



The impact of early childhood education on language learning in third grade students

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Abstract

This study aimed to analyze the Early Childhood Education (ECE) impact on third-grade students' language learning outcomes in District Gujranwala public schools, Pakistan. It was a concurrent parallel mix method design. The purpose was to explore the how early childhood education influences the language learning in third grade students and also to compare the language learning outcomes of third-grade students with and without ECE. Semi structured interviews was conducted to 5 teachers and two-stage stratified sampling method was chosen from third grade of public schools. The total number of respondents was 400, 200 from ECE schools and 200 from non-ECE schools. Data from respondents was gathered using an adopted English language achievement test. An adopted English language achievement test was used to assess the language learning outcomes of third grade students. For analysis of descriptive and inferential statistics, SPSS software was used. The reliability of the test was .817. The study found that, it has numerous positive effects on children's academic performance, Phonological awareness, Syllable awareness, Rhyming, Alphabet knowledge, Oral language, Print awareness, and, most importantly, the development of sentence understanding and applying knowledge to real-life actions. It also examined that there is a significant difference in the language achievement of third-grade students with and without early childhood education. That calls attention to the impact of early support.

Keywords:

Early Childhood Education, Language Learning, Third Grade students.

Introduction:

Early childhood education provides a foundation for lifelong learning, and its basic role is to shape the children's cognitive development. The two major constructivist theories by Piaget (1970) emphasize that children learn a lot when they actively participate and engage with the

environment, and Vygotsky theory (1978) underscores that when children get guidance from others, it supports developing thinking and language skills. In an early childhood setting, the quality of language learning is particularly influenced by the quality of language interaction in a rich verbal environment that enhances the vocabulary and comprehension skills (Hart & Risley, 1995). Different language skills such as new vocabulary, grammatical structure, and pragmatic language skills are impacted by the interactive learning activities such as peer discussion, storytelling, and singing poems as demonstrated in empirical studies (Tabors, 1997). For the equitable language development opportunities, particularly in low-income regions, that are hindered due to the disparities in access to early childhood education programs (UNESCO, 2015). These challenges are required to be addressed when ECE curricula are aligned with evidence-based strategies that enhance language learning effectiveness and enhance the professional development for teachers to use the child-centered methodologies. [NAEYC], 2020)

Despite the recognized importance of early childhood education, there is a gap in understanding its impact directly on language learning when children switch from ECE to primary school, while different studies suggest the importance of early childhood education in contributing to cognitive development and literacy. Therefore, there is limited research to examine how early childhood education influences the language learning and academic achievement of third-grade students (Heckman, 2006). Early childhood education is absent in many underdeveloped areas, which can cause disparity in language skills (Meloy et al., 2021). In underprivileged areas, the availability of resources such as teacher expertise, resource availability, and curriculum design significantly affects the effectiveness of the program in fostering language learning. (Garcia et al, 2021). To ensure that all the children get the benefit of high-quality early education, it is significant to understand these disparities and inform policy recommendations. Early childhood education can improve children's language learning and long-term by targeting teacher training and strengthening resource allocation (Barnett, 2011). The aim of this research is to provide empirical evidence of how early childhood education shapes the language development of third-grade children and provide insight into qualifying curriculum, improving teacher training, and fostering an equitable early learning environment.

Research Objectives:

1. To explore how early childhood education influences the language learning of third-grade students.
2. To compare the language learning outcomes of third grade students with and without early childhood education.

Research Question:

How does Early Childhood Education (ECE) influence the language learning of third-grade students?

Hypothesis of the study:

H01: is there any significant difference in language learning outcomes of third-grade students with and without early childhood education.

Research Limitations

The study was confined to third-grade students enrolled in public schools within the district of Gujranwala, focusing on schools with and without Early Childhood Education (ECE) programs.

Operational definition:

The following are operational definitions of the study's variables:

Early Childhood Education (ECE): refers to prearranged educational programs planned for youngster, typically ages 3 to 5, before they enter primary school. In the context of this study, ECE includes structured learning environments and activities that aim to develop foundational skills in language learning.

Language Learning Outcomes: In the above study Language learning outcomes for third-grade students are defined as measurable achievements in English language skills, typically evaluated through scores on standardized assessments.

Early Childhood Education: An Overview

An Overview of Early Childhood Education

Early Childhood Education (ECE) typically spans from three to eight years of age, laying the foundation for a child's cognitive, social, and emotional development. The primary goal of ECE is to foster an initial understanding of the educational process, preparing children for structured learning as they progress to primary education. This phase necessitates the involvement of trained educators and support staff that can create an engaging and developmentally appropriate learning environment. According to Thompson et al. (2024), the role of early childhood educators extends beyond teaching to fostering emotional stability, health, nutrition, and social skills through play-based learning.

Research underscores that effective ECE programs integrate family and community participation, ensuring a holistic approach to early learning (UNICEF, 2022). Children naturally engage with their environment through play, which serves as the foundation for their early academic exposure. Activities such as coloring, drawing, and simple problem-solving exercises pave the way for recognizing letters and numbers (Kim & Lee, 2021).

Education, as defined by the Council of the European Union (2023), encompasses not only knowledge and skills but also attitudes and habits that contribute to social and cognitive competencies. Sunarti (2023) highlights that a well-structured ECE program provides incremental learning opportunities, ensuring that young learners transition to formal education with confidence

2.19 Early Childhood Education in Pakistan

Pakistan introduced formal early childhood education in the 1970s, primarily through "Katchi" classes in public schools for children aged three to six. However, these classes lacked a structured ECE framework and were discontinued due to political challenges. The absence of an official

enrollment system meant that participation data was undocumented (Government of Pakistan, 2003).

In 1992, the government reinstated Katchi classes, but inadequate resources and a lack of specialized curriculum limited their effectiveness (Hunzai, 2007). The 2003 government report estimated that only 10% of children aged three to five participated in Katchi classes, with many younger children attending school informally alongside their older siblings.

Montessori methods were primarily adopted by private institutions, serving only affluent families. By 1998, Pakistan had approximately 18.6 million children under five, constituting 14.2% of the total population. By 2000, children aged three to five were estimated at 8.61 million, with a nearly equal gender distribution (Government of Pakistan, 2003).

Recognizing the significance of ECE, Pakistan aligned its educational policies with international frameworks, including the United Nations' declaration on children's rights and the Dakar Framework for Action (UNESCO, 2000). Key policy measures aimed at strengthening ECE in Pakistan include:

- Establishing dynamic and engaging learning environments rather than rote learning.
- Ensuring ECE accessibility for all children within ten years, with at least one year of state-funded pre-primary education.
- Increasing investment in resources, teachers, and aides for early education.
- Implementing a two-year specialized training program for ECE teachers.
- Developing culturally relevant curricula and learning materials.

Language Learning in Early Childhood Education:

Phonemic Awareness and Letter-Sound Recognition

Phonemic understanding is the ability to recognize and use phonemes. It is significant for the early hours of reading and writing skills. In letter-sound relationships, a child's ability to understand the completion of word gaps, such as "_at" to "cat" early reading success strongly anticipates phonemic awareness. (Ehri, 2005).

Language Development and Word configuration:

When children are encouraged to explain the things they do on daily basis it strengthened the neural connection that associated to speech production by promoting contextual learning, gap-filling activities help children's vocabulary and critical thinking skills grow. These everyday jobs are destined to help pupils in increasing their vocabulary. (Biemiller and Boote, 2006)

Physical and intellectual skill development:

Exercises involving letter completion enhance resolving issues and hand-eye coordination. Cameron (2001) emphasizes that integrating intellectual and physical skills improves literacy development.

Boosting Self-assurance and Enthusiasm: Gradual learning fosters enthusiasm and confidence through the use of structured exercises. Rayan & Deci (2000) provides examples of the importance of self-confidence in lifelong learning.

Importance of Daily Routine Practices To enhance communication skills by linking language to meaningful context use daily vocabulary like brushing teeth or eating breakfast the learning of language becomes more effective when it is tied to daily familiar activities. (Snow, 2010).

Contextual Learning: The importance of social interaction and context in language learning is emphasized by Lev Vygotsky's sociocultural theory (1978), with the help of daily vocabulary executive functions such as sequencing and planning that develop in children.

Encouraging Language Production: Wasik and Hindman (2020) propose that when children use interactive dialogue during routines, it fosters active language use. When children are encouraged to explain the things they do on a daily basis, it strengthens the neural connection that is associated with speech production.

Population and sample of the study:

The purpose of this research was to study the **impact of Early Childhood Education (ECE) on language learning in third-grade students**. All third-grade students of District Gujranwala enrolled in public ECE and non-ECE schools were the target population across District Gujranwala. A number of third-grade students selected for the data collection.

Sampling Strategy:

The first tool of the study was semi structured interview to teachers to get important information that how early childhood education influences the language learning of third grade students. Two stage **stratified sampling strategy was used to select the sample** of third-grade students from public ECE and non-ECE schools. It was ensured the **representativeness** and maintains a balanced distribution of participants. At first stage 40 ECE and non ECE schools were selected and at 2nd stage 10 students selected from each ECE and non ECE school in this way a sample of 400 students were selected from both type of public schools.

English Language Achievement Test for 3rd grade students:

The tool serves as a language achievement test for third-grade students as well. The main goal of the tool was to ascertain the degree of language learning outcomes among third-grade students in Gujranwala district's public schools. The language achievement test was given to third-grade students who had previously participated in Early Childhood Education (ECE) as well as those who had not attended ECE before entering in third grade. There are two parts to the instrument: A and B. Section 'A' contains information on the respondents' demographics. While the English Studies Achievement Test for Third-Grade Students is covered in Section B. A, B, C, and D are the components that make up the instrument. The students' ability to use the correct letters to fill in the blanks was assessed in Section "A." Section "B" assessed their ability to indicate everyday activities by filling in the blanks with the words in the box. Their ability to match pictures with

the appropriate phrases was examined in Section "C." Section "D" assesses their capacity to use the proper words to identify each activity in the photos.

Specification table for English language Achievement Test for third-grade students (ELATFTGS)

Section	Question Type	Cognitive Level	Number of Items	Marks per Item	Total
Section A	Letter recognition and completion	Remembering	6	1	6
Section B	Sentence completion	Understanding	5	1	5
Section C	Word-Picture Association	Understanding	5	1	5
Section D	Applying knowledge to real-life actions	Applying	4	1	4
Total			20		20

Validity and reliability of research instrument:

To ensure the validity of the research instruments, the instruments were checked and reviewed by the researcher, supervisor, and expert for the construct face and content validity instruments. The researcher adopted the English Language Achievement Test for 3rd-grade students. There are four sections (A, B, C, and D) in each item. Fifty (50) 3rd grade students who were not part of the main study were used for a pilot test of the twenty (20) drafted items in four (4) public in Gujranwala city to determine the reliability which is .817.

Data analysis method:

Language learning:

One of the participants described that:

“Early childhood education plays a vital role in children's development. It provides a strong foundation for later academic, social, and emotional growth. During these formative years, a child's brain is like sponge, absorbing new information and experiences at a remarkable rate.”
(Participant 2)

“I guess language of ECE students will be better than the other ones. Because of an intentional emphasis on establishing environment rich in language and offering organized chances for both written and spoken communication, ECE students frequently possess superior language skills. They gain an academic advantage from this foundation, but they also acquire critical cognitive abilities that will help them succeed in the future” (participant 1)

A teacher said that:

“Early Childhood Education (ECE) is essential for helping young children acquire the fundamentals of language. The development of vocabulary and phonological awareness are essential components of this process” (participant 2).

According to my point of view early childhood education developed the specific language skills.

“A variety of language abilities that form the basis of literacy and effective communication are fostered by early childhood education. During this phase, important language abilities were acquired, including: Phonological awareness, Syllable awareness, Rhyming, Alphabet knowledge, Oral language, Print awareness” (participant 3)

An experienced teacher told about the strategies to promote language learning in the classroom.

“Vocabulary building is a very successful way to encourage the learning of languages in the classroom because it helps children build critical communication skills and establishes the groundwork for literacy. In an animal lesson, for instance, youngsters learn terms like "lion," "zebra," "jungle," and "roar." For instance, if the word "tall" is introduced, use it frequently in a variety of sentences, such as "The building is tall," "The giraffe is tall," or "Show me something tall.”(Participant 5)

According to an instructor:

Due to shortage of teachers a large number of enrollments present in class and then it is difficult to manage classroom activities within time due to the large enrollment of the students, and most of the teachers have only received 3-5 days training for ECE I think that is not enough to boost its effectiveness.(Participant 3)

A participant gave an overview:

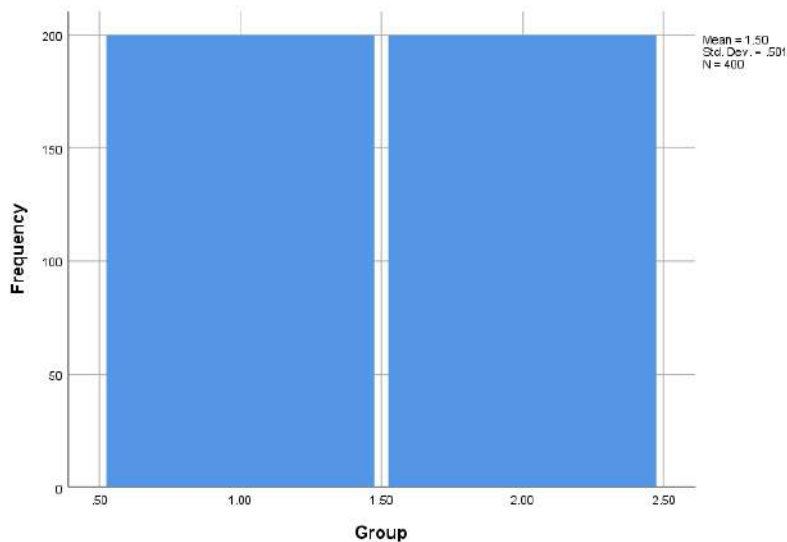
In my opinion, the curriculum is age appropriate and those who enter ECE will get prior knowledge about the primer based on a single national curriculum and develop their understanding related to the specific subject and get command through the years by doing different activities. (Participant 7)

All the teachers of public sector are highly qualified and have lot of experience in their field. They agreed that early childhood education have positive impact on students’ language learning and also helpful to enhance the later academic performance. Teachers also agreed that the use to different activities in the classroom enhance the student’s vocabulary, communication skills, phenomenological awareness, print awareness. The daily based speaking and learning activities involved in ECE make the children confident. Teachers also emphasized that the curriculum studied in ECE is age appropriate and accommodating to enhance student’s basic language skill. For example during classroom activities teachers provides the children new words and encourage

them to pronounce without any fear. Group discussion and storytelling method used to enhance students communication skills in the classroom.

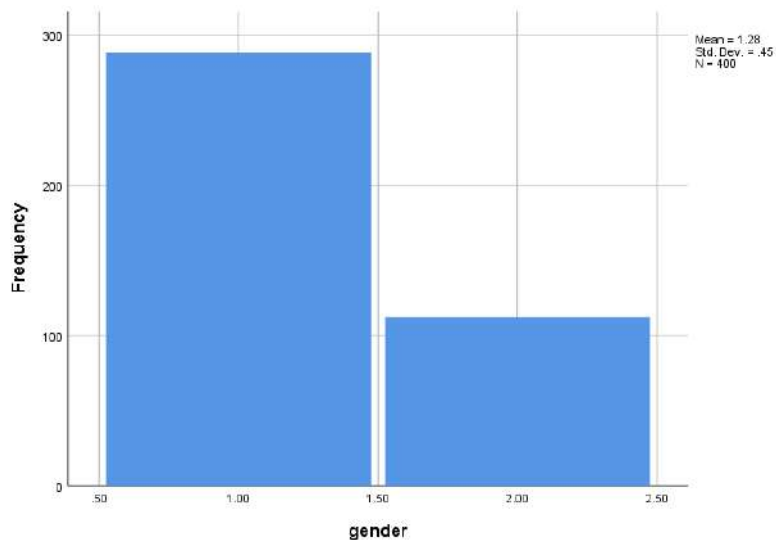
The hypothesis was examined using inferential statistics and descriptive statistics.

H01 There is no significant difference in language learning outcomes of third-grade students with and without early childhood education.

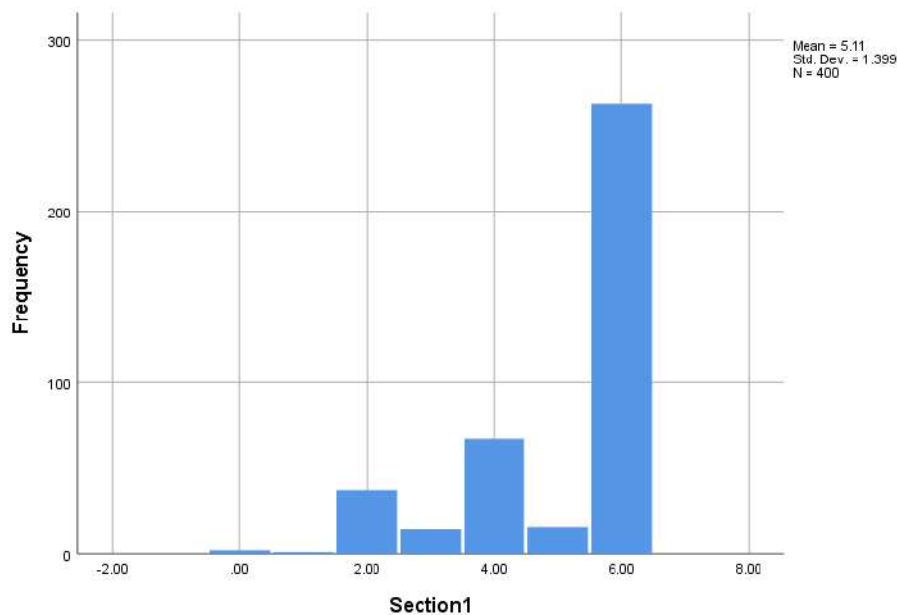
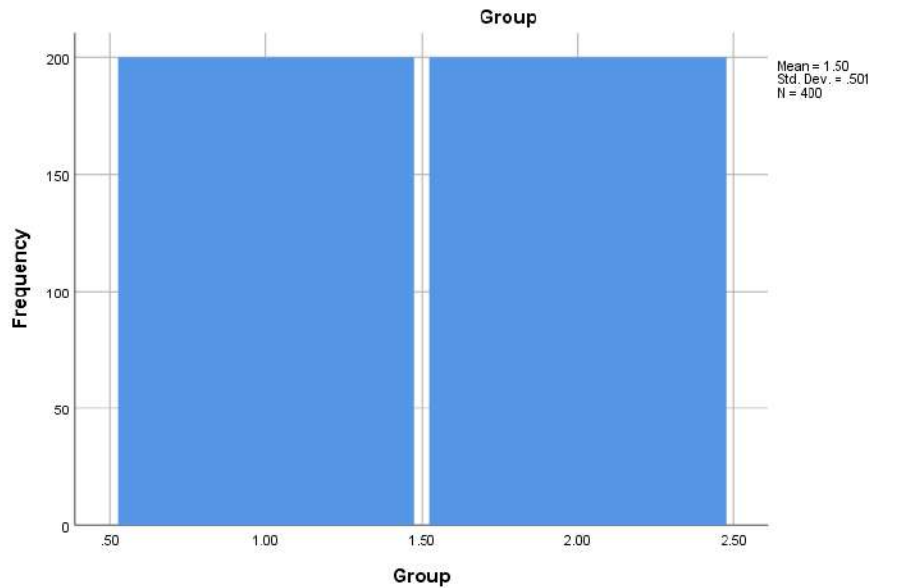


The horizontal and vertical axes in this histogram stand for the group and frequency, respectively. Both groups are evenly distributed in this bar graph, which presents a fair comparison of the ECE and non-ECE groups. It prevents unequal group sizes from skewing the results, enabling more accurate and reliable conclusions.

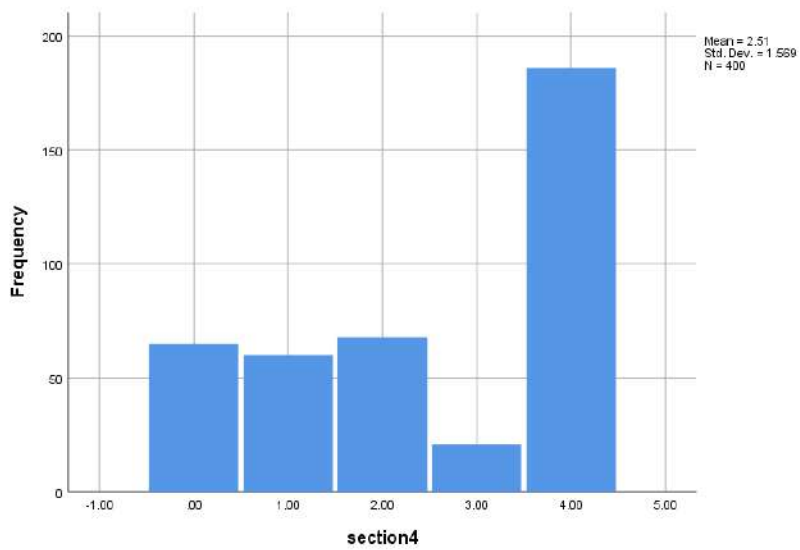
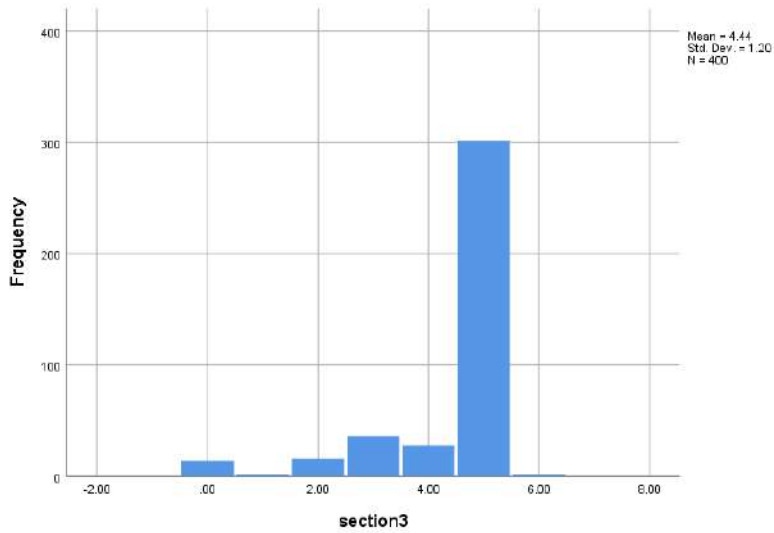
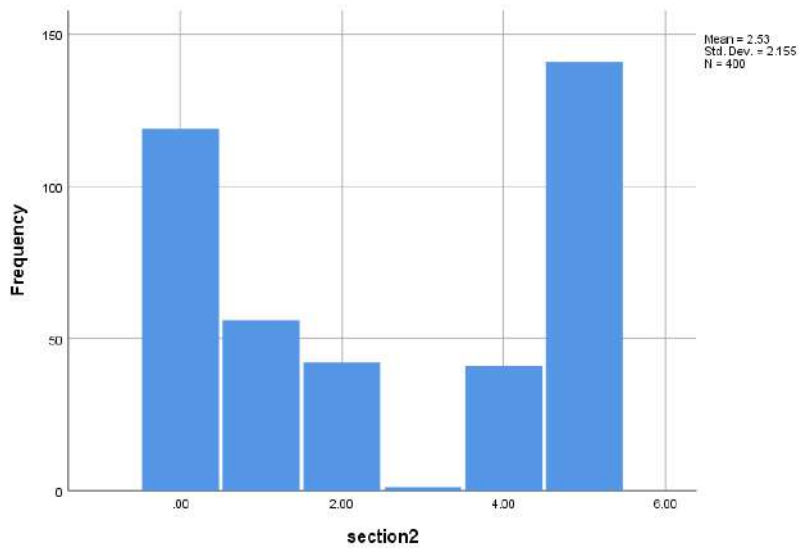
Gender wise Frequency table of participant:

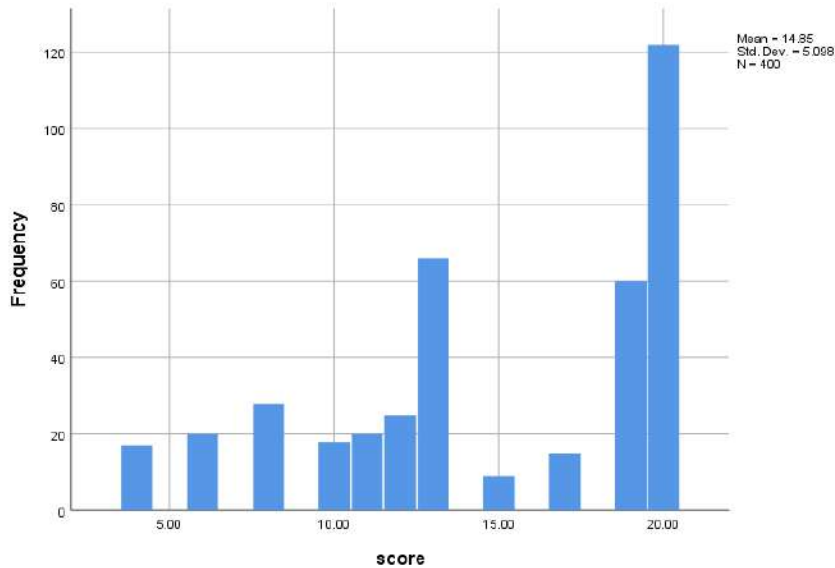


This bar chart illustrates the representation of the gender category present on the x-axis, and the y-axis represents the frequency in this bar chart. High frequency represents the girls and lower frequency represents the boys, and the total number of sample sizes is 400. The mean score and standard deviation are 1.28 and 0.45, respectively. It indicates that girls are almost twice as many as boys.



Impact of Early Childhood Education on Language Learning





Comparison on language learning outcome between ECE and non ECE students:

Group Statistics					
language learning	Group	N	Mean	Std. Deviation	Std. Error Mean
Participants	ECE	200	18.9350	2.60860	.18446
	non ECE	200	10.7650	3.42908	.24247

The above-mentioned table gives the details of the scores of the two groups. The number of participants in both groups has an equal sample size of 200 participants that shows an equal comparison. The ECE group has a mean score of 18.9350, and the non-ECE group has 10.7650. There is approximately a difference of 8.17 points that revealed that the students who attended early childhood education performed better than those who did not. It underscores the importance of early childhood education in terms of language learning.

The standard deviation of the ECE group was 2.60860, which shows a more consistent score and is closer to the mean. While the standard deviation of the non-ECE group was 3.42908, which shows the greater variability in the student's performance in representing the population, the mean is measured by the Standard Error of the Mean (SEM). SEM is smaller for the ECE group, which is 0.18446, and larger for the non-ECE group, which is 0.24247. It means that due to greater variability in scores, there is less precision in the population mean.

Group Statistics					
English Studies language achievement Test for 3 rd grade students	Group	N	Mean	Std. Deviation	Std. Error Mean
Section1 (letter recognition) remembering	ECE	200	5.8600	.61013	.04314
	non ECE	200	4.3550	1.55275	.10980
section2 (Sentence completion) understanding	ECE	200	4.4000	1.28384	.09078
	non ECE	200	.6600	.79849	.05646
section3 (Word-Picture Association)understanding	ECE	200	4.9500	.31303	.02213
	non ECE	200	3.9300	1.50547	.10645
section4 (Applying knowledge to real-life actions)	ECE	200	3.7150	.81677	.05775
	non ECE	200	1.3000	1.15615	.08175
Overall score	ECE	200	18.9250	2.61795	.18512
	non ECE	200	10.2450	3.56208	.25188

The above table demonstrates how public ECE students and public non-ECE students are compared based on their overall scores as well as their remembering, understanding, and applying level in the cognitive area of English. According to the table, students with an ECE background significantly differ in their accomplishment ($M=18.92$, $S.D=2.67$).

And pupils with backgrounds outside of ECE ($M=10.24$, $SD=2.64$). Additional analysis shows that while there was a significant difference in the questions related to understanding and application level, there was no statistically significant difference in the items related to knowledge level. English proficiency is clearly higher among pupils in ECE environments in public schools than among those in non-ECE settings; this difference is even more noticeable in the learning outcomes of meaningful learning.

Independent Samples Test									
Comparison on language learning outcomes of with and without early childhood education	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper

Equal variances assumed	44.935	.000	26.817	398	.000	8.17000	.30466	7.57106	8.76894
Equal variances not assumed			26.817	371.541	.000	8.17000	.30466	7.57093	8.76907

The Independent Samples Test performed seeks to find out whether or not there exists a significant difference between the means of two independent groups with regard to their scores. The preliminary section of the analysis entails Levene's Test of equality of Variances, which determines if the variances of the two groups are equal. In this case, the test returned an F-value of 44.935 with a p-value of 0.000, which is lower than 0.05. This means that the two groups have different variances and thus we do reject the null hypothesis of equal variances. The t-test for Equality of Means now focuses on checking the averages of the two groups. With equal variances assumed (from Levene's Test), the t-value is 26.817 with p-value as 0.000 and degree of freedom is 398. The p-value suggest there is sufficient evidence to conclude that the difference between the averages of the two groups is statistically significant prompting us to reject the null hypothesis which is stated as the means of the two groups is equal. The groups mean difference is 8.17 while the standard error is 0.30466 which shows level of accuracy for this difference. The mean difference's confidence interval of 95 % is from 7.57 to 8.77 which means we can be 95% certain that the actual mean difference exists in this interval. Because this interval does not contain zero, this emphasizes the conclusion that the difference between the two groups is statistically significant. When equal variances are not assumed, the t-value of 26.817 is retained with the new degree of freedom at 371.541 due to the offsetting of unequal variances. The p-value continues to be at 0.000 which proves that the means adjusted with unequal variances is still significant. The confidence interval and the mean difference did not change from the equal variance assumption case, which adds further evidence to the argument of significant difference between the groups. The analysis of the data integrating Levene's Test for Equality of Variances and the t-test for Equality of Means suggests that there is a statistically significant difference between the means of the two groups with respect to their scores. Levene's Test returned a p-value of 0.000, meaning that the two groups' variances are not equal. Therefore, the "Equal variances not assumed" row of the t-test for Equality of Means will be used to interpret the results. The t-test produced a large t-statistic with 8.17 point mean difference among the groups and it was statistically significant ($p < 0.0001$). It indicates that the difference in scores do not occur randomly but is, in fact, a true difference between the two groups. The estimated 95 confidence interval bounds for the mean difference of 7.57 and 8.77 provide high certainty on true mean difference. The results clearly prove to be reliable. With such high mean difference of 8.17, this not only emphasizes such finding, but it shows one group out of the many outperforming the other. The level of outperformance is practically very high. Therefore, the analysis clearly indicates that there is a significant and meaningful difference between the two groups, with a strong effect size, confirming the importance of the factors contributing to this distinction.

Hypothesis H01: is there any significant difference in language learning outcomes of third-grade students with and without early childhood education.

The difference in means between ECE (18.9350) and non ECE (10.7650) groups are statistically significant with a p-value of 0.000, which is much lower than the 0.05 threshold. This indicates that the variances between the ECE and Non-ECE groups are significantly different.

Conclusion for H01: since the results from independent sample t test show a significant difference and we reject the null hypothesis indicating that early childhood education has a significant impact on language learning outcome of third grade students.

Discussion:

It was highlighted from the results of the interview that the majorities of the teachers in public schools were highly educated and had a lot of years of experience. In the part of the interview, the teachers highlighted that children can improve their prior language learning skills by getting early childhood education, combining enjoyable and engaging activities encourages youngsters to feel enthusiastic and raises their level of understanding. Early childhood education can help the children to develop cognitively. This makes the task easier to understand and the issues easier to solve. Every instructor concurred that language learning activity can enhance children's language learning since, according to a study review, it has numerous positive effects on children's academic performance, Phonological awareness, Syllable awareness, Rhyming, Alphabet knowledge, Oral language, Print awareness, and, most importantly, the development of sentence understanding. Children's good attitudes can be increased when teachers try to incorporate language learning activities into the classroom. Children that participate in language related activities typically exhibit higher levels of excitement, confidence, and enthusiasm. In early childhood education children regularly participate in these learning activities can also communicate and have rich vocabulary knowledge. Some of the teachers have also concerned about the strength of the students due to the large enrollment it was difficult to manage the classroom activities within time.

The analysis reveals a significant disparity in English language achievement between students who attended Early Childhood Education (ECE) programs and those who did not. ECE students achieved a markedly higher mean score ($M = 18.93$) compared to their non-ECE counterparts ($M = 10.76$). This substantial difference underscores the effectiveness of ECE programs in equipping children with the foundational skills necessary for academic success, particularly in language development. According to the findings, the critical role of early childhood education is that it provides a baseline for later academic achievement. Early childhood education offered a structured and language-rich environment that is the major factor in the program's success. Different types of activities in early childhood education programs, like hands-on activities, storytelling, phonics-based group discussion, and interactive reading, provide children with early and consistent exposure to literacy-building practices. These approaches not only engage the children but are also suitable for their development. The approaches are also significant in developing necessary language skills, like recognizing new words, recognizing sounds, and communicating abilities, and they are also built by these approaches effectively. With the help of this structured learning environment, the challenges of primary school are without any difficulty.

faced by the children. On the other hand, nonECE students face a lot of difficulties in achieving a similar level of language learning. These students frequently miss the necessary developmental opportunities that lead to a weaker base in language skills due to the lack of a structured early learning environment. These students showed poorer performance in language-related tasks because of a lack of introductory experiences during formative years; it also hindered their ability to engage effectively with academic content. This is a major gap that underscores the early learning experiences and ensures the equitable access of early education to all children. The value of ($t=26.817$) and p -value ($p<0.001$) confirmed that the difference in language achievement is not due to any chance. It is reliable based on the statistics; the result showed that early childhood education plays a significant role in enhancing language learning that promotes academic success. The results affirm the measurable and consistent benefits of ECE programs in fostering language development. Given these findings, it is clear that Early Childhood Education plays a transformative role in shaping academic trajectories. Policymakers, educators, and stakeholders must prioritize the expansion and accessibility of ECE programs to bridge the achievement gap between ECE and non-ECE students. By ensuring that all children, particularly those from underserved communities, have access to structured early learning opportunities, society can create a more equitable educational landscape and set the stage for sustained academic and lifelong success.

The null hypothesis (H01) is rejected. The significant impact of early childhood education on the language development of third-grade students. A further conclusion found that ECE enhances students' academic performance as indicated by their academic achievement in English. Additionally, it was discovered that students' academic performance in these areas was superior at the cognitive domain's remembering, Understanding, and Applying levels. Both groups of English test takers performed equally on remembering-level items that required letter recognition. Nonetheless, ECE students outperformed non-ECE students in terms of understanding and applying level. The Qual- Quan part of the study has supported that early child hood education has a significant impact on the language learning of third grade students.

Recommendation:

It is suggested that all public schools in Punjab and other provinces improve their ECE facilities in light of the findings and discussions. To meet the goals outlined in the Sustainable Development Goals, the state should provide a clear ECE policy and appropriate funding. And make it possible for all the children in public schools. Government should focus the student teacher ratio and recruit more teachers to effectively enhance the learning environment. Teachers in ECE classrooms may receive training on how to use participatory teaching and learning techniques to engage young students in language skills development.

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