The Benefits of Alternative Education: How Piaget’s Theories of Cognitive Development in Children Supports the Montessori System

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Abstract

The discussion of the most effective way to educate children began in the early 20\textsuperscript{th} century and since then has spurred the establishment of various educational methods. Many of them, such as the Montessori method, have shown to be effective in advancing cognitive development in children, thus becoming increasingly accepted as a form of alternative education. The research question for this essay is: Do Piaget’s theories of cognitive development support the Montessori system?

This essay found that while Piaget’s theories of cognitive development were established a half-century after the Montessori system was created, they clearly support the Montessori system. As there have been frequent modifications of theories on cognitive development by psychologists and researchers, as well as various alternations made by modern educators to the Montessori system, it has been necessary to focus this essay on both Piaget’s theories and Montessori’s teachings as they were originally established. This essay will first describe each of these in detail, and then address the ways in which Piaget’s theories of cognitive development support the Montessori system. However, there are criticisms to the idea that this relationship exists; for example, it might be argued that though it seems that the Montessori method is supported by Piaget’s ideas, and by all accounts should thus advance cognitive development, Montessori schools are not seen as widely as one might expect. These issues can be explained by addressing several pragmatic reasons, such as the concern of cost.

This paper will argue that the Montessori system is supported by Piaget’s theories of cognitive development through its close adherence to the theory of the developmental stages of cognition, its emphasis on learning information using a variety of senses, and its focus on self-motivation as essential to both learning and cognitive development.
Introduction

How do children learn best? Until recently, the focus of Western educational systems has been directed at ensuring that all children were given the opportunity to attend school, a goal that has been largely achieved. Now the West, as well as many countries in Europe, has shifted its concentration to breaking down teaching methods in an attempt to determine those by which children learn best. Such educational systems are subject to frequent modifications with the goal of bettering the learning of children.

As a result of differing philosophies on the way to most successfully educate children, alternative educational techniques have become increasingly popular. Many of these techniques can be considered an application of cognitive developmental psychology as opposed to its earlier counterpart, behavioristic developmental psychology. Perhaps the most widely used and accepted of these is known as the Montessori method, developed by the innovative Italian physician Maria Montessori nearly a century ago. In stark opposition to attitudes regarding education when her first book *The Method of Scientific Pedagogy Applied to the Education of Young Children in the Casa de Bambini*, *The Montessori Method* was published in 1909, the Montessori Method centers on the concept that children should learn at their own pace and use their own approach while observing certain carefully formulated directives to ensure maximum cognitive growth. There have been frequent modifications to the Montessori teaching method since it was first introduced; these changes will be addressed in the essay.
Even in public and other non-Montessori schools in the Western countries as well as countries such as India,\(^1\) alterations in teaching techniques have been made based on the observed benefits of this method on cognitive growth. It should be noted that the Montessori system has also been shown to foster social, moral, and emotional growth in addition to cognitive progress; however, due to such a vast number of educational benefits accredited to Montessori schooling, it is necessary in this essay to explore only a single area of development. The research question of this paper is: Do Piaget’s theories of cognitive development support the Montessori system? This paper will argue that the Montessori system is supported by Piaget’s theories of cognitive development through its close adherence to the theory of the developmental stages of cognition, its emphasis on learning information using a variety of senses, and its focus on self-motivation as essential to both learning and cognitive development. This topic is worthy of study as it elevates the Montessori system as a program that advances cognitive growth, thus presenting a highly effective form of alternative education.

A Definition of Cognitive Development

In order to most effectively demonstrate the effects of the Montessori program on cognitive development, it is first necessary to define the term “cognitive development.” While there is a great diversity of opinion as to the specifics that constitute cognitive growth, the majority of these stem from the fundamentals laid down by Jean Piaget (1896-1980), a Swiss zoologist-turned-psychologist. Piaget’s theories were first

published in *The Origins of Intelligence in Children* 1936\(^2\) after far-reaching observations of children, including his own, and his work remains “the foundation of all subsequent investigations in the area of the formation of the intellect.”\(^3\) Piaget studied the mistakes that children made when presented with certain tasks, believing that they would reflect the cognitive abilities of children of different ages, and developed theories based on his findings regarding the stages at which certain cognitive skills were reached, what these cognitive skills were, and the necessary factors for one to progress through these stages. This essay will explore the way in which the Montessori system advances cognitive development predominantly according to such theories belonging to Piaget.

Some argue the difficulty of sequestering the environmental factors, such as method of education, from the biological factors that influence the individual. In *Cognitive Development: Psychological and Biological Perspectives*, Rosemary Rosser maintains, “The influence of biological and environmental forces are perfectly confounded.”\(^4\) Rosser asserts that it is difficult to separate the two variables, and overly reductionist to ignore the effects of either biological or environmental factors. However, she also states that Piaget’s theories take into account the “complex exchange processes” between cognitive abilities acquired from either biological inheritance or environmental stimuli. Because Piaget examines the way that environmental factors, such as method of education, interact with biological factors, such as physical growth of the brain, his


(correlations) among different behavioral indicators at a given point in development.\(^8\)

There are significant similarities between Piaget’s theory of the stages of cognitive development and the Montessori system’s organization of students in the classroom. Roland A. Lubienski Wentworth states that Piaget’s stage theory “confirmed the existence of phases in the development of the child’s mind and comprehension”\(^9\) in the 1950s when the stage theory was first introduced. In a manner different from most conventional systems of education and in close proximity to Piaget’s theory on the stages of cognitive development, the Montessori system places children into classrooms based upon a common cognitive stage, and not by age or “grade level” as in most Western schools. In the Montessori program, children are divided into age groups spanning approximately three years\(^10\) and are presented with activities that correspond to their cognitive ability at that level (Standing, 1962).\(^11\) This system coincides closely with Piaget’s stages of development in which certain cognitive tasks must be mastered during a certain age in order for normal learning to progress.

In fact, Montessori referred to development as “a series of rebirths” that progresses as one “psychic personality” completes its growth potential, which guides the formation of another; additionally, she believed that each of these stages necessitates an “appropriate and specifically designed” type of learning (Standing, 1962). However, unlike Piaget’s stage theory, Montessori believed that certain stages present critical periods, which she referred to as the “sensitive periods” of the “absorbent mind.”

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\(^8\) Ibid, pg. 24.
\(^9\) Lubienski, op cit, pg. 11.
\(^10\) Edwards, op cit.
\(^11\) Schunk, Dale H. et al. op cit, pg. 179.
asserted that the most critical period is that from three to six years old, as she thought this stage to be “a decisively significant stage of human physical, psychological, social, and cultural development.” In concordance with Piaget’s schema theory, she believed that while modifications are made to information learned as the child matures into an adult, this progression stems from the foundations laid down in early childhood.\textsuperscript{12}

Not only are the students grouped according to cognitive ability; they are also placed in an environment that is tailored to their cognitive stage. The Montessori system presents the individual child with a curriculum that is specifically tailored to assisting him or her in meeting the benchmarks of development as outlined by cognitive developmental psychologists. For example, Piaget proposed that in the preoperational stage, which lasts from age two to seven, a child is predominantly developing his/her linguistic skills, mastering symbols and using words as category headings, as well as sorting objects by physical characteristics. As such, the placement of children of that age together in a classroom with activities that are geared towards aiding them in the development of these skills aids in the successful mastery of such abilities.

The Montessori system also provides the necessary growth opportunities as delineated by Piaget to progress from one cognitive stage to the next. These four criteria include maturation, experience, social interaction, and equilibration. Maturation encompasses both the physical and psychological development that is present in a child at a certain cognitive level. Experience is the process through which a child interacts with tangible objects in his or her environment. Social interaction involves contact and communication between a child and others, especially members of the child’s peer group. Each of these first three factors is further advanced by the Montessori program, which

\textsuperscript{12} Ibid.
pulls the child along through the development of cognitive processes. While activities
and other learning opportunities presented by the educator in the classroom may advance
maturation, experience may be acquired by way of the independent exploration that is
encouraged in the program. Social interaction is developed not by collaboration and
group work, as frequently occurs in public schools, but by teaching the children how to
work independently while respecting their peers’ ideas and working space. Therefore,
while the Montessori system aids children in the mastery of cognitive tasks by grouping
them according to level of development, it is also carefully structured around the
factors that allow the child to advance to the next stage in the hierarchy of such cognitive
headway.

Equilibration, the fourth term that Piaget deemed necessary in the furtherance of
cognitive development, is defined as the result of the summation of maturation,
experience, and social interaction, which together create a schema, or “[a] basic unit of
knowledge used to organize past experiences and serve as a basis for understanding new
ones;”\textsuperscript{13} in other words, if a child is placed in an environment by which maturity,
experience, and social interaction are fostered, a foundation of knowledge will be built
that can be expanded upon as new information is encountered. In a child demonstrating
standard cognitive development, schemata will be created that allow further progression
towards increasingly intricate and theoretical ways of thinking as experiences are
amassed and linked with physical, psychological, and social growth.\textsuperscript{14}

However, criticism has been offered that the stages of cognitive development are
not as uniform and universal as Piaget believed. It has been argued that children do not

\textsuperscript{13} Rosser, op cit, pg. 24.
\textsuperscript{14} Psychology. Dept. home page. State U of New York at Cortland. 11 Sept. 2007
\textless http://facultyweb.cortland.edu/\%7EANDERSM/Piaget/Piaget.HTML\textgreater .

Bower and Wishart (1972) presented babies from one to four months old with an object and then turned off the lights. The babies could no longer see the object, yet continued to reach for it. This contradicts Piaget’s assertion that the infant displays a lack of object permanence; that is, when objects are not visible, they no longer “exist” for the child.\footnote{Graham, op cit, pg. 84.}

The Montessori system is supported by Piaget’s stage theory of cognitive development in grouping children according to their cognitive capabilities; additionally, the factors that Piaget deemed necessary in order for movement to occur between these stages is further facilitated by the nature of the Montessori program.

**Cognitive Development Through Interaction With the Environment**

A second critical concept in Piaget’s theories of development is that individuals are only able to grow cognitively by interacting with their environment through discovery, and not simply by observation. This concept corresponds closely with Maria Montessori’s scientific views on the manner in which children learn most successfully. Montessori believed that classrooms should be furnished and equipped in a manner that allows children to explore and interact with their surroundings in a safe and engaging environment. In her description of this type of environment in her book, *The Montessori Method*, Montessori states that the classroom should not only be aesthetically appealing, as she believed that “Color, brightness, and proportion are sought in everything that
surrounds a child,”¹⁷ but also that any material provided should inspire children to interact with their surroundings, stating, “…the environment is so arranged that it lends itself to a child’s desire to be active.”¹⁸

Piaget believed that interaction with one’s surroundings aids in cognitive development in a way that is collectively referred to as the schema theory. This theory encompasses the previously discussed terms of maturation, experience, social interaction, and equilibration. According to Christopher A. Thurber, Piaget thought that “intelligence grows as we add to and revise our ideas of how the world works.” In this way, cognitive development occurs as our perceptions of our environment changes, a process that occurs with the addition of new knowledge.

The schema theory is comprised of two interconnected and equally important processes: assimilation and accommodation. Piaget asserted that in the process of assimilation, new information is integrated into the schemata, or “internal representation[s] of a specific physical or mental action,”¹⁹ as the result of a stimulus. Eventually, accommodation occurs when a schema changes to incorporate new knowledge, resulting in the information being learned. Piaget believed that cognitive development occurs when assimilation and accommodation attempt to occur in a balanced form, a state that he referred to as equilibration,²⁰ where schemata are continually amassing new information and altering themselves in a way that allows them to develop and become increasingly detailed. The schema theory helps developmental

¹⁸ Ibid, pg. 103.
¹⁹ Graham, op cit, pg. 83.
psychologists to analyze the continuous progression in children’s capacity to take in information as a part of the total learning process through the dual processes of assimilation and accommodation. The Montessori system expresses a similar theory: that interaction with the environment results in actions that “enable them to construct a psychic network of relationships, which in turn, builds the cognitive and affective integration of the healthy personality (Montessori, 1995).”  

Research supports Piaget’s theory that interaction with one’s environment aids in the most successful learning. Lynn Staley, former educator and child care center director, asserts that multi-sensory processing of information during exploration of a child’s surroundings acts as a “foundation for conceptual understanding,” she also puts forth the idea that children experience situations with their senses and then combine these situations into more comprehensive and detailed schemata. In fact, Staley states that Piaget himself (1983) found that early education should be comprised of multi-sensory experiences through “experimentation, investigation, and discovery.” In the same way that Piaget believed that abstract skills appear with increasing levels of cognitive levels of cognitive ability and can only be achieved once more concrete views of the environment have been shaped, this multi-sensory interaction is essential “prerequisite” to the later, more “symbolic” learning that is necessary to function in the world (Elkind, 1987).  

Staley wished to determine the effect of multi-sensory learning on the comprehension of color. Staley matched each color to a corresponding scent, i.e. purple

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23 Ibid.  
24 Ibid.
was paired with the smell of grapes and the taste of a grape-flavored Popsicle, and explored thus explored each color through smell and taste. Additionally, each of the colors was also explored visually; bins of objects of the same color, i.e. purple clothing and household objects such as toothbrush holders and costume jewelry, were also presented to the children. While at the beginning of the project, only four of the ten children involved knew the eight colors,\textsuperscript{25} by the end, all ten children could both recognize these colors and use them to describe their surroundings. By using a multi-sensory approach to the learning of color, Staley believes, the children’s understanding of this critical concept was “supported;”\textsuperscript{26} the solidification of such knowledge provides the base of knowledge that Piaget deemed so critical in the formation and renovation of schemata. Montessori, too, believed that multi-sensory learning achieves the greatest cognitive growth. She writes that teaching a child to read is most successful when the child is presented with a physical object at the same time that he or she is reading the word; Montessori describes in detail games utilizing this approach, which she argued results in a more complete understanding of the written word.\textsuperscript{27} In this way, Piaget’s theories of the benefits of multi-sensory learning support Montessori practice.

\textbf{The Motivated Child}

A third essential Piagetian idea is that children actively acquire knowledge and possess an inherent sense of curiosity and enthusiasm for learning. This concept presents similarities with Maria Montessori’s idea of \textit{normalization}; or, the state in which children are able to work in cooperation with educators at their own pace and without a system of

\textsuperscript{25} Red, orange, yellow, green, blue, purple, black, and white.
\textsuperscript{26} Ibid.
\textsuperscript{27} Montessori, Maria. \textit{The Discovery of the Child}, op cit, pg. 230-31.
rewards or punishments. The normalized child, Montessori believed, does not learn in competition with other children or as a result of pressure from the teacher, but is motivated purely by an inherent drive to learn.

In explaining the effect of interest on cognitive development, Mihaly Csikszentmihalyi and Jeremy P. Hunter say, “Interest cultivates an internal milieu that optimizes the acquisition of information.”28 And indeed, there is evidence that the more interest is present, the more successfully a child will learn. For example, Renninger (2000) found that when students are interested in an article, they show higher levels of recall of information related to the article, can remember more topic sentences, provide a more comprehensive account of what they read, make fewer mistakes in “written recall,” and are able to offer more information pertinent to the topic.29

The benefits of this motivation are far-reaching; in addition to aiding comprehension, interest in a topic has shown to increase cognitive functioning. Csikszentmihalyi et al. (1993) and Schiefele and Csikszentmihalyi (1995) found that students who were more interested in a given reading were more likely to earn higher marks in school and test with greater accuracy.30 Furthermore, studies indicate that cognitive development is enhanced by interest simply because it makes us “feel good;” when we are interested in something, we are likely to experience feelings of pleasantness, self-confidence, and a significant amount of spontaneity (Izard, 1991)31 that aids in our absorption of the information.

29 Ibid.
30 Ibid.
31 Ibid.
According to Maria Montessori’s instructions, every aspect of the Montessori classroom should revolve around this natural drive to learn, providing a variety of choices within a structured environment. Even the physical classroom environment was carefully constructed so as not to obstruct this interest in learning; Montessori describes furniture tailored specifically to children’s needs, such as desks that are “strong but extremely light so that two four-year-olds could easily carry them about,” in addition to washstands, cupboards, and blackboards. Montessori believed that in this type of environment, where children are provided with activities and materials that have been carefully selected as a result of their known appeal to that age group, that they would be interested and thus more likely to learn.

Criticisms of the Connection Between Piaget’s Theories and the Montessori System

However, criticisms of the argument that Piaget’s theories of cognitive development support the Montessori system exist. For example, for a system that seems to be in line with Piaget’s theories, the method is not as widely practiced as one would expect. There are a few key reasons for the relative dearth of Montessori schools. Firstly, there is a certain risk in experimental schools, as most parents would not wish to delay their child’s education by placing them in a tentative educational program. In many cases, such decisions are made only as a last resort, when the child has had trouble progressing in other didactic settings. Additionally, there arise more pragmatic issues, such as the trouble of funding such expensive schools. For example, while public schools often place a single teacher in a classroom of several dozen children, the Montessori
system generally advocates the use of several teachers to assist children within the learning environment; this simple differentiation of the Montessori program is extremely expensive.

Conclusion

As evidenced by the congruence in the concepts of cognitive stages, the importance of the child’s interaction with their environment during the learning process, and the intrinsic sense of motivation within children to learn, Piaget’s theories support the program proposed by Montessori. While Maria Montessori developed her program of education based on “scientific pedagogy”32 in the early 1900s, it was not until half a century later that Piaget would espouse his conjectures of the specifics of cognitive development. While Montessori therefore could not have possibly based her system on Piaget’s theories, his observations and conclusions regarding the manner in which children develop cognitively is directly paralleled in Montessori classrooms.

Bibliography

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theories of cognitive development allow us to more easily argue the benefits of the Montessori system on cognitive development.

An Explanation of Montessori Schooling

Maria Montessori maintained that in order for education to be facilitated successfully, a child must be allowed choices and be provided with a comfortable learning environment. Additionally, a key basic assumption of Montessori’s model is that there exists an inherent desire to learn; she believed that this natural force is illuminated when a child is placed in such an environment. Montessori advocated a child-centered approach to learning in which the curriculum is individually tailored to each student, placing them in control of their educational advancement as well as fostering growth and development. However, despite a seemingly liberal approach to education, specific rules are also laid out in Montessori’s writings, “blend[ing] both freedom and prescription”;5 while there is large room for interpretation of these directives, Montessori believed that educators must adhere to certain practices in order to assist learning most successfully.

However, just as Piaget’s theories do not provide the sole definition of cognitive development, Maria Montessori’s initial dictations of how the educational process should be conducted are not the only views of the Montessori system. In the past century, the practices and teachings of the Montessori program have evolved into a less scientific and sterile philosophy. In support of the theory that the Montessori program is flexible and

may be shaped according to contemporary views, Roland A. Lubienski states that “[Montessori schools] should be undergoing continual revision and modification according to the changing times and different needs of new generations of children.” Because there are so many nuances in the modern practice of Montessori education, this essay will predominantly focus on ways in which Piaget’s theories support the fundamentals of the Montessori system as originally designed by Maria Montessori.

Stages of Development

One of the most central principles of Piaget’s theory of cognitive development is that all humans progress through a series of four cognitive stages that always occur in the same sequence and are present cross-culturally: the sensorimotor stage, the pre-operational stage, the concrete operational stage, and the formal operational stage. Piaget believed that children ultimately learn to grasp abstract concepts, test hypotheses, and understand hypothetical situations as they progress through this hierarchy of increasingly complex and abstract degrees of cognition. Piaget contended that children think in ways that are “qualitatively” different that adults. However, these stages are not clearly defined. Rosser clarifies the inexact nature of Piaget’s levels of cognitive development, stating:

“The criteria for ‘stageness’ from a Piagetian perspective are somewhat vague and not easy to operationalize, but most investigators agree that stageness presupposes discontinuity and a high degree of synchrony

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7 Graham, op cit, pg. 83.