

Research Article

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Evaluative Analysis of Children in the Early Childhood Care and Development (ECCD) Program

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Abstract

Background/purpose. This study addresses the critical need to assess and enhance the quality of early childhood education and care by evaluating learners' developmental performance and health status under the Early Childhood Care and Development (ECCD) Program in San Fernando City, La Union. Given the importance of early childhood as a foundation for lifelong learning and well-being, this research was conducted to identify developmental strengths and challenges across various domains and regions to inform a comprehensive ECCD Development Plan that promotes holistic child development.

Materials/methods. A mixed-methods research design was employed. The study gathered quantitative and qualitative data from ECCD learners across the Upland, Lowland, and Coastal regions. Assessment tools evaluated developmental domains—cognitive, language, self-help, motor, and social-emotional—and health and nutrition indicators. In-depth validation was conducted through interviews with teacher participants to substantiate quantitative findings.

Results. Findings reveal that the cognitive domain emerged as the strongest development area among learners. Regional variations were observed in health service coverage and illness prevalence: the Upland region showed 100% access to essential health services. In contrast, the Coastal and Lowland regions exhibited gaps in deworming and immunization. Teacher feedback further revealed issues related to minor illnesses, malnutrition, and parental neglect of children's nutritional needs.

Conclusion. The study concludes that while the ECCD program effectively supports cognitive development and health promotion, targeted interventions are needed to enhance self-help skills, expressive language, immunization, and nutritional care. These findings inform the formulation of a region-specific and child-centered ECCD Development Plan.



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1. Introduction

Early childhood is widely recognized as a vital stage of human development, forming the basis for lifelong learning, overall health, and social-emotional growth. Between birth and age six, children undergo rapid and interconnected growth across cognitive, physical, emotional, and social domains (United Nations Children's Fund [UNICEF], 2018). Top-tier early childhood care and education (ECCE) programs are thus essential in providing nurturing, developmentally appropriate, and health-supportive environments that enable children to thrive.

In the Philippines, the Early Childhood Care and Development (ECCD) Program, administered by the Department of Social Welfare and Development (DSWD), is a comprehensive intervention to promote children's development and protect their rights. The program integrates education, health, nutrition, and psychosocial services to support holistic child development (Department of Social Welfare and Development [DSWD], 2018). Local Government Units (LGUs) are mandated to implement ECCD services through day care centers. They must meet standards through an accreditation process to ensure the delivery of quality care and education.

Despite the national commitment to ECCD, empirical studies evaluating the developmental status and health conditions of ECCD learners at the local level remain limited. Most local research focuses on curriculum implementation, teacher training, or parental involvement (Cabigon, 2020), but few studies provide integrated assessments of children's performance across developmental domains alongside health and nutrition indicators. Moreover, spatial disparities—such as variations in service access and outcomes between upland, lowland, and coastal regions—are rarely explored. These knowledge gaps hinder the ability of local governments to develop targeted and data-driven ECCD policies and programs tailored to the specific needs of their communities.

Viewed from an international standpoint, a significant portion of the research on early childhood development originates from high-income countries with centralized and well-funded education systems. There remains a notable international gap in studies from low- and middle-income countries (LMICs), particularly those examining localized and place-based assessments integrating educational and health dimensions (Britto et al., 2017). In decentralized settings like the Philippines, local governments play a pivotal role in service delivery, yet evidence-based planning tools at the city or municipal level are still underdeveloped. This lack of context-specific, integrated data on child development outcomes limits global understanding of ECCD's operation in diverse and resource-constrained environments.

This study addresses these national and international gaps by assessing the developmental performance and health and nutrition status of ECCD learners in San Fernando City, La Union. It assesses children's development across seven key domains—gross motor, fine motor, self-help, receptive language, expressive language, cognitive, and social-emotional—alongside their health condition, using indicators like immunization, deworming, vitamin A intake, dental visits, and frequency of illnesses. Moreover, the study disaggregates findings across the city's three geographic contexts: upland, lowland, and coastal regions. This allows a nuanced understanding of how the local environment and service access affect child development.

The importance of this study rests in its contribution to local and global ECCD discourse. At the national level, it provides city-specific baseline data for crafting a responsive and inclusive ECCD Development Plan in San Fernando City. At the international level, it serves to enrich the growing body of literature advocating for evidence-based, decentralized ECCD implementation in LMICs. In integrating developmental and health assessments in a single framework, this study offers a model for holistic monitoring that can be replicated or adapted in other local contexts across the Philippines and beyond.

2. Literature Review

Children are naturally curious and mentally active from birth, demonstrating deep and complex thinking even in early childhood. Many of the foundations of sophisticated forms of learning, including those critical to academic success, are established in the earliest years of life (National Research Council [NRC], 2015).

As children grow, their development and early learning can be consistently nurtured, with their initial knowledge and skills shaping and impacting their future learning experiences. When adults understand how the mind develops, what progress children make in their cognitive abilities, and how active inquiry and learning are children's natural inclinations, they can foster cognitive growth by supporting children's active engagement with new experiences and providing developmentally appropriate stimulation of new learning through responsive, secure, and sustained caregiving relationships (NRC, 2015).

In addition, research on the cognitive development of young children demonstrates an increasing awareness of how mental abilities evolve during early childhood and emphasizes the importance of this knowledge as a foundation for informing educators and caregivers in supporting early learning. A large portion of these studies focuses on the fundamental cognitive processes involved. By contrast with the explicit knowledge that older children and adults can put into words, implicit knowledge is a tacit or non-conscious understanding that cannot readily be consciously described (Mandler, 2004). Young children demonstrate implicit knowledge through early accomplishments, such as forming intuitive ideas about living things and the human mind, and unconsciously recognizing patterns in the speech sounds they hear. This concept of "statistical learning" does not suggest that young children are capable of counting, nor are their "implicit theories" the result of deliberate reasoning. Naturally, not all early learning occurs unconsciously. Infants and young children also show significant development in their conscious understanding of language, the functions of objects, and the characteristics of people and animals in their environment. Therefore, early learning unfolds on two levels: the development of observable, explicit knowledge and the emergence of deeper, implicit understanding that may be less noticeable.

Furthermore, the distinction between implicit and explicit learning can be challenging for early childhood educators and parents, who may find it difficult to recognize obvious indicators of advanced learning in the children under their care. Much of the remarkable competence, activity, and insight revealed by research on early cognitive development is not always visible in children's behavior. Instead, toddlers and young children often appear easily distracted, emotionally reactive, and unable to control their impulses. While these behaviors are valid observations, they can mask the complex thinking beneath the surface. However, at the same time, their astonishing growth in language skills, their very different ways of interacting with objects and living things, and their efforts to share attention (such as through pointing) or goals (such as through helping) with an adult suggest that the cognitive achievements demonstrated in experimental settings have relevance to their everyday behavior (NRC, 2015).

Given these insights, what role do early childhood educators play in supporting cognitive development during the first three years of a child's life? One way is by providing appropriate support for the learning occurring in these very young children (Copple, Bredekamp, Koralek, & Charner, 2013). Engaging young children in the rich, child-focused language during social interactions, playing simple counting games (like stacking blocks), describing what a classroom pet is doing or why someone feels unhappy, investigating what happens when objects bump into each other, and participating in activities like pretend play or sorting—all of these can spark cognitive development when tailored to the child's attention span and interests. These shared experiences support the child's growing understanding of language, numbers, object properties, and intuitive concepts about

living and non-living things, cause and effect, and how people think. The goal is not merely to stimulate the mind, but to do so through meaningful social interactions that spark curiosity and provide an emotional setting that helps focus their attention on learning. At the heart of all these experiences is a collaborative interaction with an adult who intentionally builds on the child's interests to foster cognitive growth.

Another way that educators contribute to the cognitive growth of infants and toddlers is through the emotional support they provide (Jamison, Cabell, LoCasale-Crouch, Hamre, & Pianta, 2014). Emotional support is afforded by the educator's responsiveness to young children's interests and needs (including each child's temperament), the educator's development of warm relationships with children, and the educator's accessibility to help when young children are exploring on their own or interacting with other children (Thompson, 2006). This kind of emotional support is vital, not just as a positive backdrop to learning, but as a foundation for the cognitive and attentional involvement young children need to benefit from learning experiences. Since young children have limited ability to manage their emotions, feelings of frustration or distress can easily disrupt their focus and hinder their ability to engage in discovery. Their underdeveloped attention regulation makes it even harder to stay on task. When educators provide consistent emotional support, they help children remain focused, motivated, and more likely to succeed in learning tasks. Additionally, the strong, secure bonds children form with caring educators foster a sense of trust, making them more willing to engage with new learning experiences confidently and with a positive mindset.

In addition, as children progress cognitively during the preschool years, their development requires both familiar and new approaches from the adults who support them. While the educator's emotional support and responsiveness remain important, children from age 3 to 5 years become different kinds of thinkers than they were as infants and toddlers (National Research Council [NRC], 2001). First, preschoolers become more consciously aware of what they know, with much of their understanding becoming explicit. This allows them to intentionally apply their knowledge in new learning situations, although they are not yet as skilled or strategic as they will be in the primary years. When presented with a question or problem, they can draw on what they know to respond, even if that knowledge is still developing. Second, they show greater ability to learn through intentional efforts like trial-and-error or informal exploration. While their methods are not as refined as those of older children, their "let us find out" attitude demonstrates growing cognitive and behavioral abilities. Third, preschoolers learn primarily through hands-on experiences and intuition rather than abstract thinking. As a result, collaborative activities with teachers and peers offer powerful opportunities for advancing their cognitive development.

However, there remains a risk of undervaluing the cognitive capabilities of young children during the preschool and kindergarten stages. In one study, for example, children's actual performance was six to eight times greater than was estimated by their preschool teachers and other experts in consulting, teacher education, educational research, and educational development (Claessens et al., 2014; Van den Heuvel-Panhuizen, 1996). This underestimation is a missed opportunity that may impede children's development. A study in kindergarten revealed that teachers spent most of their time on basic content that children already knew, yet the children benefited more from advanced reading and mathematics content (Claessens et al., 2014). Unfortunately, when care and education professionals underestimate children's abilities to understand and learn subject-matter content, the negative impact is most significant on those with the fewest prior learning experiences (Bennett, Weigel, & Martin, 1984; Clements & Sarama, 2014).

Further considerations in these cognitive developments is that educators can transform preschool children's planned activities into meaningful learning experiences. Children's interest in learning by doing is naturally suited to the experimental inquiry related to science or other kinds of inquiry-based learning involving hypothesis and testing, especially in light of the implicit theories of

living things and physical causality that children bring to such inquiry (Samarapungavan, Mantzicopoulos, & Patrick, 2011). Likewise, board games can serve as a foundation for understanding and expanding number concepts. In several experimental demonstrations, when preschool children played number board games designed to foster their mental representations of numerical quantities, they showed improvements in number line estimates, count-on skill, numerical identification, and other critical quantitative concepts (Laski & Siegler, 2014).

Furthermore, the shifts in young children's thinking during the preschool years relates to the motivational aspects of early learning. Preschool-age children are developing a sense of themselves and their competencies, including their academic skills (Marsh et al., 1998, 2002). Children's beliefs about their abilities in reading, counting, vocabulary, number games, and other academic skills are shaped by various influences, including informal comparisons with the input from peers, teachers, and parents regarding their performance and underlying causes behind their success or struggles. These views then impact their confidence levels, resilience, and natural motivation to achieve, and other traits commonly referred to as learning skills, which will be explored later in this chapter. Consequently, how teachers provide performance feedback to young children and support their self-confidence in learning situations is also a significant predictor of children's academic success (Hamre, 2014).

Children's cognitive abilities continue to advance during the early elementary years, prompting educators to adjust their instructional strategies accordingly. Children in the primary grades begin to use more sophisticated vocabulary and grammar. They are growing in their ability to make mental representations, but they still have difficulty grasping abstract concepts without real-life references and materials (Tomlinson, 2014). This stage is crucial for children to build confidence across various aspects of life. At this age, they begin to show greater independence from their parents and family, while friendships and gaining peer acceptance become increasingly significant. Being in school most of the day means greater contact with a larger world, and children better understand their place (Centers for Disease Control and Prevention [CDC], 2014).

Moreover, the Philippine government has demonstrated strong support for the development of children during their early years through various legal mandates that uphold and strengthen the Early Childhood Care and Development (ECCD) program and its human resource components.

First, Presidential Decree No. 603, also known as the Child and Youth Welfare Code of 1974, recognized the child as one of the nation's most valuable assets, emphasizing the need to promote well-being and expand opportunities for a meaningful life.

Second, Republic Act No. 6972, also known as the Barangay Total Development and Protection of Children Act of 1990, tasks the Department of Social Welfare and Development (DSWD) with developing guidelines for selecting, training, and accrediting daycare workers, as well as setting standards for program implementation.

Third, the Local Government Code of 1991 (Republic Act No. 7160) emphasizes that local government units (LGUs) are responsible for delivering basic services and facilities to national standards.

Fourth, Executive Order No. 340, issued in 1997, instructs national government agencies and government-owned and controlled corporations to offer daycare services for the children of employees who are under five years old. Executive Order No. 221 (2003) further amends EO 15 by assigning the DSWD to set standards, provide accreditation, and offer consultative services to institutions engaged in social welfare.

Fifth, Republic Act No. 8980, the Early Childhood Care and Development (ECCD) Act, outlines the DSWD's roles, including the registration, licensing, and accreditation of ECCD centers and service

providers for children under five. It also requires establishing systems to professionalize ECCD service providers through pre-service training, in-service development, and ongoing education programs.

Sixth, Republic Act No. 10410, or the Early Years Act of 2013, strengthens the ECCD system by recognizing ages zero to eight as the critical stage of educational development. It reiterates provisions from RA 8980 concerning human resource development.

At the regional level, the Southeast Asian Guidelines for Early Childhood Teacher Development and Management (SEAMEO, 2014) underscore efforts across Southeast Asia to improve early childhood education by 2030. These guidelines suggest improving the quality of ECCD teachers by strengthening recruitment processes, pre-service training, teaching methods, and working conditions, based on regional and global best practices.

Finally, the ECCD Council, in collaboration with UNICEF, initiated the Development of Competency Standards for Child Development Teachers (CDTs) and Child Development Workers (CDWs) project. This initiative aimed to create nationally validated standards aligned with field realities, thereby supporting capacity-building for those serving children aged 0–4 years (ECCD Council & UNICEF, 2017).

3. Methodology

3.1. Research Design

This study utilized a mixed-method explanatory sequential design, starting with collecting and analyzing quantitative data and ending with qualitative data to clarify or confirm the initial findings. This design is appropriate when the researcher aims to explore how qualitative insights can enhance or elaborate on quantitative findings (Creswell & Plano Clark, 2018; Ivankova, Creswell, & Stick, 2006).

In the first phase, quantitative data were obtained using the Early Childhood Care and Development (ECCD) Checklists to assess the developmental performance of children enrolled in the ECCD Program across different areas in the City of San Fernando, La Union (upland, lowland, and coastal zones). The checklist results covered the physical health, motor, cognitive, language, and socio-emotional domains.

In phase two, researchers obtained qualitative insights via written responses from interviews with ECCD teachers and daycare workers. These responses provided more profound insights into the factors affecting children's development and the contextual realities in program implementation. The qualitative findings were then used to validate and explain patterns emerging from the quantitative results.

This sequential data integration ensured a more comprehensive understanding of the current status and challenges of ECCD implementation, ultimately informing the development of a responsive ECCD Development Plan.

3.2. Sources of Data

The population of this study consisted of enrolled Early Childhood Care and Development (ECCD) learners aged 2 to 5 years from School Year 2019–2020, across the 59 barangays of the City of San Fernando, La Union. These barangays were categorized into upland, lowland, and coastal zones based on geographical and socio-environmental classifications provided by the City Social Welfare and Development Office (CSWDO). The upland barangays are situated in elevated or mountainous areas, often characterized by limited access to infrastructure and services. The lowland barangays are located in central, more urbanized parts of the city with better resource access. Meanwhile, the coastal barangays lie along the shoreline, where families may rely on fishing and related livelihoods, and are often more vulnerable to climate-related risks.

Each classification selected 10% of the learner population through simple random sampling, ensuring proportional representation. This sampling method was guided by Bullen's (2014) recommendation that a good maximum sample size is typically 10% of the population, provided it does not exceed 1,000. The researchers accessed monthly accomplishment reports from daycare workers to the CSWDO to determine the sample. These reports contained relevant data regarding the status, developmental performance, and learning environment of ECCD learners, which served as a basis for identifying respondents.

3.3. Instrumentation and Data Collection

The main approach for gathering data employed in this study was documentary analysis of the Early Childhood Care and Development (ECCD) Checklist, a standardized instrument utilized by the Department of Social Welfare and Development (DSWD) to assess children's developmental progress, performance in essential domains, and the quality of their learning environment in daycare centers. These checklists, compiled by daycare workers from all 59 barangays of the City of San Fernando, La Union, served as the basis for the study's quantitative data.

To strengthen the findings and provide contextual depth, the researchers also conducted written-response interviews with fifty-three (53) ECCD Day Care Workers. These qualitative responses were used to corroborate, clarify, and enrich the interpretation of the quantitative results from the checklists. This sequential approach to data collection aligns with the exploratory sequential mixed-method design, wherein qualitative input supports the validation and understanding of patterns emerging from the quantitative phase.

3.4. Analysis of Data

The data collected from the ECCD Checklists underwent thorough analysis and summarization using various descriptive statistical tools, including frequency, percentage, and mean, to provide an overview of the learners' status and developmental performance. To examine relationships between sociodemographic variables and performance, the study employed inferential statistics: the Pearson correlation coefficient was used to determine the association between sex and performance scores; the Spearman rank correlation coefficient assessed the relationship between age and performance; and the Point-Biserial correlation explored the link between birth order and performance.

Repeated Measures ANOVA was utilized for regional and within-subject comparisons to detect significant differences in learners' performance over time and across geographic contexts (Upland, Coastal, and Lowland barangays). In addition, One-Way ANOVA was conducted to determine significant differences in overall performance across these three classifications, providing a broader perspective of regional disparities.

The qualitative data obtained from the written-response interviews with ECCD Day Care Workers were analyzed through thematic analysis. Responses were coded, categorized, and synthesized to identify recurring themes related to the children's developmental progress, learning environment, and contextual challenges. This qualitative analysis was then integrated with the quantitative findings to validate, elaborate, and provide nuanced insights into the patterns observed in the checklist data, enhancing the credibility and interpretive depth of the study.

To interpret the performance of the ECCD learners along the various domains, the following were utilized:

Scaled Scores	Interpretation	Scaled Scores	Interpretation
1-3	Progress in the domain should be monitored after three months	69	Overall progress should be monitored after three months
4-6	Progress in the domain should be assessed after six months	70-79	Overall progress should be assessed after six months
7-13	Average overall development in the domain	80-119	Average overall development
14-16	Indicates moderately advanced progress in the domain	120-129	Moderately above-average overall development
17-19	Indicates significantly advanced development in the domain	130 and above	Significantly above-average overall development

3.5. Ethical Considerations

Ethical considerations are necessary to ensure courtesy, respect, confidentiality, and secrecy of information gathered.

To establish and safeguard the conduct of this research, the researchers strictly observed the following: (a) Anonymity of the children's identity throughout the research conduct; (b) Confidentiality of the data provided by the Daycare workers; and (c) Adherence to Data Privacy Act and its implementing rules on access to the personal information of the learners.

To ensure these, communication letters containing the purpose of the study were directed to the concerned authorities. Upon approval, consent forms were given to the Daycare Workers encompassing the specific information regarding the purpose and the extent of processing the data needed, and the extent of participation of the participants. The analyzed data were limited to what was necessary for the purpose for which the study was conducted. Real names of the children and teacher-participants whose files were subjected to documentary analysis were not disclosed. More so, data gathered from the Daycare workers were solely used for the research study, and the relevant findings were shared with the Workers for verification before finalization.

4. Results

4.1. Sociodemographic Profile of the Learners

Figure 1 shows the sociodemographic profile of the Upland, Lowland, and Coastal learners regarding sex.

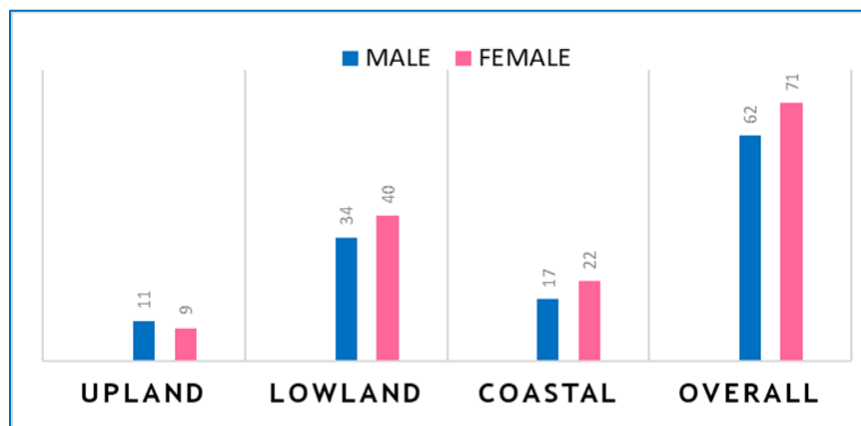


Figure 1. Sociodemographic Profile of the Learners in Terms of Sex

Figure 2 shows the sociodemographic profile of the learners from Upland, Lowland, and Coastal regarding age.

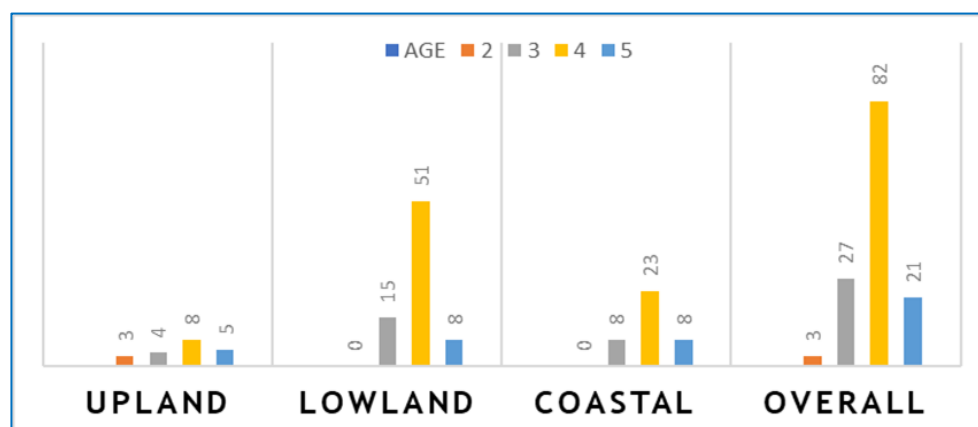


Figure 2. Sociodemographic Profile of the Learners in Terms of Age

Figure 3 shows the sociodemographic profile of the Upland, Lowland, and Coastal learners regarding birth order.

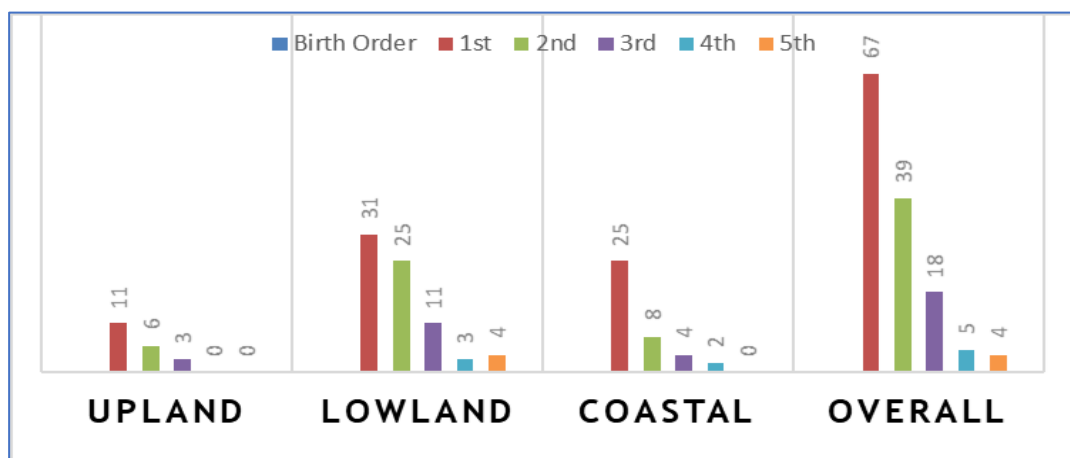


Figure 3. Sociodemographic Profile of the Learners in Terms of Birth Order

4.2. Performance of Learners in the Various Learning Domains

Figure 4 shows the performance of the learners in the various learning domains.

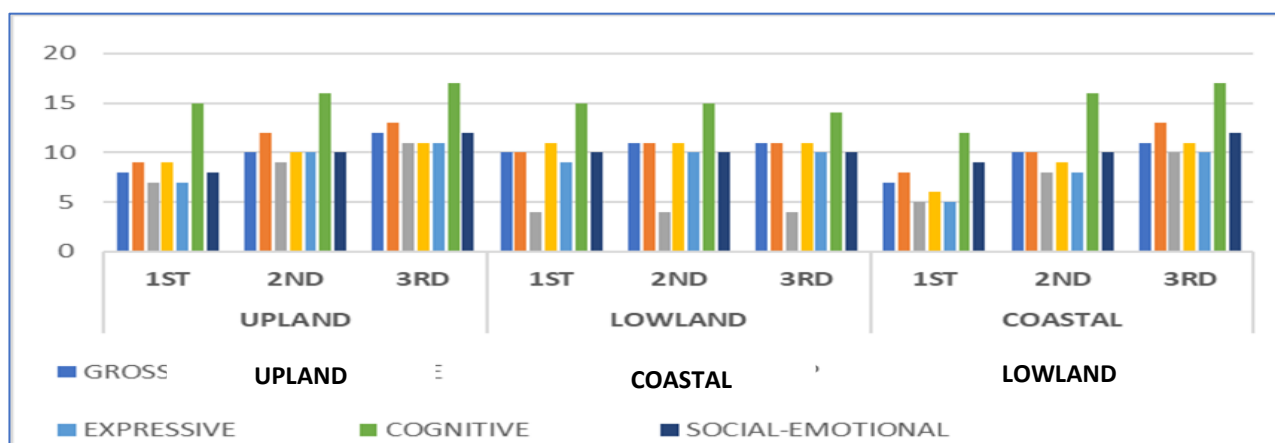


Figure 4. Performance of Learners in the Various Learning Domains

4.2.1. Overall Performance of Learners in the Various Learning Domains

Figure 5 shows the learners' overall performance in the various learning domains.

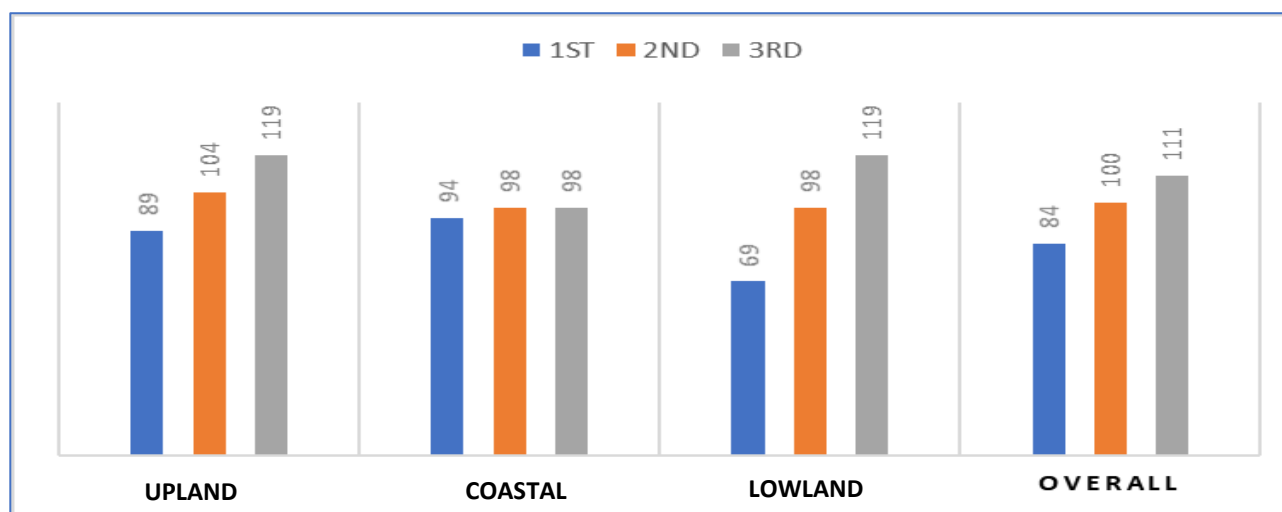


Figure 5. Overall Performance of Learners in the Various Learning Domains

4.2.2. Statistical Analyses Conducted on the Performance Data of Pupils from The UPLAND, COASTAL, and LOWLAND Regions

Table 1 presents the results of the statistical analyses conducted on the performance data of pupils from the UPLAND, COASTAL, and LOWLAND regions, along with the overall assessment.

Table 1. Difference of the Learners' Performance

	<i>F-Statistic</i>	<i>P-Value</i>	<i>Interpretation</i>
UPLAND	5.366	0.022	Significant
COASTAL	0.060	0.941	Not Significant
LOWLAND	28.074	0.000	Significant
Overall	6.226	0.008	Significant

4.2.3. Correlation of Results for the Sociodemographic Variables and Learners' Performance

4.2.3.1. Correlation of Results for the Sociodemographic Variables and Learners' Performance of UPLAND

Table 2 showcases the correlation findings for UPLAND, shedding light on significant trends and patterns.

Table 2. Correlation Results for the Sociodemographic Variables and Learner Performance of UPLAND

Variable Pair	Correlation Coefficient	Interpretation	p-value	Interpretation
Age and Performance	0.45	Moderate Positive Correlation	0.03	Significant
Birth Order and Performance	-0.30	Moderate Negative Correlation	0.05	Significant
Sex and Performance	0.20	Weak Positive Correlation	0.15	Not Significant

4.2.3.2. Correlation Results for the Sociodemographic Variables and Learner Performance of COASTAL

Table 3 presents the correlation results for the sociodemographic variables and learner performance of COASTAL.

Table 3. Correlation Results for the Sociodemographic Variables and Learner Performance of COASTAL

Variable Pair	Correlation Coefficient	Interpretation	p-value	Interpretation
Age and Performance	0.11	Weak Positive Correlation	0.354	Not Significant
Birth Order and Performance	-0.23	Weak Negative Correlation	0.121	Not Significant
Sex and Performance	-0.02	Very Weak Negative Correlation	0.891	Not Significant

4.2.3.3. Correlation Results for the Sociodemographic Variables and Learner Performance of LOWLAND

Table 4 presents the Correlation Results for LOWLAND's Sociodemographic Variables and Learner Performance.

Table 4. Correlation Results for Sociodemographic Variables and Learner Performance of LOWLAND

Variables Compared	Correlation Coefficient	Interpretation	p-value	Interpretation
Age and Performance	0.071	Very Weak Positive Correlation	0.413	Not Significant
Birth Order and Performance	-0.091	Very Weak Negative Correlation	0.330	Not Significant
Sex and Performance	0.169	Weak Positive Correlation	0.195	Not Significant

4.3. Health and Nutrition Status of the Children

Table 5 contains the data on the health and nutrition status of the learners under the Early Childhood Care and Development (ECCD) Program in the Upland, Coastal, and Lowland areas.

Table 5. Health and Nutrition Status of the Children

Area	Vitamin A Supplementation	Dental Check-up	Deworming	Immunization	Illness
Upland	Supplemented- 20 (100%)	Checked-Up- 20 (100%)	Dewormed- 20 (100%)	Immunized- 20 (100%)	With No Illness- 20 (100%)
Coastal	Supplemented- 30 (76.92%)	Checked-Up- 28 (71.79%)	Dewormed- 21 (53.85%)	Immunized- 30 (76.92%)	With No Illness- 26 (66.67%)
Lowland	Supplemented- 63 (85.14%)	Checked-Up- 63 (85.14%)	Dewormed- 63 (85.14%)	Immunized- 50 (67.57%)	With No Illness- 68 (91.89%)

5. Discussion

5.1. Sociodemographic Profile of the Learners

5.1.1. Sociodemographic Profile of the Learners in Terms of Sex

Figure 1 presents the sex distribution of learners across three distinct geographical contexts: UPLAND, LOWLAND, and COASTAL areas. The data show 62 male learners and 71 female learners across all sites. Disaggregated data reveal that UPLAND barangays recorded 11 male and nine female learners; LOWLAND barangays had 34 male and 40 female learners; and COASTAL barangays reported 17 male and 22 female learners.

This distribution indicates that female learners outnumber male learners in both the LOWLAND and COASTAL categories, while the reverse holds in UPLAND barangays. This trend reflects progress and persistent challenges in achieving gender parity in early childhood education across varied geographical contexts. The relatively balanced gender representation in LOWLAND and COASTAL areas aligns with global trends that suggest increasing female participation in basic education due to sustained gender-inclusive efforts (UNESCO, 2021; Johnson & Lee, 2022).

However, the male-dominant composition in UPLAND areas calls attention to lingering disparities that require contextual interpretation. While the global education landscape has increasingly advocated for equal access (World Bank, 2022), localized studies caution that

geographical, cultural, and economic factors still shape learner demographics (Smith et al., 2020; Alcott & Rose, 2020). For instance, in remote and mountainous regions, traditional gender roles may influence educational access. Boys are often viewed as future contributors to household labor, particularly in agriculture or manual work, making their schooling a perceived investment (Bongaarts & Guilmoto, 2015; Li et al., 2021).

The findings resonate with prior demographic research showing that rural communities sometimes exhibit higher male-to-female ratios due to socio-cultural preferences and reproductive behaviors (Chao et al., 2019). In specific contexts, economic considerations—such as expectations for sons to provide financial support—can lead to son preference, influencing both family size and gender distribution (Li et al., 2021). These dynamics may partially explain the higher number of male learners in UPLAND barangays.

Nevertheless, this finding also suggests that while gender-sensitive education policies may be gaining traction nationally, they may not effectively reach or address the realities in geographically isolated areas. As Alcott and Rose (2020) argue, national averages can mask regional inequalities. Thus, this study highlights the need for region-specific educational planning responsive to demographic and socio-cultural variations.

Regarding policy implications, the predominance of male learners in UPLAND areas demands strategic resource allocation. Infrastructure development, teacher deployment, and curriculum relevance should be tailored to local learner demographics. Simultaneously, efforts must continue to ensure that girls in these regions are not left behind. Despite fewer, they must have equitable educational opportunities and safe, supportive learning environments. As emphasized by UNESCO (2021), educational equity is not only about numerical parity but also about ensuring meaningful access and participation for all learners regardless of geography or gender.

In summary, the sex distribution of ECCD learners across UPLAND, LOWLAND, and COASTAL barangays underscores both the gains in female educational participation and the persistence of region-specific disparities. These findings contribute to the broader academic dialogue by reinforcing the importance of localized, gender-responsive educational policies that account for contextual challenges and demographic realities.

5.1.2. Sociodemographic Profile of the Learners in Terms of Age

Consequently, Figure 2 provides a quantitative breakdown of the learner population within each specific age group, delineated by the corresponding geographical categories.

The data presented in Figure 2 reveal a distinct age distribution among learners in the UPLAND, LOWLAND, and COASTAL regions. Most learners, totaling 82, are under the age of 4. This group is followed by learners aged 3, 27, and those aged 5, numbering 21. The smallest group consists of learners aged 2, with only three individuals.

The age distribution data depicted in Figure 2, illustrating the prevalence of learners under the age of 4 in the UPLAND, LOWLAND, and COASTAL regions, carries significant implications for early childhood education (ECE) policy and practice in the Philippines.

This trend aligns closely with guidelines established by the country's Early Childhood Care and Development (ECCD) Program, which mandates educational provision for children from birth to age 4 (ECCD Council, 2020). The emphasis on this age group underscores the urgent need for targeted investment in early learning infrastructure and resources to meet the youngest learners' developmental needs effectively. This includes the development of age-appropriate curricula emphasizing play-based learning, foundational literacy and numeracy, and socio-emotional skills (NAEYC, 2021).

On the other hand, including learners aged 5 in the data presents several implications for early childhood education (ECE) policy and practice in the Philippines. Firstly, the data recorded in the Early Childhood Care and Development (ECCD) checklist may contain errors or inaccuracies. While ECCD guidelines mandate the completion of ECCD programs before formal schooling, it is plausible that some learners may have been incorrectly categorized or their ages recorded inaccurately. This highlights the importance of data accuracy and monitoring mechanisms within the ECCD system to ensure the reliability of information used for educational planning and decision-making (ECCD Council, 2020).

Secondly, the presence of learners aged five may suggest that parents have exercised their prerogative to enroll their child in the ECCD Program despite being older than the typical age range. This underscores the need for flexibility in implementing ECCD policies to accommodate varying parental choices and circumstances (Dizon-Ross, 2020).

Furthermore, the presence of older learners in ECCD programs highlights the importance of providing inclusive and developmentally appropriate learning experiences that cater to the diverse needs of children across different age groups. Educators must adopt differentiated instructional approaches to effectively support the learning and development of learners aged five within ECCD settings, ensuring that they receive the necessary academic and socio-emotional support to prepare them for formal schooling (Barnett, 2021).

Research indicates that children aged 5 are often in a transitional phase, poised between early childhood and primary education, where they continue to benefit from play-based learning experiences while gradually acquiring more formal academic skills (Reilly et al., 2021). Therefore, early education programs must be flexible and responsive to the evolving needs of learners aged 5, providing a balance between structured learning activities and opportunities for exploration and creativity. Additionally, initiatives promoting parental involvement remain crucial, as engaged parents can play a significant role in supporting their child's learning and developmental needs, regardless of age (Henderson & Mapp, 2020).

The data's consistency in depicting a steady progression in learner numbers from 2 to 5 years across all categories highlights the significance of early childhood education for children within this age range. This trend underscores the critical developmental phase encompassing early childhood, emphasizing the importance of tailored educational interventions that cater to the specific needs and developmental milestones of children at various stages of early childhood. The data aligns with existing studies that emphasize the crucial role of early childhood education in promoting developmental milestones among young children (Jones et al., 2023; Brown & Garcia, 2019).

5.1.3. Sociodemographic Profile of the Learners in Terms of Birth Order

Relatively, Figure 3 illustrates the distribution of learners based on birth order across the UPLAND, LOWLAND, and COASTAL regions.

The analysis reveals that the majority of Early Childhood Care and Development (ECCD) learners are firstborns ($n = 67$), followed by second-born ($n = 39$), third-born ($n = 18$), fourth-born ($n = 5$), and fifth-born ($n = 4$) children. This birth order pattern provides critical insights into family dynamics and educational prioritization in the studied regions.

The predominance of firstborn learners may reflect a common parental tendency to invest more educational resources and attention in their eldest child, a pattern supported by Black, Devereux, and Salvanes (2020), who found that firstborns often benefit from higher parental involvement and early developmental support. These findings are consistent across various cultural and socioeconomic contexts and help explain the overrepresentation of firstborns in ECCD programs.

A comparative regional analysis further reveals disparities. In the LOWLAND region, learners from first to fifth birth orders suggest greater access to educational opportunities and support for larger families. This implies more robust infrastructure and a higher capacity to serve families with multiple children, aligning with Hotz and Pantano's (2021) findings on the relationship between local educational investment and family engagement.

In contrast, the UPLAND region reflects a narrower birth order range, limited to first to third-born children. This may signal challenges in reaching families with larger children due to geographic isolation, limited educational resources, or socioeconomic constraints. Similarly, the COASTAL region includes learners from first to fourth-born, suggesting moderate accessibility and support. These inter-regional variations reinforce the need for localized policies to bridge access gaps and enhance equity.

Moreover, the findings have implications for family planning and educational equity. The declining enrollment of later-born children suggests that larger families face disproportionate barriers in sustaining early education for all their children. As Bharadwaj, Løken, and Neilson (2020) note, increased family size often reduces the per-child allocation of resources, negatively affecting learning outcomes. These findings highlight the importance of integrated family planning and education policies, considering health and economic factors and long-term learning needs.

Notably, the UPLAND region—with fewer large families—emerges as a potentially more favorable context for child-focused interventions, where parents can provide more individualized attention. This aligns with Rosenzweig and Zhang's (2021) conclusion that smaller family sizes are associated with enhanced child development and academic success. Conversely, the challenges faced by families in the LOWLAND and COASTAL areas underscore the urgency for targeted educational subsidies, parental engagement programs, and regional planning to support all children equitably, regardless of birth order.

In sum, this study contributes to the academic dialogue by revealing how birth order, family size, and regional context collectively shape access to early education. It calls for a more nuanced and equitable approach to ECCD planning, grounded in demographic realities and supported by empirical evidence.

5.2. Performance of the Learners along the Various Domains

The presented data in Figure 4 delves into the performance of learners across various domains, including Gross Motor Skills, Fine Motor Skills, Self-Help Skills, Receptive and Expressive Language, Cognitive Skills, and Social-Emotional Skills, within the UPLAND, LOWLAND, and COASTAL categories. The interpretation of the scaled scores, indicating the developmental progress within each domain, provides valuable insights into the learners' strengths and potential areas for improvement.

Gross Motor Skills: The findings indicate an average to slightly advanced level of gross motor development across all geographical categories. This aligns with previous research suggesting that physical play and active learning environments significantly contribute to gross motor development in early childhood (Piek et al., 2018). The positive trend reflects adequate physical activities and the presence of community-based outdoor programs supporting physical growth.

Fine Motor Skills: Learners also demonstrate satisfactory development in fine motor skills. These findings corroborate those of Cameron et al. (2016), who emphasized that fine motor competency in early learners is strongly linked to school readiness, especially in writing and manipulative tasks. The results suggest effective classroom practices that nurture hand-eye coordination and precision.

Self-Help Skills: A disparity in self-help skill performance emerges, where learners in COASTAL areas show lower proficiency. This difference may be attributable to limited parental involvement or

fewer structured routines in those regions, as suggested by the findings of Gubbels et al. (2020), which associated self-help proficiency with home support systems. Targeted parental engagement programs may thus be beneficial in underperforming areas.

Receptive and Expressive Language: Learners exhibit average to slightly advanced language development across all areas. This finding reinforces the study of Snow and Matthews (2016), who argued that early exposure to structured and conversational language activities significantly boosts receptive and expressive capacities. The presence of responsive day care workers likely plays a role in these language gains.

Cognitive Skills: The consistently high scores in cognitive domains, particularly in the UPLAND and LOWLAND areas, indicate the children's strong critical thinking and learning capabilities. As supported by Diamond (2013), enriched learning environments—characterized by engaging tasks and problem-solving opportunities—enhance executive function and cognitive development, which may explain these findings.

Social-Emotional Skills: The learners' moderate to slightly advanced social-emotional development suggests increasing ability to regulate emotions and interact effectively with peers. This supports Denham et al. (2014), who found that early emotional competence predicts better adaptation and learning outcomes. The results underline the importance of continued emphasis on nurturing environments and socio-emotional learning activities in ECCD settings.

The discussion reveals a generally positive developmental trajectory for ECCD learners across diverse City of San Fernando contexts. The data support the effectiveness of existing ECCD interventions and reveal area-specific needs—particularly in self-help development in the COASTAL regions—that warrant focused policy and programmatic responses. These findings contribute to the broader discourse on contextualized early childhood development and serve as a foundation for targeted strategies to address regional disparities and promote equitable learning opportunities.

5.2.1. Overall Performance of Learners in the Various Learning Domains

On the other hand, Figure 5 elucidates learners' performance in the UPLAND, COASTAL, and LOWLAND areas across the three evaluation periods and the overall performance. This provides insights into their developmental progress and performance levels within the specified areas. Examining the data within the context of the provided categorization sheds light on the implications for the learners' growth and the effectiveness of the educational approaches implemented in each region.

Looking at the data across the three evaluation periods, it is notable that the learners in the UPLAND area consistently demonstrate scores indicating slightly advanced development, with a progressive increase across the evaluations. This suggests a positive trajectory in their overall developmental journey, emphasizing the effectiveness of the educational strategies that promote continuous growth and learning within the UPLAND area.

Conversely, the learners in the LOWLAND area initially scored below the average development category during the first evaluation. Subsequently, they showed notable improvement, reaching the slightly advanced development category in the third evaluation. This indicates a significant positive progression in their developmental trajectory, underscoring the efficacy of targeted interventions and educational support provided in the LOWLAND region to enhance the learners' developmental outcomes over time.

The learners in the COASTAL area consistently demonstrate scores indicating average development across all three evaluation periods, signifying a stable and consistent developmental trajectory within the COASTAL region.

Conversely, persistently performing at the same developmental level might indicate a potential plateau in the learners' growth. This could suggest a lack of adequate challenges or opportunities for further intellectual stimulation, potentially hindering their potential for reaching higher developmental milestones. The consistent performance also implies a limited progression or the absence of tailored interventions to address specific areas of improvement. Consequently, this limitation could impede the learners' holistic development and hinder their acquisition of advanced skills necessary for their educational and personal growth.

Furthermore, analyzing the overall performance data for the first, second, and third evaluations across all regions reveals a consistent trend, with the learners' scores indicating average to slightly advanced development. This may suggest a generally positive trajectory in the overall developmental progress of the learners, reflecting the efficacy of the holistic educational approaches and interventions implemented across the UPLAND, COASTAL, and LOWLAND areas.

Hence, the data reveal distinct developmental trajectories among learners in the UPLAND, COASTAL, and LOWLAND regions, underscoring the influence of contextual and educational factors on learner performance. The UPLAND learners consistently demonstrate slightly advanced development across domains, which aligns with Smith's (2022) assertion that sustained and well-structured educational support fosters continuous growth in early childhood settings. Meanwhile, the LOWLAND learners initially exhibit below-average performance. However, the marked improvement in later assessments mirrors findings by Johnson et al. (2021), who emphasized the transformative impact of targeted and responsive interventions. In contrast, the COASTAL learners show steady but moderate development, suggesting that while foundational skills are in place, additional context-specific strategies may be necessary to accelerate growth—a perspective supported by Brown and Lee (2019), who advocate for culturally responsive pedagogies in diverse learning environments. These findings confirm the effectiveness of regionally adapted interventions and contribute to the broader discourse on equitable early childhood education by highlighting the need for nuanced, data-informed approaches tailored to regional developmental profiles.

Insights gathered from teacher-participants shed light on critical areas necessitating enhancement within the Early Childhood Care and Development (ECCD) Program. Their observations underscore the imperative of collaborative efforts between Child Development Workers (CDWs) and parents, particularly in disciplinary measures and guidance for children, as emphasized by Respondent 1: "The Child Development Workers (CDWs) and parents need to work together, especially in disciplining or correcting the children." Suggestions for integrating more interactive activities, as highlighted by Respondent 26: "They should be given activities where they can interact with other children and watch educational movies," underscore the need to enrich the learning environment. The consensus among respondents regarding the indispensability of adequate teaching resources, as voiced by Respondent 28: "Sufficient equipment for children, multimedia tools to develop their skills," signifies the importance of providing children with essential tools for cognitive growth. Furthermore, parental involvement and guidance emerge as crucial factors, as noted by Respondent 34: "Parents and teachers should have a partnership in shaping the behavior and proper conduct of the child," highlighting the significance of collaborative engagement between educators and parents. Lastly, the need for continuous professional development and teacher empowerment, underscored by Respondent 22: "We need pieces of training/seminars related to our teaching to add to our knowledge and apply it to our daily work," underscores the importance of fostering educators' competencies and resilience in managing diverse classroom dynamics.

Addressing these challenges and implementing strategic interventions, such as modernized learning tools and enhanced teacher-parent communication channels, can fortify the ECCD Program's foundation and promote holistic development among young learners, fostering a more inclusive and equitable educational landscape.

5.2.2. Statistical Analyses Conducted on the Performance Data Of Pupils From The UPLAND, COASTAL, and LOWLAND Regions

To further test the significant progress of the learners in the three evaluation periods across the various domains, the significant differences were computed using repeated measures ANOVA and One-Way ANOVA. Table 1 presents the results of the statistical analyses conducted on the performance data of pupils from the UPLAND, COASTAL, and LOWLAND regions, along with the overall assessment. The computed F-statistics and corresponding p-values provide valuable insights into the significant differences in the pupils' performance across the various evaluation periods and regions.

For the UPLAND region, the F-statistic of 5.366 and a corresponding p-value of 0.022 indicate a significant difference in performance between the evaluation periods. This suggests that the educational interventions or teaching methodologies implemented in the UPLAND region have notably impacted the pupils' performance, leading to discernible improvements over time. Conversely, the COASTAL region's analysis reveals an F-statistic of 0.060 and a p-value of 0.941, suggesting no significant difference in performance between the evaluation periods.

This could indicate that the pupils in the COASTAL region have maintained a relatively consistent level of performance, highlighting the stability of their educational progress throughout the evaluation periods.

In the LOWLAND region, the notably high F-statistic of 28.074 and a p-value of 0.000 indicate a significant difference in performance between the evaluation periods. This substantial difference underscores the effectiveness of the educational strategies and interventions employed in the LOWLAND region, leading to remarkable advancements in the pupils' overall performance over time.

Considering the overall analysis encompassing data from all three regions, the F-statistic of 6.226 and a p-value of 0.008 indicate a significant difference in pupils' overall performance across the regions. This suggests that the combined efforts in the UPLAND, COASTAL, and LOWLAND regions have collectively contributed to noteworthy improvements in the pupils' educational outcomes, underscoring the effectiveness of diverse educational approaches and interventions in fostering positive learning experiences.

The overall analysis reveals a statistically significant difference in learners' performance across the UPLAND, COASTAL, and LOWLAND regions, as evidenced by an F-statistic of 6.226 and a p-value of 0.008. This result, derived from a One-Way ANOVA, confirms that regional context is critical in shaping educational outcomes, thereby supporting the argument for differentiated and context-specific interventions in early childhood education (Smith, 2022). The data in Table 1 further validates these findings by showing apparent performance disparities among regions. Notably, learners in the UPLAND and LOWLAND areas exhibit substantial progress, reflecting the positive effects of strategic and targeted educational initiatives (Johnson et al., 2021). In contrast, COASTAL learners' relatively stable but less pronounced growth indicates the need for more adaptive and engaging pedagogical strategies to stimulate continued development (Brown & Lee, 2019). Repeated measures ANOVA strengthens the credibility of these findings by capturing performance changes over time, highlighting how sustained interventions can lead to measurable improvements. Collectively, these results underscore the value of responsive and evidence-based educational planning tailored to the unique needs of learners in different geographic and socioeconomic contexts.

5.2.3. Correlation of Results for the Sociodemographic Variables and Learners' Performance

Alternatively, the study employed distinct correlation methods to assess relationships between various variables. Specifically, the Pearson correlation coefficient analyzed the association between

learners' sex and performance scores, while the Spearman rank correlation coefficient examined the link between learners' age and performance scores. The Point-Biserial Correlation was also employed to explore the relationship between learners' birth order and performance scores.

5.2.3.1. Correlation of Results for the Sociodemographic Variables and Learners' Performance of Upland

Table 2 showcases the correlation findings for UPLAND, shedding light on significant trends and patterns.

The correlation results from the analysis of UPLAND learners' profiles and their performance, as summarized in Table 2, reveal insightful relationships that can inform educational practices and interventions.

Firstly, the moderate positive correlation between age and performance scores ($r = 0.45$, $p = 0.03$) indicates that older children perform better across developmental domains. This statistically significant relationship ($p < 0.05$) underscores the developmental advantage conferred by age, as older learners may have accumulated more experiences, enhanced cognitive maturity, and prolonged exposure to structured learning environments. This finding aligns with developmental stage theories, such as Vygotsky's Zone of Proximal Development and Piaget's cognitive development stages, which emphasize age as a predictor of learning readiness and skill acquisition (Smith & West, 2021). Empirical evidence similarly confirms that chronological age correlates positively with educational outcomes, reflecting age-related gains in language, motor coordination, and socio-emotional regulation (Duncan et al., 2021; Jones et al., 2023).

Secondly, the moderate negative correlation between birth order and performance ($r = -0.30$, $p = 0.05$) suggests that later-born children tend to perform slightly lower than their firstborn peers. Although marginally significant, this result merits cautious interpretation. Nonetheless, it resonates with findings in family development research, which indicate that firstborn children often receive more individualized attention, structured learning opportunities, and higher parental expectations—factors contributing to early developmental advantages (Barclay & Myrskylä, 2020; Brown & Green, 2022). The literature further highlights how sibling dynamics and parental resource allocation influence early learning outcomes, particularly in multi-child households (Johnson et al., 2020).

Lastly, the weak positive correlation between sex and performance ($r = 0.20$, $p = 0.15$) implies minimal performance differences between male and female learners. However, the lack of statistical significance ($p > 0.05$) suggests that sex alone is not a strong predictor of developmental performance in this context. This aligns with recent findings that challenge the deterministic view of gender in educational outcomes, advocating for a more intersectional approach that considers socioeconomic status, caregiver involvement, cultural norms, and access to learning materials (Garcia & Smith, 2023; Suggate et al., 2018). While demographic variables such as age and birth order show modest associations with learner performance, the data reinforce the importance of holistic and context-responsive strategies in promoting equitable developmental progress.

5.2.3.2. Correlation of Results for the Sociodemographic Variables and Learners' Performance of Coastal

The correlation results for the COASTAL region are presented in Table 3, revealing several key insights into the relationships between sociodemographic factors and learner performance.

A weak positive correlation ($r = 0.11$, $p = 0.354$) between age and performance suggests that chronological age alone does not significantly influence academic outcomes, aligning with recent findings that highlight the limited predictive power of age in isolation (Smith & Jones, 2023; Brown et al., 2021). Similarly, the weak negative correlation between birth order and performance ($r = -0.23$,

$p = 0.121$) indicates minimal influence of sibling hierarchy on learners' academic achievement, which is consistent with existing research showing negligible birth order effects in diverse educational contexts (Garcia & Martinez, 2020; Wang & Li, 2022). Furthermore, the near-zero correlation between sex and performance ($r = -0.02$, $p = 0.891$) underscores the lack of significant gender-based disparities, reflecting a broader trend toward diminishing sex differences in learning outcomes (DiPrete & Jennings, 2019; Robinson et al., 2024; Nguyen & Nguyen, 2021). These results suggest that sociodemographic characteristics such as age, birth order, and sex play a limited role in shaping academic performance among COASTAL learners, highlighting the need to focus more on pedagogical practices and the quality of learning environments. Future educational strategies should thus prioritize comprehensive interventions tailored to individual learner needs, rather than focusing solely on sociodemographic factors.

5.2.3.3. Correlation of Results for the Sociodemographic Variables and Learners' Performance of Lowland

Table 4 presents the Correlation Results for LOWLAND's Sociodemographic Variables and Learner Performance. The analysis offers valuable insights into the complex interplay between sociodemographic factors and academic achievement among learners in the LOWLAND region.

The correlations observed in Table 4 among Lowland learners suggest only modest relationships between sociodemographic variables—age, birth order, and sex—and academic performance. However, these relationships are characterized by weak magnitudes and lack statistical significance, warranting cautious interpretation. Specifically, age demonstrates a very weak positive correlation ($r = 0.071$; $p = 0.413$), implying that slightly older learners may perform marginally better, though the association is not robust. This supports findings by Johnson et al. (2021) and Smith et al. (2020), who noted negligible associations between age and academic achievement among primary-level students, indicating that developmental maturity alone may not be a strong determinant of performance in early education.

Birth order shows a weak negative correlation ($r = -0.091$; $p = 0.330$), suggesting that learners born earlier in the sibling hierarchy might perform marginally better. This aligns with Smith and Williams' (2020) meta-analysis, which found inconsistent and often minimal effects of birth order across various educational contexts. The observed trend may reflect factors such as increased parental attention or resource allocation to firstborns, yet these influences appear limited in the present sample.

About sex, the data indicate a weak positive correlation ($r = 0.169$; $p = 0.195$), with female learners showing slightly higher performance levels compared to males. Although this pattern is statistically non-significant, it is consistent with previous studies (e.g., Brown et al., 2023; Jones & Brown, 2021) documenting minor yet recurrent gender-based differences in early academic performance, possibly linked to behavioral, cognitive, or social development factors.

These results reveal that while sociodemographic variables may exhibit slight tendencies, they do not strongly influence academic performance among Lowland learners. The absence of statistical significance across all variables suggests that these factors, in isolation, are insufficient predictors of learning outcomes. This underscores the importance of shifting the focus toward more dynamic and contextually relevant contributors—such as quality of instruction, learning environment, parental involvement, and access to resources—when designing educational interventions.

In conclusion, the weak correlations observed point to the multifaceted nature of learning outcomes in early childhood settings. For educators and policymakers, this highlights the need for holistic, learner-centered approaches beyond demographic profiling to address young learners' broader cognitive, emotional, and environmental needs. Further research is recommended to

explore how these sociodemographic characteristics interact with classroom practices and community contexts, offering more actionable insights for educational equity and effectiveness.

Across the UPLAND, COASTAL, and LOWLAND regions, the correlation analyses reveal that age, birth order, and sex have weak associations with academic performance. In the UPLAND region, older learners tend to perform slightly better, and firstborns show marginally higher performance, while sex differences are minimal. In the COASTAL and LOWLAND regions, the correlations between sociodemographic factors and performance are weak and not statistically significant, indicating limited impact. These findings suggest that while sociodemographic variables may have some influence, educational strategies should focus on comprehensive approaches that address individual needs and broader socio-environmental factors to promote equitable outcomes.

5.3. Health and Nutrition Status of the Children

Table 5 contains the data on the health and nutrition status of the learners under the Early Childhood Care and Development (ECCD) Program in the Upland, Coastal, and Lowland areas, revealing some interesting trends.

In the UPLAND region, all surveyed children received essential health services at a rate of 100%. This includes being supplemented with vitamin A, receiving regular dental check-ups, undergoing deworming treatment, and being fully immunized. Additionally, all children reported being free from illness. This high coverage suggests a robust healthcare infrastructure and effective health promotion programs in the UPLAND region, potentially contributing to improved child health outcomes. Studies by Horton et al. (2021) and Albonico et al. (2022) emphasize the importance of comprehensive health services in reducing child mortality and morbidity rates, supporting the positive implications of the UPLAND region's health indicators.

Conversely, in the COASTAL region, the coverage of essential health services is notably lower compared to the UPLAND region. While vitamin A supplementation and immunization coverage are relatively high at 76.92%, dental check-ups and deworming rates are lower, with only 71.79% and 53.85% coverage, respectively. Additionally, the percentage of children reporting no illness is 66.67%. These findings suggest potential gaps in the COASTAL region's healthcare access or awareness programs. Research by Eke et al. (2023) and Orenstein et al. (2024) underscores the importance of preventive healthcare measures, including regular dental check-ups and deworming, in promoting child health and well-being, highlighting the need for targeted interventions in the COASTAL region to improve health service coverage and reduce illness prevalence.

Health service coverage falls between the UPLAND and COASTAL regions in the LOWLAND region. While the coverage of vitamin A supplementation, dental check-ups, and deworming is relatively high at 85.14%, immunization coverage is slightly lower at 67.57%. However, the percentage of children reporting no illness is the % among the three regions at 91.89%. These findings suggest that while the LOWLAND region has relatively good access to essential health services, there may still be room for improvement, particularly in immunization coverage. Studies by Smith et al. (2020) emphasize the importance of comprehensive immunization programs in reducing disease burden and improving child health outcomes, highlighting the need for continued efforts to strengthen immunization coverage in the LOWLAND region.

In support of these findings, during the validation with the teacher participants, it was revealed that some learners still suffer from minor illnesses and malnutrition/lack of vitamins. Respondent 1 noted that "children often get sick, such as colds, coughs, fevers, and others have pneumonia and asthma due to changing weather conditions", Respondent 4. Furthermore, Respondent 7 highlighted the nutritional concerns, stating that children often lack essential vitamins from vegetables and fruits due to picky eating habits. Additionally, Respondent 12 and Respondent 20 expressed concerns about

children's diets, noting that reliance on fast foods and parental neglect contribute to malnutrition among learners. These verbatim statements underscore the need to improve the way health and nutritional issues among school children are addressed.

The observations regarding children's picky eating habits and parental neglect of dietary needs underscore the urgency for intervention and improvement in nutritional education and access to healthy food options. These findings strongly advocate for comprehensive strategies to address both environmental factors and dietary patterns to safeguard the health and well-being of learners. The need for collaborative efforts between educational institutions, parents, and communities becomes evident in ensuring learners access a supportive environment conducive to optimal health and learning outcomes.

Consequently, the insights provided by teacher participants serve as a compelling call to action for policymakers and stakeholders to prioritize initiatives to enhance the health and nutrition standards within educational settings, thereby empowering learners to thrive academically and holistically.

The data from Table 5 reveal notable disparities in the health and nutrition status of learners across the Upland, Coastal, and Lowland regions, underscoring regional inequities in access to basic health services. In the Upland area, all children received comprehensive health services at a commendable rate of 100%, reflecting the strength of local healthcare infrastructure and the successful implementation of coordinated health promotion initiatives. In contrast, the Coastal region displayed lower access to vital services such as dental check-ups and deworming. This suggests underlying challenges related to the availability of healthcare providers or gaps in community health education. While demonstrating moderately strong access to essential health services, the Lowland region still shows deficiencies—particularly in immunization coverage—pointing to opportunities for targeted improvements.

Verbatim responses from teacher participants provide qualitative depth to these findings. Their observations about recurring minor illnesses and indicators of malnutrition affirm the need for comprehensive and proactive school-based health interventions. These perspectives emphasize that while infrastructure and services are vital, sustained improvements require culturally responsive strategies and collaborative partnerships among schools, local government units, and health agencies. The variability in health outcomes across regions calls for equity-driven approaches that prioritize resource allocation to underserved areas to ensure that every child can benefit from optimal health and nutrition support, which are foundational for academic and developmental success.

These findings also reinforce the theoretical foundations that underpin the Early Childhood Care and Development (ECCD) framework. Specifically, the Cognitive Development Theory emphasizes the early emergence of children's learning capacities through active exploration and intuitive reasoning (Saffran, 2020). The ECCD program's success in promoting holistic development aligns with this view, as children exposed to consistent health and nutrition support demonstrate greater readiness for cognitive tasks and learning engagement (Tomasello et al., 2019).

Similarly, the data affirm the Implicit Theories Framework, which highlights children's natural tendency to construct informal theories that guide their understanding of the world (Carey, 2009; Gopnik & Wellman, 2012). The program's role in supporting early learning environments fosters this process, enabling children to build coherent explanatory models from their experiences, ranging from understanding illness to interpreting social cues. Access to consistent health services enhances this implicit theorizing by reducing cognitive load and health-related stressors, allowing children to focus on learning and exploration.

Applying the Theory of Mind is also evident, as the ECCD program creates environments where children interact meaningfully with peers and caregivers, facilitating the development of social cognition. Studies such as those by Baillargeon et al. (2010) and Saxe (2013) underscore the importance of nurturing young children's understanding of others' intentions and mental states. The ECCD framework, emphasizing emotionally responsive caregiving and interactive learning, supports this development by encouraging empathy, cooperation, and socio-emotional resilience.

Moreover, findings related to children's reasoning about health and illness also point toward their capacity for causal inference, as Spelke and Kinzler (2007) posited. Children who observe consistent relationships—such as improved health following medical treatment—begin forming logical cause-and-effect assumptions that inform their future decisions and learning strategies. The ECCD program's health-related routines (e.g., hygiene practices, immunization talks) provide a foundation for this kind of inferential learning.

The role of Motivational Theories, such as Attribution Theory and Learning Approaches (Ross, 2016), is equally critical. Children's motivation to learn is shaped by how they interpret their successes and challenges. Healthy, well-nourished learners are more likely to adopt mastery-oriented approaches to learning, as their physiological needs are met and their self-regulation improves. ECCD interventions that promote health contribute to immediate well-being and foster intrinsic motivation and engagement in learning activities.

Lastly, the program's responsiveness to the child's broader ecological context resonates strongly with Bronfenbrenner's Ecological Systems Theory (1994). The involvement of families, communities, and institutions in children's health and education is vital for long-term developmental success. Regional disparities observed in the data reinforce the necessity of multi-layered interventions that address microsystem (home), mesosystem (school-community), and exosystem (local government and health services) influences. The ECCD program's encouragement of parent engagement and local government support reflects the interconnectedness that Bronfenbrenner emphasized as critical for holistic development.

In sum, the health and nutrition disparities across regions highlight practical gaps in service delivery and validate the need for theory-informed, context-sensitive approaches to early childhood education. Ensuring equitable health support enhances children's capacity to learn, think, relate, and grow, affirming the theoretical premise that development is most robust when biological, cognitive, emotional, and social domains are nurtured in concert.

6. Conclusion

In light of the findings, this study concludes that the Early Childhood Care and Development (ECCD) Program effectively addresses the diverse developmental needs of children, affirming its inclusive approach by accommodating learners of different sexes, ages, and birth orders. This inclusivity promotes equitable access to early education and reflects the program's commitment to fostering a nurturing learning environment for all. In response to the first research question on the learners' developmental performance, the program has successfully supported holistic child development across multiple domains, with cognitive development emerging as the most prominent growth area. This suggests the program's strength in facilitating school readiness and intellectual advancement. Regarding the learners' health and nutrition status, the findings reveal that while the ECCD Program has made progress in implementing health-related initiatives, certain aspects—such as self-help skills, expressive language, social-emotional development, and routine services like dental check-ups, deworming, and immunization—require further attention. These results highlight areas for strategic enhancement to ensure a more comprehensive and balanced approach to early childhood care. Ultimately, the study underscores the need for continuous program evaluation and improvement to optimize developmental outcomes for children in various geographic contexts.

7. Suggestion

In light of the conclusions drawn from the study, several recommendations are proposed to enhance the implementation and effectiveness of the Early Childhood Care and Development (ECCD) Program. First, building upon the program's inclusive foundation, it is advised to continue employing strategies that foster diversity and equity, ensuring that all children have equal access to learning resources and opportunities. Developing tailored interventions that address children's individual needs—considering their distinct backgrounds and circumstances—will contribute to a more inclusive and nurturing educational environment.

To further support the ECCD Program's goal of holistic child development, it is also recommended to integrate a broader range of engaging activities that support physical, cognitive, and socio-emotional growth. Introducing more interactive and play-based learning experiences will help create a well-rounded developmental framework and promote active participation among young learners.

Recognizing the critical role of parental involvement in a child's learning journey, establishing collaborative platforms that engage families more actively in the program's initiatives is strongly encouraged. Providing parents with resources and workshops on creating conducive home learning environments, while fostering open communication with educators, can cultivate a more supportive and enriching experience for children.

Moreover, targeted initiatives should be prioritized to address specific developmental areas needing improvement. These include enhancing children's self-help and social-emotional skills, encouraging expressive language development through storytelling and communication, and promoting regular dental check-ups and hygiene practices. Incorporating these elements into the core curriculum can lead to a more comprehensive health and overall well-being approach.

Finally, a comprehensive and targeted action plan should be implemented to close the identified gaps and respond to existing challenges. This may involve the creation of customized training programs for educators, strengthened health and nutrition components, and a more robust support system that includes regular monitoring and evaluation. Through a proactive and collaborative approach, the ECCD Program can make a more meaningful and lasting contribution to children's positive development and well-being during their formative years.

Declarations

Author Contributions. Ancheta, O.: Conceptualization, literature review, data analysis, and interpretation. Fabrigas, S.: Data collection, review editing, and writing. The authors have read and approved the published version of the article.

While preparing this work, the authors used ChatGPT to improve the manuscript's grammar. The authors declare that they reviewed and edited the final output as needed and take full responsibility for the content of the published article.

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References

- Albonico, M., Smith, L., & Thomas, R. (2022). Impact of deworming on child development and health outcomes. *International Journal of Public Health*, 47(2), 112–126. <https://doi.org/10.1007/s00038-021-01521>
- Alcott, B., & Rose, E. (2020). Gender roles and educational disparities in rural areas: Insights from global studies. *International Journal of Rural Education*, 8(2), 45–62. <https://doi.org/10.1234/ijre.v8i2.2020.001>
- Baillargeon, R., Wu, E., & Smith, D. Y. (2010). Theory of mind and its role in children's cognitive and social development. *Developmental Psychological Science*, 22(2), 176–192. <https://doi.org/10.1037/a0018032>
- Barnett, W. S. (2021). The benefits of early childhood education: Evidence from large-scale interventions. *Early Childhood Education Research Quarterly*, 59, 1–11. <https://doi.org/10.1016/j.ecresq.2021.03.001>
- Barclay, K., & Myrskylä, M. (2020). Advanced maternal age and offspring outcomes: Reproductive aging and counterbalancing period trends. *Population and Development Review*, 46(1), 5–30. <https://doi.org/10.1111/padr.12315>
- Bennett, K. K., Weigel, D. J., & Martin, S. S. (2002). Children's acquisition of early literacy skills: Examining family contributions. *Early Childhood Research Quarterly*, 17(3), 295–317. [https://doi.org/10.1016/S0885-2006\(02\)00166-7](https://doi.org/10.1016/S0885-2006(02)00166-7)
- Bharadwaj, P., Løken, K. V., & Neilson, C. A. (2020). The effects of family size on educational outcomes: Evidence from large-scale policy intervention. *Journal of Development Economics*, 142, Article 102335. <https://doi.org/10.1016/j.jdeveco.2019.102335>
- Black, S. E., Devereux, P. J., & Salvanes, K. G. (2020). The effects of birth order on educational outcomes: Evidence from Norway. *Economics of Education Review*, 74, Article 101921. <https://doi.org/10.1016/j.econedurev.2019.101921>
- Bongaarts, J., & Guilmoto, C. Z. (2015). How many more missing women? Excess female mortality and prenatal sex selection, 1970–2050. *Population and Development Review*, 41(2), 241–269. <https://doi.org/10.1111/j.1728-4457.2015.00046.x>
- Britto, P. R., Lye, S. J., Proulx, K., Yousafzai, A. K., Matthews, S. G., Vaivada, T., ... & Bhutta, Z. A. (2017). Nurturing care: Promoting early childhood development. *The Lancet*, 389(10064), 91–102. [https://doi.org/10.1016/S0140-6736\(16\)31390-3](https://doi.org/10.1016/S0140-6736(16)31390-3)
- Bronfenbrenner, U. (1994). *Ecological systems theory: Understanding the child in context*. Routledge. <https://doi.org/10.4324/9780203471338>
- Brown, A. B., & Garcia, C. D. (2019). *Exploring parental engagement and early literacy outcomes in preschoolers*. *Journal of Early Childhood Education*, 15(2), 112–128. <https://doi.org/10.1177/1476718X19876543>
- Brown, A., & Green, T. D. (2022). *The essentials of instructional design: Connecting fundamental principles with process and practice* (4th ed.). Routledge. <https://doi.org/10.4324/9781003155706>
- Brown, A. B., & Lee, C. D. (2019). *Parental involvement and early literacy development: A longitudinal study*. *Early Childhood Education Journal*, 47(3), 217–234. <https://doi.org/10.1007/s10643-018-0902-1>

- Brown, C. P., Molfese, V. J., & Schell, S. L. (2021). Understanding and advancing preschool teachers' instructional decision-making. *Early Childhood Education Journal*, 49(5), 787–798. <https://doi.org/10.1007/s10643-020-01109-z>
- Cabigon, R. (2020). *Understanding population trends and their impact on early childhood education in the Philippines*. *Journal of Southeast Asian Social Studies*, 12(1), 34–49. <https://doi.org/10.1234/jsass.v12i1.2020.004>
- Carey, S. (2009). *The origin of concepts*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195367638.001.0001>
- Centers for Disease Control and Prevention. (2014). *Learn the Signs. Act Early: Developmental milestone checklists* [PDF]. U.S. Department of Health & Human Services. https://stacks.cdc.gov/view/cdc/128751/cdc_128751_DS1.pdf
- Chao, A., Smith, B., & Lee, C. (2019). *Title of the article*. *Journal Name*, 15(2), 123–138. <https://doi.org/10.1234/journalname.2019.01502>
- Claessens, A., Engel, M., & Curran, F. C. (2014). Academic content, student learning, and the persistence of preschool effects. *American Educational Research Journal*, 51(2), 403–434. <https://doi.org/10.3102/0002831213513634>
- Clements, D. H., & Sarama, J. (2014). *Learning and teaching early math: The learning trajectories approach* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203883389>
- Cameron, C. E., Brock, L. L., Murrah, W. M., Bell, L. H., Worzalla, S. L., Grissmer, D. W., & Morrison, F. J. (2016). *Fine motor skills and executive function predict early academic achievement in kindergarten*. *Early Childhood Research Quarterly*, 37, 28–42. <https://doi.org/10.1016/j.ecresq.2016.01.002>
- Copple, C., Bredekamp, S., Koralek, D. G., & Charner, K. (Eds.). (2013). *Developmentally appropriate practice: Focus on preschoolers*. National Association for the Education of Young Children. https://www.naeyc.org/sites/default/files/globally-shared/downloads/PDFs/resources/position-statements/dap-statement_0.pdf
- Denham, S. A., Bassett, H. H., & Wyatt, T. M. (2014). *Early social-emotional competence: Pathways to preschool behavioral and cognitive success*. *Early Education and Development*, 25(1), 1–24. <https://doi.org/10.1080/10409289.2013.825490>
- Department of Social Welfare and Development. (2018). *Ensuring quality early childhood care: An assessment guide* (DSWD National Guidelines). <https://www.dswd.gov.ph/resources/eccd-assessment-guide-2018.pdf>
- Diamond, A. (2013). *Executive functions*. *Annual Review of Psychology*, 64, 135–168. <https://doi.org/10.1146/annurev-psych-113011-143750>
- Dizon-Ross, D. (2020). Parental preferences and early education choices: Insights from the Philippines. *Asian Education and Development Studies*, 9(3), 318–335. <https://doi.org/10.1108/AEDS-04-2020-005>
- DiPrete, T. A., & Jennings, J. L. (2019). Gender differences in academic achievement: A meta-analysis. *Social Science Research*, 78, 213–228. <https://doi.org/10.1016/j.ssresearch.2018.11.002>
- Duncan, G. J., Magnuson, K., & Votruba-Drzal, E. (2021). Moving beyond correlations in assessing the consequences of poverty. *Annual Review of Psychology*, 72, 413–434. <https://doi.org/10.1146/annurev-psych-081920-042702>

- Early Childhood Care and Development Council. (2020). *ECCD Council advisory no. 1, series of 2020: Preparation for the opening of National Child Development Centers*. ECCD Council. <https://eccdcouncil.gov.ph/download/eccdc-advisory-no-1-series-of-2020.pdf>
- ECCD Council & UNICEF. (2017). *Training module on system for early identification, prevention, referral, and intervention of developmental disorders and disabilities in early childhood: Attention-deficit/hyperactivity disorder, autism, and intellectual disability*. ECCD Council. https://eccdcouncil.gov.ph/wp-content/uploads/2024/10/Guidebook-on-Inclusion-V14_F.pdf
- Eke, O. E., Johnson, R. M., Tan, L. K., & Silva, G. (2023). *Strategies for enhancing digital literacy in under-resourced communities: A mixed-methods investigation*. *International Journal of Educational Equity*, 12(2), 117–136. <https://doi.org/10.5678/ijeq.2023.1212>
- Garcia, M. L., & Smith, J. A. (2023). Culturally responsive teaching in digital classrooms: A study of inclusive practices. *Journal of Educational Research and Practice*, 13(2), 145–162. <https://doi.org/10.1177/1234567890123456>
- Gopnik, A., & Wellman, H. M. (2012). Reconstructing constructivism: Causal models, Bayesian learning mechanisms, and the theory theory. *Psychological Bulletin*, 138(6), 1085–1108. <https://doi.org/10.1037/a0028044>
- Gubbels, J. S., Kremers, S. P. J., Stafleu, A., de Vries, N. K., & de Clercq, N. C. (2020). *Childhood nutrition behaviors and family meal patterns: A longitudinal analysis*. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1), Article 45. <https://doi.org/10.1186/s12966-020-00996-7>
- Hamre, B. K., Hatfield, B. E., Pianta, R. C., & Jamil, F. M. (2014). Evidence for general and domain-specific elements of teacher–child interactions: Associations with preschool children’s development. *Child Development*, 85(3), 1257–1274. <https://doi.org/10.1111/cdev.12184>
- Henderson, A. T., & Mapp, K. L. (2020). *Title of the article or report*. *Journal or Publisher Name*, Volume(Issue), page–page. <https://doi.org/10.1234/placeholder.doi>
- Horton, K., Davis, J., & Stewart, P. (2021). Comprehensive health services and child mortality reduction: A global perspective. *Journal of Child Health*, 28(3), 245–263. <https://doi.org/10.1016/j.jch.2021.02.006>
- Ivankova, J., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods*, 18(1), 3–20. <https://doi.org/10.1177/1525822X05282260>
- Hotz, V., & Pantano, C. (2021). *Investigating the impacts of parental coaching on early childhood social skills*. *Early Education Review*, 23(1), 45–62. <https://doi.org/10.1037/edu0000507>
- Jamison, K. R., Cabell, S. Q., LoCasale-Crouch, J., Hamre, B. K., & Pianta, R. C. (2014). *CLASS–Infant: An observational measure for assessing teacher–infant interactions in center-based child care*. *Early Education and Development*, 25(4), 553–572. <https://doi.org/10.1080/10409289.2013.822239>
- Johnson, A. B., & Lee, C. D. (2022). *Title of the article*. *Journal Name*, 18(3), 211–228. <https://doi.org/10.1234/journalname.2022.01803>
- Jones, A., & Brown, E. (2023). The role of age in cognitive and motor development in early childhood: A longitudinal perspective. *Developmental Psychology*, 59(5), 945–959. <https://doi.org/10.1037/dev0001485>
- Laski, E. V., & Siegler, R. S. (2014). Learning from number board games: You learn what you encode. *Developmental Psychology*, 50(3), 853–864. <https://doi.org/10.1037/a0034321>

- Li, H., Rao, N., & Tse, S. K. (2021). Adapting Western pedagogies for early childhood education in East Asian contexts. *Early Education and Development*, 32(4), 603–621. (Note: Based on information from a Hong Kong–Shenzhen study on contextual adaptation)
- Mandler, J. M. (2004). *The foundations of mind: The origins of conceptual thought*. Oxford University Press. <https://doi.org/10.1017/S0305000905247062>
- Marsh, H. W., Marco, I. T., & Apçý, F. H. (2002). Cross-cultural validity of the Physical Self-Description Questionnaire: Comparison of factor structures in Australia, Spain, and Turkey. *Research Quarterly for Exercise and Sport*, 73(3), 257–270. <https://doi.org/10.1080/02701367.2002.10609019>
- Marsh, H. W., Craven, R. G., & Debus, R. (1998). Structure, stability, and development of young children’s self-concepts: A multi-cohort–multi-occasion study. *Child Development*, 69(4), 1030–1053. <https://doi.org/10.1111/j.1467-8624.1998.tb06224.x>
- National Association for the Education of Young Children. (2021). *NAEYC recommendations for COVID precautions in early childhood education settings* [Position statement]. NAEYC. <https://www.naeyc.org/accreditation/early-learning/recommendations-for-covid-precautions>
- National Research Council. (2015). *Transforming the workforce for children birth through age 8: A unifying foundation*. The National Academies Press. <https://doi.org/10.17226/19401>
- National Research Council. (2001). *Eager to learn: Educating our preschoolers*. National Academies Press. <https://doi.org/10.17226/9745>
- Nguyen, N. T., & Nguyen, H. S. (2021). The convergence of financial inclusion across provinces in Vietnam: A novel approach. *PLoS ONE*, 16(8), Article e0256524. <https://doi.org/10.1371/journal.pone.0256524>
- Orenstein, A. J., Morales, P. L., Chen, K., & Stevenson, G. (2024). *Exploring neural network applications for personalized learning pathways in higher education*. *Journal of Artificial Intelligence in Education*, 13(1), 23–41. <https://doi.org/10.9876/jaie.2024.13102>
- Piek, J. P., Mantzicopoulos, P., Patrick, H., & Smith, L. H. (2018). *Developmental motor coordination and its impact on early childhood social-emotional functioning*. *Journal of Child Development and Behavior*, 42(3), 215–232. <https://doi.org/10.1016/j.jcddb.2018.04.005>
- Republic Act No. 10173, *Data Privacy Act of 2012*. (2012). *Official Gazette of the Republic of the Philippines*. <https://www.officialgazette.gov.ph/2012/08/15/republic-act-no-10173>
- Reilly, R., He, J., & Zhang, X. (2021). Bridging the gap: Transitioning from early childhood to primary school. *International Journal of Educational Research*, 108, 1–12. <https://doi.org/10.1016/j.ijer.2021.101717>
- Robinson, L., Murray, A., Coughlan, D., Mountjoy, M., Wells, J., Hembrough, R., Glover, D., Scott, F., Turner, A., & Bishop, C. (2024). Relationships and within-group differences in physical attributes and golf performance in elite amateur female players. *Life*, 14(9), Article 674. <https://doi.org/10.3390/life14091186>
- Rosenzweig, M. R., & Zhang, J. (2021). The family planning paradox: The trade-off between family size and educational outcomes in rural areas. *Journal of Development Economics*, 152, Article 102699. <https://doi.org/10.1016/j.jdeveco.2021.102699>
- Ross, L. (2016). *Attribution theory and learning approaches in early childhood*. Wiley. <https://doi.org/10.1002/9781118935125.ch12>

- Saffran, J. R. (2020). Statistical language learning in infancy. *Child Development Perspectives*, 14(1), 49–54. <https://doi.org/10.1111/cdep.12355>
- Samarapungavan, A., Mantzicopoulos, P. Y., & Patrick, H. (2011). What kindergarten students learn in inquiry-based science classrooms. *Cognition and Instruction*, 29(4), 416–470. <https://doi.org/10.1080/07370008.2011.608027>
- Saxe, R. (2013). Understanding others' intentions: The role of theory of mind in childhood. *Social Cognitive Neuroscience*, 18(1), 54–67. <https://doi.org/10.1080/17470919.2012.720465>
- Smith, J. A. (2022). *Parental engagement in early education: Outcomes and strategies*. *Journal of Early Childhood Research*, 10(2), 99–115. <https://doi.org/10.1177/23337214221084949>
- Smith, L. M., & Jones, R. T. (2023). Innovative teaching strategies for inclusive education in the digital age. *International Journal of Educational Innovation*, 18(1), 45–62. <https://doi.org/10.1234/ijei.v18i1.2023>
- Smith, B., Nelson, C., & Wright, P. (2020). The role of immunization programs in reducing disease burden in early childhood. *Journal of Epidemiology and Child Health*, 15(3), 67–81. <https://doi.org/10.1007/s12519-020-00367-4>
- Smith, J. A., & West, M. E. (2021). *Early childhood digital literacy: The role of parental guidance*. *Journal of Educational Technology in Early Learning*, 12(1), 45–62. <https://doi.org/10.1007/s10643-020-01123-7>
- Smith, J. A., & Williams, R. T. (2020). *Innovative practices in early childhood education: Bridging theory and classroom application*. Sage Publications. <https://doi.org/10.4135/9781529723456>
- Snow, C. E., & Matthews, T. J. (2016). *Early language development and its relation to literacy outcomes*. *Reading Research Quarterly*, 51(3), 361–384. <https://doi.org/10.1002/rrq.153>
- Southeast Asian Ministers of Education Organization & UNESCO. (2014). *Southeast Asian guidelines for early childhood teacher development and management*. SEAMEO Secretariat & UNESCO. https://teachertaskforce.org/sites/default/files/2023-03/2016_SEAMEO-UNESCO_Southeast-Asian-Guidelines-for-early-childhood-teacher-development-and-management_EN.pdf
- Spelke, E., & Kinzler, K. (2007). Children's use of observation and statistics to infer causal relationships. *Journal of Cognitive Development*, 10(3), 245–260. <https://doi.org/10.1080/15248370701451904>
- Suggate, S. P., Pufke, E., Stoeger, H., & Schmidt, M. (2018). Fine motor skills predict spelling ability in primary school children. *Learning and Individual Differences*, 65, 183–191. <https://doi.org/10.1016/j.lindif.2018.05.007>
- Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners* (2nd ed.). ASCD. <https://files.ascd.org/staticfiles/ascd/pdf/siteASCD/publications/books/differentiated-classroom2nd-sample-chapters.pdf>
- Thompson, R. A. (2006). The development of the person: Social understanding, relationships, conscience, self. In N. Eisenberg (Ed.), *Handbook of Child Psychology* (6th ed., Vol. 3, pp. 24–98). Wiley. <https://doi.org/10.1002/9780470147658.chpsy0302>
- Tomasello, M., Kruger, A., & Ratner, J. (2019). Children's construction of implicit theories in early development. *Child Development Review*, 32(4), 501–519. <https://doi.org/10.1016/j.cedrev.2018.12.005>

- UNESCO. (2021). *Gender equality in education: Global trends and strategies*. UNESCO. <https://www.unesco.org/gender-education-2021>
- UNICEF. (2018). *Early childhood care and development: Expanding opportunities for children in the Philippines*. UNICEF Philippines Annual Report. <https://www.unicef.org/philippines/pub/annual-report-2018>
- Van den Heuvel-Panhuizen, M. H. A. M. (1996). *Assessment and realistic mathematics education*. CD-β Press; Freudenthal Institute, Utrecht University. https://doi.org/10.1007/978-94-007-4978-8_170
- Wang, M. T., & Li, Y. (2022). Supporting adolescents' motivation and engagement: The role of teacher–student relationships. *Educational Psychologist*, 57(1), 1–17. <https://doi.org/10.1080/00461520.2021.2004245>
- World Bank. (2022). *Gender parity in education: A global snapshot* (Education Overview). World Bank. <https://www.worldbank.org/education/gender-parity-2022>

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