



RESEARCH PAPER

Impact of Early Childhood Education Project on Students' Cognitive Development at School in the Punjab, Pakistan

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ABSTRACT

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This study intended to measure the impact of early childhood education project on students' cognitive development at schools in the Punjab. The study was quantitative and descriptive in nature. Sample of the study was comprised of 120 government school teachers (60 teachers from schools having ECE classrooms and 60 teachers from schools having Katchi classes). The non-participant complete observation method was used and data were collected on self-developed instrument named Cognitive Development Scale. It was concluded that the students who received early childhood education their cognitive development grows in ameliorate way. It was also concluded that in mostly schools where ECE rooms exist, trained ECE teacher and caregivers not available. On the basis of conclusions, it was recommended for the public sector to promote Early Childhood Education (ECE) all over the Punjab, additional funding is needed for the building of distinct rooms and the training of teachers to convey knowledge at this specific level of children.

Introduction

Early Childhood Education (ECE) is considered very important for children and Havnes and Mogstad, (2009) argued that the quality of an early childhood education program is an important underlying factor that determines the program's positive impact on children. Lancet, (2011) reported that the fastest growth of cognition happened in the first thousand days of a human's life. Gopnik and Wellman (2012) claimed that children from 1.5 years to 5 years of age adopt stochastic learning tools such as informal pedagogy in their physical psychological connecting inferences and informal experimentation through play.

European Commission (2010) reported that the development of children's cognitive abilities is one of the very critical parts of children's development and growth. Cognitive ability can be viewed as the ability to learn or think critically. Hildayani's (2009) research posit that cognitive development is the process by which children's mindsets and abilities in understanding and solving simple problems grow over their lifetimes. Cognitive development occurs swiftly at a young age, and despair

harms various aspects of other areas of development, such as the development of language and physical-motor skills.

This ability to think allows children to investigate themselves as well as other people, animals, plants, and everything else in their environment, gaining new knowledge as a result of their exploration activities. A child whose cognitive development is at its peak will also have no trouble interacting with his or her peers. Cognitive processes contain a variety of components such as perception, memory, thinking, symbols, reasoning, and problem-solving (Hijriyati, 2016).

A child's cognitive development comprises his or her ability to reason logically and critically, provide reasons for decisions, solve issues, and determine the causal relationship between the problems that he or she encounters. Children's cognitive development is based on two important aspects i.e. genetic makeup and surrounding environment. When it comes to heredity, it is a factor that every child has from the time he is in his mother's womb. This element manifests itself in the form of genes, which are passed down from one generation to the next. The hereditary element appears to have a crucial role in children's cognitive development (Erlenmeyer & Jarvik, 1963). Therefore, the research assessed the impact of early childhood education projects on students' cognitive development at schools in province Punjab. Regarding the rationale of the study, the following questions were formulated

Literature Review

Cognitive development means the development of a child's mind and capabilities in understanding things and solving simple problems. According to Heryanti (2014), in early childhood cognitive development is growing rapidly and removes effects on different aspects of the development such as language and physical development. Santrock (2005) quoted that early childhood education enables children to explore themselves in front of people, animals, plants, and they're surrounding so they get new knowledge from these exploration activities.

A kid whose cognitive development develops maximally easily interacts with peers (Hijriyati, 2016). There are many aspects, such as perception, memory, thoughts, symbols, reasoning, and problem-solving included in the development of cognition. According to Wood and Attfield (2005) through early childhood education child can explore the surrounding environment, then he or she becomes more creative and more imaginative and his or her cognitive world grows rapidly.

Khadijah, (2016) reported that children's cognitive development is influenced by two major factors, their heredity, and environment. Heredity is in the form of genes and children received it through parents. Sunarti (2013) described that the heredity factor plays an important role in children's cognitive development because there is a relationship between family ties with IQ size Ewing., Herres, Dilks, Rahim, and Trentacosta (2019) concluded the same results from their study that usually, individuals have relatively similar IQs with other individuals who have family relationships with them. In the same way Jenks (1972) and Moss (2011) that a child tends to have the same IQ as his parents.

The second-factor environment also affects the child's cognitive development. Danoebroto (2015) argued that a child's cognitive abilities develop smoothly in a good environment rather than in an uncomplimentary environment. According to Arifin (2016), a child's cognition effect by two kinds of environments a family environment and a school environment. A child's personality and mentality formation occur through the family environment and the family environment plays a key role in this formation. It is very necessary that family members especially parents, provide good examples and guidance so that children will be able to develop their self nicely. The school environment is a formal institution that helps parents in defining children's cognitive abilities. Some efforts can be implemented by schools to improve such child's cognitive abilities like developing harmonious interactions between students and teachers, facilitating students to interact with their fellows, and conserving with persons who are experts in developing children's language skills through different media sources. According to the genes, every child has a different perspective on thinking skills. The school environment provides a base for the development of this perspective in which a child is educated and developed. Khadijah, (2016) reported that positive school and family environments are favorable for the development of a child's thinking ability.

Jean Piaget and Lev Vygotsky formulate theories about cognitive development.

Jean Piaget's Cognitive Theory

Jean Piaget (1896-1980) was a biologist and he was interested in studying to find out the answers to those problems that faced the children. He observed the everyday activities of kids and mentioned the logical differences that affect kids' behavior. Piaget used a clinical method where different types of tasks and problems are given to children and asked questions. Children were responding differently, and then Piaget set advanced questions. Piaget concludes that in this way individuals learn and think very uniquely (Hildayani, 2009).

Piaget mentioned that the things that are learned and successfully done by the individual will be organized as a schema. Schema is a set of activities or an organized mind. Firstly, a child's schemes are in the form of behavior, and then it changes into a mental operation and finally transforms into an abstract. Schemes of a baby are obtained putting everything into his mouth. The scheme is used for different types of objects, i.e. pacifiers, the mom's nipples, blankets, toys, toes, and inserting a thumb. Piaget reported that children will learn more and more schemes from various situations. Finally, schemes are connected with a mental processor and it is called the operation. The scheme will assist the individual in sophisticated and logical thinking.

Ability in which one's handle new information is called adaptation. According to Piaget, adaptation is based on assimilation and accommodation. Assimilation is a person's ability in which he or she gets new information and matches it with the existing structure. In accommodation, an individual can modify or change the scheme of existing cognitive structures and link with new information or an event or object and develop a new scheme to fit.

Both accommodation and assimilation are interrelated with each other as the child's knowledge and understanding of his surroundings. Without the appearance of assimilation, accommodation hardly happens. Therefore, it is understandable that the modification schemes process has happened when a child needs a new experience. So it is assumed that maybe adults can stimulate children's interest to explore, for example by inviting children to observe how shoots can grow from green beans, manipulate the world around them by seeing the difference in the speed of shoots of green beans with and without the sunlight, encourages children to carry out simple experiments such as by inviting children to cook beans, and observing water flows from high place to low place. It is necessary for balance and cognitive growth the process of assimilation and accommodation should be continued.

The following development stage and its characteristics were proposed by Piaget:

1. The stage is the whole that is structured in a state of balance. The movement between one stage at a later stage involves more qualitative structural changes.
2. Every stage was obtained, added, and transformed from the previous stage, and is as preparation for the next stage. In preparation for the next stage, the present stage must have been completed.
3. Each stage follows an unchanged sequence. No one stage can be skipped. Each stage is prepared and obtained by the abilities gained from the earlier stage.
4. Each stage is universal. It has meaning that all people have the same phase sequence.
5. Each stage includes "a coming-into-being and a being". There is a preparation period and a final period that will be achieved in each stage (stage). Also, it can be said that there is an unstable period which leads to a more stable period.

Each stage acts as both the result and the beginning of the next stage.

The stages of cognitive development are divided into the following:

1. Sensorimotor stage: Birth to two years
2. Preoperational stage: Two years to seven years.
3. Concrete operational stage: Seven to twelve years.
4. Formal operational stage: twelve years to adulthood.

Some children may reach a stage a bit faster than the other children, while the others may also start at a slightly older age (Piaget & Inhelder, 1969).

Lev Vygotsky's Cognitive Theory

Lev Semenovich Vygotsky (1886-1934) was a Russian Psychologist. According to Vygotsky, cognitive development is more preferred in social aspects. Socially, a person's mental structure and processes may be identified from their interactions with others. Social interaction can shape a person's reflective process and create their cognitive structure. It is under Vygotsky's view on social cognition that social cognition may be interpreted as an understanding of the social environment and interpersonal relationships. This model describes how social experience affects or influences cognitive development. His theory highlights the important factor for individual development is culture. We believe this because only humans can create a culture and every child grows in a cultural context (Suryana, 2016).

Culture has a major influence that contributes to children's intellectual development. With culture, children can gain many facets of understanding and they can have many ways of thinking or intellectual adaptation tools. Culture has taught children about what and how they think (Danoebroto, 2015). Vygotsky believes that cognitive development can create instructional social processes in which children learn to exchange experiences in solving problems with others such as parents, teachers, siblings, and peers. The development is an internalization process upon a culture that creates knowledge and adaptation tools mainly through language and verbal communication (Arifi, 2016).

Material and Methods

Research Design

This study aimed to assess the impact of the Early Childhood Education Project on Students' Cognitive Development at schools in Punjab. Early Childhood Education was an independent variable. Whereas Cognitive Development (CD) dependent variable and nature-wise continuous variable. This study was descriptive. It was a quantitative study. The non-participant complete observer observation method was used for data collection from respondents of the study.

Instrumentation

A self-developed questionnaire was used to find out the impact of early childhood education projects on students' cognitive development. A seven-point Likert-type scale was designed for assembling responses of the selected sample. The Content Validity Index of the questionnaire was 0.92 and an alpha reliability value was .80.

Data Analysis Technique

A statistical package of Social sciences, (SPSS 21) was used for entering data and subsequent statistical analysis. Descriptive statistics mean scores, standard deviation, and t-tests in inferential statistics were applied for analysis.

Results and Discussion

Table 1
Cognitive Development of students who enrolled in ECE class

Sr.#	Items	N	Mean	S.D
1	Students know that Urdu is read and write from right to left.	60	4.35	1.90
2	Students know that English is read and write from left to right.	60	4.45	1.97
3	Students can identify the alphabet of the Urdu language.	60	4.63	1.78
4	Students can identify the alphabet of the English language.	60	4.92	1.60
5	Students understand the sequence of digits one to nine.	60	4.95	1.71
6	Students can identify the initial sound of the words.	60	4.52	1.85
The overall mean of Cognitive Development		60	4.60	1.61

This table shows the mean score i.e.4.60 with SD=1.61 of students' cognitive development who enrolled in ECE class. Specifically explaining, the students obtained a mean score of 4.35 with SD=1.90 against the indicator that the Students know that Urdu is read and write from right to left. Moreover, students obtained a mean score of 4.45 with SD = 1.97 against the indicator that the Students know that English is read and write from left to right. Moreover, students obtained a mean score of 4.63 with SD = 1.78 against the indicator that the Students can identify the alphabet of the Urdu language. Moreover, students obtained a mean score of 4.92 with SD = 1.60 against the indicator that the Students can identify the alphabet of the English language. Moreover, students obtained a mean score of 4.95 with SD = 1.71 against the indicator that the Students understand the sequence of digits one to nine. Moreover, students obtained a mean score of 4.52 with SD = 1.85 against the indicator that the Students understand the sequence of digits one to nine.

Table 2
Cognitive Development of students who enrolled in Katchi class

Sr.#	Items	N	Mean	S.D
1	Students know that Urdu is read and write from right to left.	60	3.63	1.75
2	Students know that English is read and write from left to right.	60	3.95	1.84
3	Students can identify the alphabet of the Urdu language.	60	4.07	1.65
4	Students can identify the alphabet of the English language.	60	4.50	1.69
5	Students understand the sequence of digits one to nine.	60	4.47	1.90
6	Students can identify the initial sound of the words.	60	3.92	1.87

The overall mean of Cognitive Development	60	4.088	1.56
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Table 2 shows the mean score i.e.4.09 with SD=1.56 of students' cognitive development who enrolled in Katchi class. Specifically explaining, the students obtained a mean score of 3.63 with SD=1.75 against the indicator that the students know that Urdu is read and write from right to left. Moreover, students obtained a mean score of 3.95 with SD = 1.84 against the indicator that the Students know that English is read and write from left to right. Moreover, students obtained a mean score of 4.07 with SD = 1.65 against the indicator that the Students can identify the alphabet of the Urdu language. Moreover, students obtained a mean score of 4.50 with SD = 1.69 against the indicator that the Students can identify the alphabet of the English language. Moreover, students obtained a mean score of 4.47 with SD = 1.90 against the indicator that the Students understand the sequence of digits one to nine. Moreover, students obtained a mean score of 3.92 with SD = 1.87 against the indicator that the Students can identify the initial sound of the words.

Table 3
Comparison of Cognitive Development of students.

Grouping Variable	N	Mean	S.D.	Df	t-value	Sig.
School where ECE room exists.	60	4.60	1.55			
Schools where Katchi class exists.	60	4.08	1.56	118	1.92	0.03

Table 3 shows an independent sample t-test was employed to compare students' Cognitive Development (CD) who enrolled in ECE class and who enrolled in Katchi class. There was found significant difference between the students' cognitive development who enrolled ECE class (M=4.60, SD= 1.55) and students' cognitive development who enrolled Katchi class (M=4.08, SD= 1.56; t-value = 1.92 with df = 118, $p = 0.03 < \alpha = 0.05$).

Discussion

Haddad (2016) stated that cognitive development is growing rapidly at an early age in children and despair affects several aspects of the development i.e. language and physical. Whereas the findings from data analysis narrated that there is a noteworthy difference between the mean level of students' cognitive development who are enrolled in school where Early Childhood Education (ECE) room exists and who are enrolled in school where Katchi class exist. The same results of Felfe and Lalive's (2011) study that early childhood education develops basic cognitive abilities such as verbal abilities and scientific thinking and that facilitates the further acquisition of domain-specific skills related to language and mathematics. ECE has extensive effects on children's cognitive development (Andersson, 1992; Broberg et al. 1997; Sylva et al., 2004; Melhuish et al., 2006). ECE enhances fundamental cognition that facilitates further domains and skills in children like critical thinking, confidence, language, and mathematics (Sammons et al. 2007; Brilli et al., 2011; Felfe & Lalive, 2011). A good ECE program is a bailsman of children's academic achievements and educational success in the future. Results of most longitudinal studies highlight that attending ECE has long-lasting effects on children's cognitive development (Del Boca

& Pasqua, 2010) ECE has beneficial effects on children's cognitive, social and emotional development might persist until their teenage (Datta Gupta & Simonsen, 2007). Veen, Derriks, and Roeleveld's (2002) and Driessen, (2004) study results show that ECE promotes children's positive cognitive, social and emotional development.

Conclusions

Results of the study significantly explained that the students who enrolled in early childhood education class cognition grow in ameliorate way rather than those students who were enrolled in Katchi class. Students who were enrolled in early childhood education classes had better knowledge about Urdu and English language writing patterns rather than those students who were enrolled in Katchi classes. Identifiable Urdu and English language alphabets ability better develop in the students who were enrolled in early childhood education class rather than those students who were enrolled in Katchi class. Students in early childhood education class have a better perception of the sequence of mathematical numbers rather the students in Katchi class. ECE students easily identify the initial sounds of Urdu and English letters instead of Katchi class students.

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