they learn with greater efficiency. Teachers often have to group the students to work with each other. Heterogenous grouping should ensure that differences in ability do not translate into differences in motivation and learning. Low achievers particularly benefit from group work since it gives them a feeling of self-efficacy. To evaluate students for their progress, teachers could give them opportunities to improve their work. It is also important how much time is given to them (Epstein, 1989). Giving students time to plan their schedules helps students allay anxiety about completing work with self-regulation (Zimmerman, 2008).

Motivation researchers have identified two distinct mindsets about the role of ability in achievement. Students who have fixed mindsets think that they have no control over their progress whereas those who have a growth mindset think that they can improve their performance by learning (Dweck & Molden, 2005). Students with fixed

mindsets get intimidated by difficulties which affects their learning adversely. Conversely, the students with growth mindset continue to alter their strategy, seek help and consult for more information or engage in self regulatory strategies (Dweck, 2006). These perspectives have an impact on motivation and achievement. Similarly, teachers expectations also affect student achievement outcomes (Rosenthal, 2002). Teacher expectations can act as self-fulfilling prophecies since students believe in them, particularly younger students who have closer bonds with teachers (Rosenthal & Jacobson, 1968). Brophy & Good (1974) suggest that when teachers have high or low expectations from the students, their behaviour towards the students changes accordingly. The students with high expectations get reinforcing cues from the teachers while those with low expectations, do not get the same warmth and acceptance. This happens by way of feedback given to students, non-verbal communication like smiles or nods at responses, amount of academic interaction, giving feedback and many other spontaneous responses. Teachers praise high expectations students and criticise those with low expectations (Cooper & Tom, 1984). However, this is not always the norm since there are teachers who continue to encourage the low achievers also, paying them greater attention to bring them at a higher level. Appropriate teacher expectations play an important role in student achievement.

Constructivist classrooms create rich experiences that encourage learning. In traditional classrooms only basic skills are emphasised and teachers teach didactically, seeking only correct answers to questions. Students often work alone in such classrooms and refrain from giving their own views. Assessments are disconnected from teaching, for example, end of the term exams to assess the whole year of learning. On the other hand, in constructivist classrooms the curriculum focuses on the bigger picture. There is greater teacher-student interaction, group-work, teacher observations and value given to student perspectives. Assessments are regular and they focus not only on the student performance but also the teacher performance. Objective type questions comprising true-false or multiple choice questions may not be most appropriate for assessing learning outcomes. Authentic assessment must comprise reflective pieces of writing by the students, discussing what they have learnt (Schunk, 1994). Generally, school teachers are held accountable for students' scores on standardised tests which typically assess lower-level, basic skills instead of conceptual understanding. Standard curriculum and set lesson plans for years in continuation, work against constructivist classrooms.

Peer-assisted learning methods like peer-tutoring, reciprocal teaching and cooperative learning, fit well with constructivism (Rohrbeck et al., 2003). They not only foster academic and social motivation (Ginsburg et al., 2006) but also help build learning that sticks. Students are more active in the learning process, interacting with each other, which further enhances cooperation among students. However, teachers need to ensure that for cooperative learning, the task should not be so vast that it could not be completed in time. The task should lend itself well to a group, having enough components which can be completed by individual students and then merged to produce a final product (Slavin, 1994). While making groups, students must not choose on their own since they may select only their friends. Also, making heterogenous groups with different ability students brought together does not always help. High achieving peers do not always benefit from the low achievers (Hogan & Tudge, 1999). Similarly, self-efficacy of low-achievers may not necessarily improve by seeing how their high-achieving friends are performing (Schunk, 1995). Clear guidelines ought to be given to the groups for working together. The task must use inter-dependence and benefit individual ability of each student. For example, while doing a literature project on 'Merchant of Venice', some students can focus on writing, others on enacting the court scene, some others on sketching the streets and courtroom of Venice. This will produce reflective essays, posters and skit, achieving a greater understanding of the classic drama. It is also important that each group member is accountable. In a group of six where only two students do most of the work, giving an 'A' to everyone might cause resentment. Therefore, the components of group work must be clearly defined at the outset.

Conclusion
Constructivism is an epistemology about the nature of learning. As a theory, it proposes that learning is neither a stimulus-response phenomenon, nor a passive process of receiving knowledge. It rejects the idea that there is any scientific truth but prefers discovery and verification. Knowledge, which is viewed as personal and subjective, is constructed through interactions and reflections. Reality resides in the mind of the learner, who is an active creator of his now knowledge. Learners are intellectually generative individuals who pose questions, solve problems and construct their own knowledge through reflection and joint interactions. Constructivism develops thinking of each individual. The locus of intellectual authority resides neither with the teacher nor the resources. Rather, the discourse facilitated by both learners and teachers builds knowledge. Constructivism gives students ownership of what they learn, knowledge, which is more likely to be retained and transferred to real life. The brain naturally attempts to extract meaning from the world by interpreting experience through existing knowledge and then building elaborate new knowledge. Thus, learning is not the result of development but learning itself is development.

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