

Developmental Psychology: Incorporating Piaget's and Vygotsky's Theories in Classrooms

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In today's society, there is disagreement among researchers and educators as to the role of developmental psychology and its application in the elementary classrooms. It is widely accepted in the educational field that children must go through the process of learning to think and thinking to learn. Therefore, teachers, who can incorporate the theories of Piaget and Vygotsky into their teaching strategies, will be better able to increase student achievement.

Developmental Psychology, the study of age-related changes in behavior, examines the psychological processes of development, which means it describes the sequence of biological, cognitive, and socio-emotional changes that humans undergo as they grow older. 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. In more recent years developmental psychology has studied the entire life span of individuals. By understanding how and why people change and grow, we can help people live up to their full potential. This paper will examine the application the theories of two of the major scholars in developmental psychology, Jean Piaget and Lev Vygotsky, to promote student learning in current elementary education programs.

When No Child Left Behind's scientifically researched-based instructional strategies are implemented in the classroom, student achievement increases significantly (Turnbull and et. al., 2007, p. 21). Teachers must develop a better understanding

of their students' cognitive development, which will lead to the needs of the whole child being satisfied. Cognitive psychology is a branch of psychology that focuses on studies mental processes, which include how people think, perceive, remember, and learn. 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 (Black & Green, 2005).

Jean Piaget

In 1896, Jean Piaget was born in Switzerland. He was "...a psychologist with a fundamentally biological orientation" (Campbell, 2006, p. 1). 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. While working at Alfred Binet's laboratory, he became interested in studying students' wrong responses. Piaget wanted to study the errors children made, and the possibility that the errors were not random. His theory purports the process of coming to know, and the stages we move through as we gradually acquire this ability. Piaget

“belongs to the constructivism perspective that sees learning as construction (Dahl, 1996, p. 2).

Piaget identified four stages in cognitive development: sensori-motor, pre-operational, concrete, and formal. Children in the sensori-motor stage, also called infancy, are likely to learn by using their five senses, object permanence, and actions that are goal-directed. Infants and children do not think the way adults do. Young children 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 that other person's (Campbell, 2006, p. 5). The preoperational stage spans ages two through seven. During this period, children are able to do one-step logic problems, develop language, continue to be egocentric, and complete operations. Children in this stage, however, struggle with centering and conservation. The concrete stage occurs during ages seven through eleven. From age twelve to adulthood, children enter the formal operations stage, which allows them to think logically and show lingering egocentrism.

Lev Vygotsky

Lev Vygotsky, who lived from 1896 until 1934, was born to Jewish parents in Russia, present-day Ukraine. He enrolled in a private school named Sganiavsky, and majored in history and philosophy (Palmer, 2001). He believed the 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, slide 21). In his work, 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, slide 22).

Vygotsky developed concepts of cognitive learning zones. The Zone of Actual Development (ZAD) occurs when students can complete tasks on their own. There is nothing new for the students to learn. In this zone, the students are independent.

The Zone of Proximal Development (ZPD) requires adults or peers to provide assistance to students, who cannot complete the assigned task without help. The ZPD is the gap between what learners are able to do independently, and what they may need help in accomplishing (Daniels, 2001). Instruction and learning occurs in the ZPD. When students are in this zone, they can be successful with instructional help.

Vygotsky died suddenly from Tuberculosis. After his death, Stalin had Vygotsky's work banned. It was not until the collapse of the Soviet Union that Vygotsky's works were translated and read by other researchers.

The lives and works of Jean Piaget and Lev Vygotsky had similarities and differences. Both men were born in the same year, 1896. Piaget lived until the age of eighty-four. While Vygotsky died at age thirty-eight. They shared the same field of study, which was developmental psychology. Both Piaget and Vygotsky thought learning is what leads to the development of higher order thinking. However, Piaget took a more constructivist view and focused on the individual, while Vygotsky used an active theory approach that focused on social interaction. Teachers can use effective instructional strategies, based on the developmental and cognitive psychology theories of Jean Piaget and Lev Vygotsky, to increase student achievement at the elementary level. But, before Piaget's and Vygotsky's theories can be implemented in classrooms, both administrators and teachers need to develop an understanding of the lives and theories of Jean Piaget and Lev Vygotsky.

Comparison of Theories

Now that the backgrounds 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. 2). Piaget's theory refers to qualitative periods or stages of development. Piaget's theory encourages hands-on learning. Vygotsky accepted, “The activity theory 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, p. 10). He believed the learner constructed his or her own knowledge by interacting with other individuals.

Piaget’s Theory

Piaget believed individuals must adapt to their environment. He described two processes for adaptation which is an organism’s ability to fit in with its environment, assimilation and accommodation (Dimitriadis & Kamberelis, 2006, p. 171). 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). According 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 the external world has been reached, children are in a comfortable state of equilibrium (Agnes, 1999, p. 1282). 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 structures.

Piaget’s theory has not been universally accepted by all. Some researchers believe Piaget

underestimates children’s knowledge. Complex skills can be acquired easily once simpler prerequisite skills have been learned (Croker, 2003). Some have noted that the stages in his theory have inconsistencies. He ignored social and cultural groups in his research. Piaget’s tasks underestimated the impact of culture by being culturally biased. And, formal operational thinking is not universal.

Vygotsky’s Theory

Social interaction plays an important role in student learning. It is through social interaction that students learn from each other, as well as adults. Fogarty (1999) stated, “Vygotsky’s theory suggests that we learn first through person-to-person interactions and then individually through an internalization process that leads to deep understanding” (p. 77). Vygotsky explores three different types of speech: social, private, and internal. He refers to social speech as the instructions given by adults to children. Private speech allows children to process what the adult has said and try to apply it to similar situations. For example, a teacher tells the class to keep their hands to themselves. Self-control is an example of private speech because children are using for themselves the same “language that adults use to regulate behavior” (Wilhelm, 2001, p. 11). So, since their teacher has informed to keep their hands to themselves, the students do not hit or punch each other in class. Both teacher and student share the responsibility of developing students’ private speech. Internal or inner speech takes place “as the student’s silent, abbreviated dialogue that she carries on with self that is the essence of conscious mental activity” (Wilhelm, 2001, p. 11). In the earlier example, these students must internalize the consequences of hitting another student, which could lead to a disciplinary referral. Thought is the result of social speech becoming private speech that has been internalized. When the cultural signs become internalized, humans acquire the capacity for higher order thinking (Huiitt, 2000, slide 24).

There are fundamental differences between Piaget and Vygotsky. Piaget believed the individual is primary in the learning process, while Vygotsky believed that social life is primary in the learning process. As Dimitriadis and Kamberelis (2006) note, "Piaget grounded his developmental learning theory in the individual learner and positioned children as active, intelligent, creative constructors of their own knowledge structures" (p.170). In contrast, Vygotsky's main construct of the Zone of Proximal Development (ZPD) learning "depends upon outside social forces as much as inner resources" (Palmer, 2001, p. 35). Vygotsky believed that if students were not improving academically, their instruction was inappropriate. This belief contradicts Piaget's reasoning that the students may have "plateaued" in a specific developmental stage.

Developmental growth is another area of difference. Piaget's theory focuses on fixed stages of development, whereas Vygotsky's theory notes a more fluid, on-going repertoire of development. So how do administrators and teachers implement these theories in their schools and classrooms?

Application in Education

Ivic (1989), as cited by Daniels (2001), stated:

School does not always teach systems of knowledge but in many cases overburdens its pupils with isolated and meaningless facts; school curricula do not incorporate tools and intellectual techniques, all too often schools do not provide a setting for social interaction conducive to knowledge construction (p.98).

The use of Piaget's theory in Education

By using Piaget's theory in the classroom, teachers 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 (e.g. motivational set, modeling, and

assignments). Their goal is to help the individual 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 instance, if you give students modeling clay and tell them to mold it, the shape will change, but the color of the modeling clay will remain the same. Conservation of constancy "identifies relationships and makes sense of physical and abstract information" (Garner, 2007, 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 discerning 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.

In order for students to develop their conservation of constancy skills, teachers must provide their students with opportunities to recognize similarities and differences at both the physical and abstract level (Garner, 2008). Many of us developed our conservation of constancy by doing chores and playing games. Piaget believed conservation is developed in students who are ages seven and eight. Visualization and reflective awareness are crucial to students' understanding of conservation of constancy. By encouraging students to notice similarities and differences in objects, they increase their conservation of constancy.

The Use of Vygotsky's Theory in Education

Vygotsky's central topic 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's 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, modeling, and using guided practice in the classroom. By modeling 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 endeavor aloud, can be used with upper elementary and middle school students, who are in the ZPD. This strategy assists students' thinking about how they make meaning. During think-alouds, students listen 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 or explicitly. Think-alouds help teachers determine why and how students are experiencing difficulty in reading. In addition, students can analyze their own thinking about their reading.

When an administrator walks into a teacher's classroom using Vygotsky's theory to guide his or her instruction, he or she should see students engaged 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 novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" (Wood et. al, 1976, as cited by Daniels, 2001, p.107). The use of language and shared experience is essential to successfully implementing scaffolding as a learning tool. By practicing making inferences, students are able to determine what and when inferences needed to be made. Teachers need to provide students, who are in the ZPD, copies with specific sentences that have been underlined in a short story. The underlined sentences will help the students realize

when they need to make inferences. As they read the story, they can pause and think about what type of inference they need to make. Thus, students are able acquire and develop master of complex reading skills. "Scaffolding involves simplifying the learner's role rather than the task." (p. 107).

Vygotsky's model of teaching and learning has significantly influenced "early-literacy" programs, such as Reading Recovery and Guided Reading. Yet, this theory is in contradiction to what is happening in many schools today. Too many schools have teacher-centered classrooms. The teacher/information centered model (is)...learning centered on the information possessed by the teacher, which flows one way, from teacher to student (Wilhelm, 2001, p.8). To counter this prevalent view, Vygotsky maintains meaningful and productive collaborative activities that need to be engaged in by both students and teachers. Learning can occur through play, formal instruction, or work between a learner and a more experienced learner. Teachers must actively assist and promote the growth of their students, so the students can develop the skills they need to fully participate in our society.

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, 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 elementary education can positively impact student 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. Administrators and teachers have to work together. As one continues reading, a model school that incorporates these theories will unfold. The B & P Model School is a fictitious school that has been

created in order to demonstrate how these theories could be combined and utilized to increase student achievement.

The B & P Model School

The B & P Model Elementary School (BPMES) is a school with small classes, no more than 15 students per class. The school day is six and one-half hours (8:30 a.m. until 3:00 p.m.). Our curriculum is based on the Virginia Standards of Learning. The building administration includes a principal and assistant principal. The faculty consists of highly qualified individuals, certified in Pre-Kindergarten through fifth grade, with specialists in physical education, music, computer technology, art, and library. All students are required to attend one elective per day. One teacher and one paraprofessional will be in each classroom.

Both Piaget and Vygotsky's theories are demonstrated in this school. The school structure for the early years emphasizes Piaget's developmental stages more than Vygotsky's repertoires. As students develop and matriculate through the school, the classroom strategies are based more on Vygotsky's Zone of Proximal Development than the stages of development theorized by Piaget. When assigning students to classrooms, age and developmental levels will be utilized to group children to better meet their instructional needs. The school has multi-age classrooms in order to meet this method of assigning students. The classrooms with the younger students will be more experientially based with much physical activity. This includes children moving through centers that have been developed and arranged to reinforce the concepts taught. As the students move through the stages of development, the emphasis is more on small group instruction, peer tutoring, and guided learning.

A Typical School Day

The daily schedule of each grade level will be similar in that all students will have an orientation to their day after breakfast, instruction will take place for approximately two to three hours, depending on the age group. Then, students will have lunch. After lunch, children will attend

one special (music, art, library, computer, physical education), participate in recess, and receive instruction in science and social studies. Students will receive daily instruction in all subjects, rather than alternating days for specific subjects.

The morning orientation time will consist of such routine activities as putting away their belongings, handing in any notes or homework, and other paperwork, as well as a review of the schedule of activities and lessons for the day. Taking into consideration Piaget and Vygotsky's theories of development, this orientation period will be differentiated based on the developmental/grade level of the students. The general breakdown of classrooms is as follows: the primary level is composed of students whose ages are four and five, the intermediate level is made up of students who are ages six and seven, and the advanced level is composed of students who are eight, nine, and ten years of age.

In the classrooms with students ages four and five, the students will be operating at the preoperational stage of development based on theories posited by Piaget. In the preoperational stage, the concentration is on experiences that the children are able to repeat and therefore learn at their own pace with guidance. Piaget thought children needed to participate in experiences in order to learn. He claimed, "...the individual learner is a little scientist constantly constructing and reconstructing theories about the world and how it works" (Dimitriadis & Kamberelis, 2006, p. 174). Piaget believed, "...cognition can develop normally without language acting as a mediational mean" (Dimitriadis & Kamberelis, 2006, p. 174). Although Piaget believed cognition can develop before language, the early years in the B & P model school will emphasize language in accordance with Vygotsky's theory that language (speech) is necessary before the child is ready to learn more complex material.

Children continue to be egocentric at this stage of development but are moving to a more socially conscious period. According to Piaget, at the preoperational stage children tend to use

intuition to problem solve and move toward a more logical problem solving system as they develop. This stage is similar to Vygotsky's repertoire of play and his belief, "The process of trying to communicate with others results in the development of word meanings that then form the structure of consciousness" (Palmer, 2001, p. 36). It is this consciousness that enables the child to move through the next stages of development.

As stated earlier, the instruction in the early years will be grounded in experiences through play with an emphasis on language. The children will be engaged in a story time daily. The story or stories will reinforce concepts being taught to the children. Many questions by the teacher will be asked throughout story time in order to engage students in language activities that require making inferences and the recalling of information. After story time, the children would move to a central location (tables or desks) to be instructed in a specific area such as pre-reading (colors, matching, sorting, and letters) and math, (numbers, counting objects, matching, and sorting). After the initial instruction, children would either be assigned a center or choose a center that has been developed to explore and reinforce the recent instruction in that particular academic area. These centers would be arranged and planned by the teacher and aide to engage children in activities that are taught on a daily basis. During this center time, the teacher and aide would move throughout the classroom to facilitate activities with the materials. Children would be required to move throughout the centers on a rotational basis in order for all students to be exposed to each center. After a certain length of time, children would be called back to a central location in order to review what they had accomplished. This is similar to Nancy Vogel's Plan, Do, and Review model that so many early childhood classrooms utilize.

The Primary Level

It is after these activities that the children would have lunch, and attend their assigned special (art, music, library, computer, physical education) for the day. The afternoon would consist of recess

and a rest period for the four and five year olds (the primary level). It is here that some children may sleep, look at a book, puzzle, or may work individually with the teacher or aide to reinforce concepts in which the child may be struggling. Later, in the afternoon, these young students would participate in another round of centers that are based on social skills (language, role playing, turn-taking) and play activities. Again, the teacher and aide would rotate throughout the centers, which allow them to play and talk with the children. At the end of the day, there would be a group review and time to gather materials to go home.

The Intermediate Level

As children move to the intermediate level, (six and seven year olds), emphasis will be placed on reading and math. Each classroom at this level will have an orientation period followed by direct instruction, with activity centers to follow. It is very important that children have an opportunity to practice what is taught during the direct instruction period under the guidance of the teacher and aide. It is here that Vygotsky's theory, the Zone of Proximal Development (ZPD), will be utilized to a greater extent than in the earlier years. In the ZPD, the adult will control "those elements of the task that were initially beyond the learner's capacity, thus allowing the learner to complete those that were within existing capabilities" (Daniels, 2001, p. 107).

After a morning of direct instruction and reinforcement, through activities both physical and cognitive, the children will eat lunch and attend one of the following: music, library, physical education, computer, or art. When they return to their classroom, they will have another period of direct instruction in social studies and science. This would be followed by activities to reinforce the concepts presented. Children will also have a recess period.

Instruction at this level continues to be based on Piaget's preoperational stage of development but begins to include Vygotsky's theories of "leading activities typical of certain age periods around which intellectual development is organized" (Huiitt, 2000, slide 8). Writing and

reading will be the overall emphasis of instruction. The most important thing teachers can do is to help their students acquire "...strategic knowledge, a knowledge of the procedures people use to learn, to think, to read, and to write" (Wilhelm, 2001, p. 7). Pretending allows young children to practice and strengthen newly acquired representational schemes (Berk, 2003). Various cognitive skills are increased by make-believe play: attention, memory, logical reasoning, language and literacy, imagination, creativity, reflecting and taking on experiences. For instance, one-way logic questions would be given to small groups of students to work cooperatively to solve.

The Advanced Level

Students in the upper age range for the BPMES (ages eight, nine, and ten), follow a similar schedule as the other classes. An even stronger emphasis is placed on language arts, math, science, and social studies. It is in these classes that Vygotsky's theory plays a larger role in teaching strategies, however, Piaget's theories continue. According to Palmer (2001), "Piaget was explicit in recommending group learning as a standard means of classroom learning" (p. 41). Vygotsky's theory of scaffolding becomes an important technique in these classes as well as peer tutoring, small group activities and discussion, and guided learning.

The time periods set aside for language arts and math instruction would include direct instruction alternating with independent work, group activity, and use of technology for reinforcement of concepts. Students would be able to discover their individual style of learning. Too often, we give students preprinted graphic organizers or preset criteria to classify information rather than letting them discover patterns based on criteria of their own (Garner, 2008, p. 35). Social studies would include direct instruction, role playing, computer technology, and small and large group activities. Science would be replicating experiments in small groups after large group demonstration, and discussion in small and large group.

Assessment, which is a large part of indicating a student's readiness to move to the next level would take the shape of a portfolio as opposed to pencil and paper or computerized standardized testing. The teacher would collect evidence on each child as they demonstrated accomplishment of the Standards of Learning.

Conclusion

By incorporating Piaget's and Vygotsky's theories into teaching strategies in elementary classrooms, student learning is likely to increase. So, how do teachers use Piaget's and Vygotsky's theories in their instruction to improve student achievement? There are various ways for teachers to implement developmental psychology in elementary classrooms.

Even though Piaget and Vygotsky hold different views concerning developmental psychology, the use of both theories in classrooms is advantageous. Teachers have a solid understanding of Piaget's and Vygotsky's theories. Students are provided with more opportunities to play and learn with their peers. The B and P Model School, our example of a model school, demonstrates the positive effects of the theories of Piaget and Vygotsky could have at the elementary school level. Garner (2008) states, "It is truly more efficient...to equip students for ongoing learning by using the everyday curriculum (in order) to fortify cognitive structures" (p. 38).

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Piaget's theory was hugely influential, but not without criticism. Learn about Piaget's legacy, including support and criticism for his stage theory. Jean Piaget's theory of cognitive development is well-known within the fields of psychology and education, but it has also been the subject of considerable criticism. While presented in a series of discrete, progressive stages, even Piaget believed that development does not always follow such a smooth and predictable path. In spite of the criticism, the theory has had a considerable impact on our understanding of child development. Piaget's observation that kids actually think differently than adults helped usher in a new era of research on the mental development of children. Support Revising. Developmental Psychology. Vygotsky. Lev Vygotsky. By Saul McLeod, updated 2018. Vygotsky's theories stress the fundamental role of social interaction in the development of cognition (Vygotsky, 1978), as he believed strongly that community plays a central role in the process of "making meaning." Unlike Piaget's notion that children's development must necessarily precede their learning, Vygotsky argued, "learning is a necessary and universal aspect of the process of developing culturally organized, specifically human psychological function" (1978, p. 90). In other words, social learning tends to precede (i.e., come before) development. Vyg... Educational Psychology, Educational Theories, Applied Psychology, Developmental Psychology, School Psychology, Piaget Stages Of Development, Human Growth And Development, Child Development Psychology, Language Development. Latetia Staggers. Projects to Try. Classroom Activities That Relate to Piaget's Theory of Cognitive Development. Preschool Lesson Plans Preschool Classroom Kindergarten Activities Educational Activities Classroom Activities Preschool Learning Classroom Ideas Developmental Psychology Educational Psychology. Jean Piaget, the psychologist and philosopher said