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Practices and Challenges of Early Literacy and Numeracy Skills among Preschool Children in Adama City

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ABSTRACT

The study aims to assess the practices and challenges of early literacy and numeracy skills among preschool children in pre-primary education (PPE) within the Adama City Administration. A total of 546 participants were involved in this study; among them, 531 completed and returned the survey, including 375 children and 156 teachers. Additionally, eight parents and six school principals, for a total of 14 respondents, were interviewed in this study. The survey data collection instruments were adapted from those initially prepared by the Ministry of Education (MoE) to assess children's literacy and numeracy skills. The quantitative data were analyzed using descriptive statistics (mean, standard deviation, percentage) and inferential statistics (t-test and MANOVA), while qualitative data were analyzed through thematic description and word narration. First finding indicated that as practices of early literacy and numeracy skills, teachers in the Adama City PPE program employ a variety of methods for teaching early literacy and numeracy skills. A significant number of teachers incorporate numeracy activities into their classrooms more frequently than literacy activities. Traditional teaching tools such as storybooks, worksheets, and other printed materials are predominantly used, highlighting a reliance on conventional methods that which is not convenient to the interactive and engaging elements necessary for developing the foundational skills of children. Moreover, the result of study revealed that major challenge affecting the effective delivery of literacy and numeracy instruction is the shortage of resources, including teaching materials, classrooms, and technology. This lack of resources limits the ability of teachers to use diverse and engaging teaching methods and hinders students from accessing the tools necessary for fully developing their skills, thereby contributing to disparities in educational outcomes. To address the current gaps in early literacy and numeracy skills among preschool children, all stakeholders—such as the Ministry of Education, the Oromia regional state, and the city administration of Adama—must collaborate on teacher training, school improvement, parent awareness initiatives, resource enhancement, and advanced instructional strategies to prepare children for a better future.

Key words: Pre-primary school, Literacy Skills, Numeracy Skills, Practices, Challenges, Adama

INTRODUCTION

Early literacy and numeracy skills among preschool children are crucial predictors of their future success. Education plays a vital role in shaping generations, providing the knowledge, skills, and values necessary to navigate an evolving world. As societies change, education remains a cornerstone, equipping individuals to contribute meaningfully to their communities (Hidayah et al., 2021). The impact of education begins in early childhood, where a child's future is heavily influenced by the quality of early education. Preschool education is foundational for a child's overall development, preparing them not only academically but also nurturing social, emotional, and cognitive skills that support lifelong learning (Bernabini et al., 2020). Investing in high-quality preschool education has lasting effects on children and society.

Numeracy skills incorporate the capacity to understand it and work with numbers, counting essential operations and information translation. Solid numeracy skill empower children to form educated choices and unravel issues in different settings, from individual back to STEM areas. Early leaning of numeracy abilities is fundamental for future math learning (Gündoğan & Aslan, 2020). Engaging in preschoolers in math-related exercises cultivates levelheaded considering and scholarly get to (Pennington, 2006). Inquire about

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appears that preschool instruction connects with progressed math capabilities and preparation for essential school, particularly among low-income children (Finocchiaro, 2016). Early location and mediation for numeracy abilities are crucial for at-risk populaces (Drigas & Gkeka, 2017).

Early literacy and numeracy skills among preschool children are crucial predictors of their future success. Education plays a vital role in shaping generations, providing the knowledge, skills, and values necessary to navigate an evolving world. As societies change, education remains a cornerstone, equipping individuals to contribute meaningfully to their communities (Hidayah et al., 2021). The impact of education begins in early childhood, where a child's future is heavily influenced by the quality of early education. Preschool education is foundational for a child's overall development, preparing them not only academically but also nurturing their social, emotional, and cognitive skills that support lifelong learning (Bernabini et al., 2020). Investing in high-quality preschool education has lasting effects on both children and society.

Elary learning, including reading, writing, and comprehension, are essential for academic success and lifelong learning. Despite efforts to promote literacy, many individuals struggle to develop these skills. Literacy involves cognitive processes such as phonological awareness and vocabulary development (Adams, 1990). In Ethiopia, studies reveal concerning trends in early learning. A 2010 USAID Early Grade Reading Assessment (EGRA) found that many children remain illiterate despite years of schooling (USAID, 2010). The Ministry of Education's evaluations show low reading proficiency nationwide, with urban areas like Harari and Addis Ababa performing slightly better. Pre-primary education in Ethiopia includes Kindergarten (KG), the child-to-child approach, and the O lesson for rural children. However, less than 50% of children aged 4-6 participate in Early Childhood Care and Education (ECCE). The government's role is primarily in curriculum development and teacher training.

While children learn in their native languages to aid comprehension, many in regions like Sidama and Oromiya struggle with basic reading skills. The overall quality of education is declining, highlighting the urgent need for research in areas like Adama City to improve literacy and numeracy outcomes for Ethiopian children. Enhancing early literacy and numeracy skills is critical for shaping children's futures. By focusing on preschool education, we can create a strong foundation that supports lifelong learning and success. Addressing the challenges in Ethiopia's educational landscape is essential to ensure that all children have the opportunity to thrive.

Ethiopia has made significant strides in prioritizing pre-primary education to prepare children for primary school; however, substantial gaps remain that require immediate action. Research indicates that while there is a governmental focus on enhancing early literacy and numeracy skills, the quality of these educational services remains limited. For instance, assessments conducted by USAID (2010) and other researchers have highlighted poor performance among children across various grade levels, particularly in urban areas like Addis Ababa.

Early literacy and numeracy skills are crucial for children's academic success and overall development. In Ethiopia, the education system faces significant challenges in assessing these foundational skills, particularly in pre-primary education. Research indicates that many children enter primary school without adequate literacy and numeracy skills, which can hinder their future learning opportunities (Kebede, 2021; Tadesse & Ayalew, 2022). A study by Alemayehu (2020) highlights that the lack of standardized assessment tools in pre-primary settings contributes to the inconsistent evaluation of children's skills, leading to gaps in educational support. Moreover, cultural and linguistic diversity in Ethiopia complicates the assessment process. According to Tesfaye (2021), the multilingual environment poses challenges in developing effective assessment methods that cater to various language speakers. This situation calls for a comprehensive approach to evaluating early literacy and numeracy skills, ensuring that all children have the opportunity to develop these essential competencies. In light of these issues, there is a pressing need to investigate current practices in assessing early literacy and numeracy in pre-primary education across Ethiopia, identifying barriers and opportunities for improvement.

Morevoer, in Ethiopia, significant research gaps exist in understanding early literacy and numeracy skills development among preschool-aged children (age's five and six). Current studies often overlook the socio-cultural factors influencing these skills, such as family literacy practices, community engagement, and the role of local languages in early education. Additionally, there is a lack of comprehensive data on effective pedagogical approaches tailored to diverse educational settings, particularly in rural areas where resources are limited. Also, awareness of preschool education among parents and caregivers remains underexplored, hindering the potential for supportive home environments that foster early learning. Addressing these gaps is crucial for developing targeted interventions and policies that can enhance early literacy and numeracy outcomes in Adama city as well Oromia region.

Finally, to the researcher's knowledge, no similar research has been conducted in Adama City and surroundings. Addressing these gaps can provide a more nuanced understanding of the challenges and potential solutions for improving literacy and numeracy skills among children in this study area. Therefore, this research study aims to bridge the aforementioned gaps by addressing the research questions listed below.

Research Questions

1. What are the practices related to early literacy and numeracy skills for children in the Pre-primary education program at Adama City Administration?
2. What are the major factors that affect the practices of early literacy and numeracy skills among children enrolled in the Pre-primary education program in Adama City Administration?

Answering the two research questions has several potential contributions. The following will be some of the significances of the study: First, the results of the study may provide to the Adama kindergarten and public schools arise to improve awareness on to take care of preschool aged children on improving numeracy and literacy skills. Second, outcome results of the study may add new knowledge to the limited literature available about early numeracy and literacy skills of preschool-aged children and its implication on competence in mathematics and proficiency lanaggaue in childerns's talents. Third, the findings of this study may to encourage other researchers to undertake further study on similar areas of study.

Conceptual Framework

The empirical research and theoretical framework indicate that the practices and challenges involved in developing early literacy and numeracy skills directly impact children's literacy proficiency and numeracy competency. Additionally, it can give direction how current existing challenge can affect early literacy and numeracy skills among preschool children in pre-primary education (PPE) within the Adama City Administration.

This is summarized in the conceptual framework presented in Figure 1.

METHOD

Setting

This study was conducted in Adama City, which is one of the major cities in the Oromia regional state. It is located about 98 km southeast of Addis Ababa. The data for this study will be restricted to early school children aged three to five years. Thus, this study focuses on children whose ages are strictly between three and five years, ensuring precision in measurement for this specific target group. Adama has a comfortably warm climate, occasionally becoming a bit hot, throughout the year. It is one of the fastest-growing business centers and a busy transportation hub in Ethiopia, situated along the road that connects Addis Ababa with Dire Dawa. Adama is also a developing town, a conference center, and a tourist destination in Ethiopia, with significant construction expected in the future. However, very little research has been conducted on pre-primary school education in Adama.

Reseach Design

A mixed research design was employed to address the study's objectives, chosen for its effectiveness in examining associations among predictor and criterion variables. This approach aids in the scientific collection, analysis, interpretation, and reporting of data. The convergent parallel design allows simultaneous collection and analysis of qualitative and quantitative data, enhancing understanding of research problems (Creswell & Plano Clark, 2011). This method balances the strengths and weaknesses of each data form, providing a comprehensive view. Creswell (2014) emphasizes that researchers should value both data types equally. The concurrent triangulation design (CTD) involves merging these data forms to gain insights into the research problem (Figure 2).

Target Population

The present study was involved kindergarten school children in Adama city who are age of five and six years old. In the city, there are a total of 124 kindergarten schools (twelve public and 112 private schools). Out of the existing kindergarten schools in the city, six kindergarten schools were selected through lottery method i.e three schools from public school (namely Café Bu'ura Boru school, Bu'ura Boru Gada Michile school,and Bu'ura Boru Model 05) and three private schools (namely Exel Academy, Nafyad No.1, and Wisdom Educational Academy).

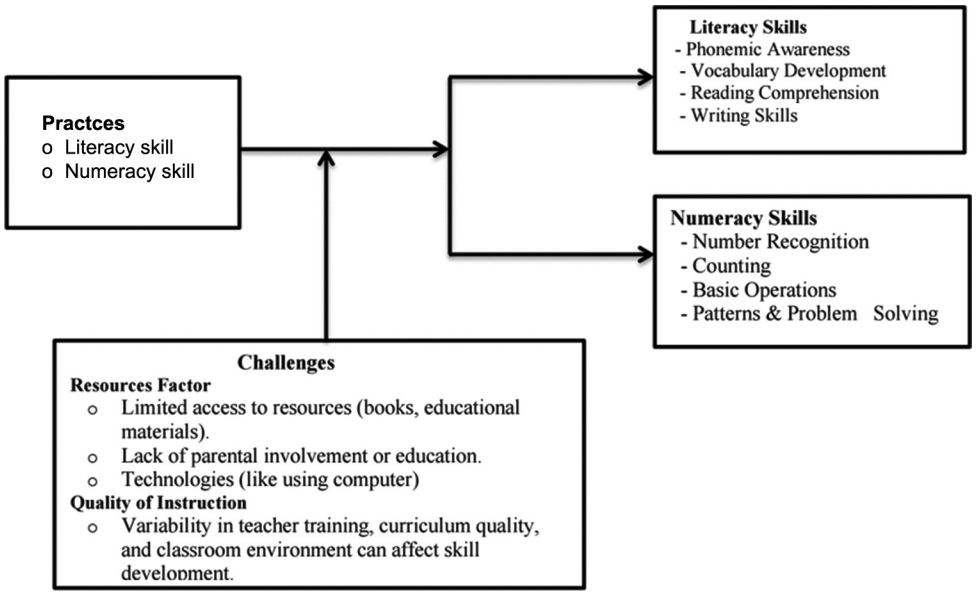

Figure 1. Conceptual framework of the study

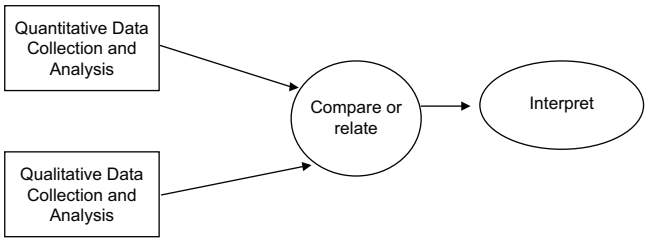

Figure 2. Convergent parallel design (CPD)
Source: (Creswell, 2014, p.541)

Sampling Procedures, Technwiqus and Size

Sample size is determined using sample size determination formula which is stated by Yamane (1967) formula. According to this Yamane, 95% confidence interval, e= 0.05 is level of precision and 5 % is sampling error and 35% non response rate. The formula is as the following:

Where, n= sample size
N= population size
e= level of precision
n=N1+N (e)2n = \frac{N}{1 + N(e)^2}n=1+N(e)2N

Where:

- N=717N = 717N=717 (population size)
- e=0.05e = 0.05e=0.05 (margin of error)

Substituting the values:

- N= 1,120
- 1+1,120 $(0.05)^2$= 295)

The required sample size of children for a precision rate of 0.05 is 295. Considering a 35% non-response rate, an additional 103 samples are needed, bringing the final required sample size to 398. Regarding teacher participants, out of the 320 teachers in the selected schools, 50% (160) were chosen to participate in the study (Adcock, 1997). Accounting for a 15% non-response rate, an additional 20 samples are necessary, resulting in a final required sample size of 180 teachers. In total, 578 samples participated in this study for quanitiaitve data. In addition to qualitative data, eight parents (guardians) and six school principals (i.e.one from each school) were purposefully interviewed, with total 14. Hence, 578 respondents distributed a questionnaire to collect quantitative data, while 8 parents (guardians) and six school principals were interviewed for qualitative data (14 in number), resulting in a total of 592 participants. Summary of samples were presented in Table 1.

Proportionate stratified sampling technique was used to select study participants. First, the schools were categorized into public and private schools. Accordingly, Biqa Bu'ura Boru School, Bu'ura Boru Gada Michile school, Bu'ura Boru Gara Nagawo, Exel Academy, Liberity Academy, Misraq Tsahay Academy schools are chosen through a lottery method from the city's twelve public kindergarten schools. The similar approach was used to choose three schools out of 112 private- schools in the city, namely, Exel Academy, Liberity Academy, Misraq Tsahay Academy schools.

Then, using a lottery method, two classes from each grade level from all KGS was chosen at random. Following this, participants in each class was classified depending on their sexes to ensure that both male and female children are given equal opportunities-proportional sampling design used. Then systematic random sampling techniques was used to select research samples**.** To do so, after collecting a list of students from the homeroom teachers, the male and female students were grouped separately, and then every "nth" were selected until the proposed sample size for each selected section is satisfied. This approach was implemented in all of the selected school sections. Table 2 presents a descriptive summary sample by school types.

Instruments of Data Collection

The survey instruments, originally developed by the Ethiopian Ministry of Education, were adapted for this study through a pilot study to assess their relevance and feasibility. The instruments used to collect the required data from participants include the Socio-Demographic Questionnaire, Practices of Early Literacy Skills Scale (ELSS), Numeracy Skills Scale (NSS), and Challenges of Early Literacy and Numeracy Skills Scale (CELNS) for the quantitative part. In addition, in-depth interviews conducted to triangulate quantitative data from parents and school principals.

Quantitative Data

The socio-demographic characteristics of respondents' tools

The Socio-demographic Questionnaire aims to collect data on the socio-demographic characteristics of participants and educational institutions. It has gathered information about teachers, including their experience, qualifications, age, and field of study, sex, and employment sector. For students, has captured their sex, socio-economic status of their families, and the type of school they attend. Additionally, the questionnaire has inquireed about school-related details such as management, environment, and facilities that may have relevance to the current investigation. The survey is thoughtfully designed to elicit both background information and the specific data needed to address the research questions. Furthermore, the study has examind statistically significant differences among demographic variables of teachers (such as experience, qualification, age, field, gender, and employment sector) and among children (sex and school type).

Early literacy and numeracy skills measurement tools

This tool was developed in 2014 by a consortium including UNESCO, UNICEF, the World Bank, and the Brookings Institution, with contributions from global experts on early childhood development (UNESCO, 2017). It was designed to provide a harmonized, adaptable approach to measure early learning and the quality of early learning environments in low- and middle-income countries. In Ethiopia, MELQO was first introduced in 2017–2018, led by the National Educational Assessment and Examinations Agency (NEAEA) and the Ministry of Education, in collaboration with Addis Ababa University and the REAL Centre at the University of Cambridge. The tools were adapted to the Ethiopian context—aligned with the national O-Class

Table 1. Summary of sample categories and sample size

S.#	Categories	Population (N)	Sample (n)	Sampling technique	Instruments used
1.	Children	1,120	398	Simple random	Survey
2.	Teachers	320	180	Systematic	Survey
3.	School principals	6	6	Purposive	Interview
4.	Parents/caregivers	Over 700	8	Purposive	Availability

Table 2. Summary of the sample by school types

Sn	School Name	Sub-city	School type	Age of childern	Sampling frame (N)			Sample (n)		
					M	F	Total	M	F	Total
1	Biqa Bu'ura Boru	Lugo	Public	5 and 6	81	91	172	28	32	60
2	Bu'ura Boru Gada Michile	Dabe	Public	5 and 6	73	89	162	24	31	55
3	Bu'ura Boru Gara Nagawo	Dambala	Public	5 and 6	69	82	151	22	26	48
4	Exel Academy	Lugo	Private	5 and 6	83	96	179	39	25	64
5	Liberity Academy	Dambala	Private	5 and 6	65	80	145	20	25	45
6	Misraq Tsahay Academy	Dabe	Private	5 and 6	152	159	311	57	70	127
	Total				523	597	1,120	190	208	398

curriculum, translated into six regional languages, and piloted with over 1,000 children to ensure cultural and linguistic relevance (Molla, 2019). A national baseline study followed in 2019, involving 3,214 children from six regions, and confirmed the tool's reliability and validity in Ethiopia

Tools for measure challenges of implementation of literacy and numeracy skills

This tool explores the challenges teachers face in implementing effective literacy and numeracy instruction across various critical dimensions of the teaching environment. It begins with questions about infrastructure and resources, probing issues like classroom space and the adequacy of teaching materials. It then addresses access to technology, assessing both availability and integration barriers, which are increasingly relevant in modern classrooms. The tool also invites reflection on curriculum relevance, asking whether current educational content aligns with the developmental needs of young learners and if policy-level obstacles exist. Parental engagement is examined to understand how families contribute to or hinder learning at home. Questions on child readiness aim to uncover developmental or behavioral challenges that impact early learning, while inquiries into administrative support seek insight into how institutional backing—or lack thereof—affects teaching effectiveness. Finally, the section concludes with personal reflections, encouraging educators to share specific experiences and identify supports that would empower them to overcome these persistent obstacles. Together, these questions paint a nuanced picture of systemic, pedagogical, and contextual barriers in early childhood education.

Qualitative Data Collection Tool and Steps for Securing Data

Eight parents and six school principals, for a total of 14 respondents, were interviewed in this study. The researcher first contacted participants randomly selected parents of children and purposely taken school principals. Next, researcher explained the purpose of the study to all participants together, emphasizing that their participation was entirely voluntary. Researcher assured them that all information provided would remain anonymous and confidential between the interviewers and interviewees. After obtaining their consent, the researcher conducted semi-structured interviews in the offices of each school principal (see Interview Protocol in Appendix B) and home of each parent.

All interviews were recorded during interview with the participants' permission. They had the option to stop the recording at any time. Then, researcher interviewed the participants for 50 minutes each. During the interviews, the researcher took notes to capture the context of the responses, including body language and emotional tone. After each interview, interviewers wrote descriptive notes to help them remember specific details.

The researcher gathered participants' contact information after the interviews were completed by informing them that follow-up data may be required for clarification. The interview protocol was prepared in English. To ensure clear communication, the interviews were conducted in Afan and Amharic transcribed by the researcher in the same language. Two weeks after the interviews, each participant received a copy of their transcript to review and suggest any corrections. Once the participants approved the transcripts, the researchers translated them into English. The researchers were read transcript for parent who were unable to read. To protect the identities of the parents and schools, pseudonyms were used. Finally, the researcher analyzed all the transcribed data and drew meaning for conclusions.

Procedures of Data Collection

First, the researcher requested a letter of cooperation from the Department of Psychology at Haramaya University.

He subsequently received a letter signed by the head of the department. Next, the researcher personally contacted the principals of the selected sample schools to briefly introduce the purpose of the study and obtain their permission for participation from each of the six schools. Appointments were arranged with each homerome teacher though school principal to collect a list of children, including their background information such as age and sex. The researcher then sent a parental consent form to obtain permission from the parents or caregivers of the children through their children thorugh facilitation of homeroom teachers.

After obtaining consent from parents or caregivers, the researcher obtained a list of children aged five and six from the school principals and homeroom teachers. Only those children who met the study criteria were included, while others were omitted. All the qualifying children's names were entered into Microsoft Excel and arranged in alphabetical order. The RAND or RANDBETWEEN function, along with the Index Rank formula from Ablebits, was then used to randomly select respondents from the sample school list. This procedure was consistently applied across all sample schools.

After confirming participation with both teachers and principals, the researcher prepared to collect data. Once the sample children were identified, orientations were conducted at their respective schools to explain the study's purpose and the data collection process. The selected data collection methods were implemented to gather relevant information, collecting both quantitative and qualitative data according to the established protocols through surveys and interviews.

Once data collection was complete, the data was analyzed using appropriate statistical or qualitative analysis techniques to derive meaningful insights and address the research questions. Results were analyzed and interpreted in relation to the research questions, leading to logical conclusions that addressed the study's objectives. The implications and significance of the research were clearly stated.

Finally, a research report or manuscript was prepared to present the findings, methodology, and conclusions. This could involve writing an academic paper, creating a presentation, or preparing a research poster, ensuring that the results were communicated clearly and accurately.

Instrument Validations

The data collection tools used in this study were validated for face and content validity. A panel of early childhood education experts reviewed the instruments to ensure that the items were relevant, clear, and aligned with the study's objectives. Feedback was incorporated, and revisions were made accordingly before the tools were finalized for field use. The validation reports are presented below:-

Face validity

To ensure face validity, researchers sought feedback from experts—including one associate professor, three assistant professors, and two doctoral students—on the instrument's grammar, organization, and clarity. Respondents suggested improvements, leading to modifications that enhanced the alignment and presentation of the test items based on their recommendations.

Content validity for literacy skills

The content validity of the data collection measures was evaluated using the Content Validity Index (CVI), a widely accepted method for assessing content validity (Amin, 2004; Polit & Beck, 2006). This index enables a panel of experts to independently assess the relevance of each scale item to the instrument's content domain. A minimum of 3 to 10 experts should review the CVI (Lynn, 1986). For this assessment, six experts—three PhD students in Educational Psychology and three Assistant Professors—were invited. They rated each item on a 4-point scale (1= Not relevant to 4= Highly relevant), with responses dichotomized as 0 for scores of 1 or 2 and 1 for scores of 3 or 4, following (Schilling et al., 2007 & Lynn,1986). The Item-level Content Validity Index (I-CVI) was calculated by summing points and dividing by the number of experts. An I-CVI of 1.00 is ideal with five or fewer experts, while.83 or higher is recommended with more than five; overall, an I-CVI above.78 is generally acceptable (Schilling et al., 2007; Polit & Beck, 2006; Lynn, 1986).

Content validity of numeracy skills

The content validity indexes (CVI) for various numeracy skills were assessed. For number identification, the individual item CVIs were.83 or higher, meeting the acceptable threshold of.78, with a scale-level CVI of.93. In number comparison, all three items had CVIs of.83+, resulting in a perfect scale-level CVI of 1. For simple addition and subtraction, the CVIs also met the.83 standard, yielding a scale-level CVI of.91. Finally, both forward and backward digit spans had individual CVIs of.83+, with scale-level CVIs of 1 and.86, respectively. All scales were deemed valid for use.

Data Analysis

After data collection and encoding into SPSS version 27, cleaning removed missing and incomplete responses. Assumptions for parametric tests, such as normality, linearity, homogeneity of variance, and multicollinearity were checked. Normality was assessed using skewness, kurtosis, and histograms, while Levene's test checked homogeneity of variances. Scatterplots and correlation coefficients evaluated multicollinearity. For instrument validation, face and content validity were assessed. Statistical methods, including descriptive statistics and MANOVA, analyzed research questions, examining the effects of sex and school type on children's literacy and numeracy skills.

RESULTS

Background Information of the Respondents

A total of 156 teachers (i.e., 52 from public schools and 104 from private schools) and 373 children (i.e., 113 from

public schools and 262 from private schools) participated in the study. Despite administering the survey to 398 children and 180 teachers across eleven preprimary schools (three public and three private), 47 copies of the survey (23 children and 24 teachers) were either incomplete or not returned at all, and thus were excluded from the data analysis. Consequently, data analysis was conducted based on the responses from 375 children and 156 teachers. The response rate was 375 (94%) for children and 156 (87%) for teachers. In total, 539 participants were involved in this study; among them, 531 completed and returned the survey, including 375 children and 156 teachers. Additionally, 8 parents (guardians) and six school principals with the total of 14 were interviewed. More analysis is presented in Table 3.

Table 3 presents the demographic characteristics of the teacher participants in the study. In terms of sex, the sample consists of 104 female participants (66.7%) and 52 male participants (33.3%), making up a total of 156 participants, or 100% of the sample. Regarding school type, 104 participants (66.7%) work in private schools, while 52 participants (33.3%) are employed in government schools, again totaling 156 participants, or 100%. When looking at level of education, 104 participants (66.7%) hold a certificate, while 52 participants (33.3%) have a diploma. The total number of participant's remains 156, representing 100% of the sample. Finally, for years of service, 52 participants (33.3%) have served for 1-3 years, 26 participants (16.7%) have served for 4-6 years, 52 participants (33.3%) have served for 7-10 years, and 26 participants (16.7%) have served for more than 10 years, once again summing up to 156 participants, or 100%

Table 4 provides an overview of the demographic characteristics of the participants, including their sex, age, and school type. In terms of **sex**, the sample consists of 185 female participants (49.3%) and 190 male participants (50.7%), with the total number of participants being 375, representing 100% of the sample. Regarding **age**, the majority of participants are aged 6, with 248 participants (66.1%), followed by 127 participants (33.9%) aged with totaling 375 participants. Finally, for school type, 262 participants (69.9%) are from private schools, while 113 participants (30.1%) are from government schools, with the total number of participants again being 375, or 100%.

Table 3. Demographic characteristic of teacher participants

	Variables	Category	Frequency	Percentage
1.	Sex	Female	104	66.7
		Male	52	33.3
		Total	156	100.0
2.	School type	Private	104	66.7
		Government	52	33.3
		Total	156	100.0
3.	Qualification	Certificate	104	66.7
		Diploma	52	33.3
		Total	156	100.0
		Certificate	104	66.7
4.	Services years	Bellow 3 years	52	33.3
		4-6	26	16.7
		7-10	52	33.3
		Above 10 years	26	16.7
		Total	156	100.0

Table 4. Demographic information of children participants

	Variables	Category	Frequency	Percentage
1.	Sex	Female	185	49.3
		Male	190	50.7
		Total	375	100.0
2.	Age	6	248	66.1
		5	127	33.9
		Total	375	100.0
4.	School type	Private	262	69.9
		Government	113	30.1
		Total	375	100.0

Practices of Early Literacy and Numeracy Skills of Children in the PPE Program

Table 5 presents a descriptive summary of the early literacy and numeracy teaching practices in PPE program

The analysis of Table 5, the frequency of literacy and numeracy instructional practices among early childhood teachers varies across specific activities. In terms of literacy, 42.3% of teachers reported that they often engage children in storytelling or read-aloud sessions, while 38.5% do so sometimes, and only 19.2% reported doing so always. The use of phonemic awareness activities, such as rhyming and syllable segmentation, was most frequently rated as sometimes (47.4%), with 38.5% indicating often and 14.1% always. Opportunities for letter recognition and writing were reported as being used often by 44.9% of teachers, sometimes by 32.1%, and always by 23.1%. The use of picture books and other print materials was also common, with 46.2% reporting often, 37.2% sometimes, and 16.7% always. Similarly, shared reading or guided reading activities were implemented often by 38.5% of teachers, sometimes by 42.3%, and always by 19.2%.

Regarding numeracy practices, counting activities such as rote or object counting were the most frequently practiced, with 52.6% of teachers indicating often, 28.2% sometimes, and 19.2% always. Number recognition and matching activities followed a similar pattern, with 55.1% reporting often, 25.6% sometimes, and 19.2% always. The use of number lines or visual aids to teach quantity was reported as often by 46.2%, sometimes by 39.7%, and always by 14.1%. Math-related play, including activities like block use and sorting, was implemented often by 48.7% of teachers and always by 20.5%, while 30.8% reported doing so sometimes. Finally, simple problem-solving or sequencing tasks were used often by 44.9% of teachers, sometimes by 35.9%, and always by

Table 5. Early literacy and numeracy teaching practices in PPE program

Variable	Statement	Measure	Sometimes	Often	Always	Total
Teaching Practices	How often do you engage children in storytelling or read-aloud sessions?	Frequency	60	66	30	156
		Percentage	38.5	42.3	19.2	100
	How often do you engage children in storytelling or read-aloud sessions?	Frequency	74	60	22	156
		Percentage	47.4	38.5	14.1	100
	How often do you provide opportunities for children to practice letter recognition and writing?	Frequency	50	70	36	156
		Percentage	32.1	44.9	23.1	100
	How often do you use picture books and other print materials in the classroom?	Frequency	58	72	26	156
		Percentage	37.2	46.2	16.7	100
	How often do you conduct shared reading or guided reading activities with children	Frequency	66	60	30	156
		Percentage	42.3	38.5	19.2	100
	How often do you engage children in counting activities (e.g., rote counting, object counting)?	Frequency	44	82	30	156
		Percentage	28.2	52.6	19.2	100
	How often do you conduct number recognition and number matching activities?	Frequency	40	86	30	156
		Percentage	25.6	55.1	19.2	100
	How often do you use number lines or visual aids to teach quantity and number concepts?	Frequency	62	72	22	156
		Percentage	39.7	46.2	14.1	100
	How often do you incorporate math-related play (e.g., blocks, sorting, and shape games) into classroom activity?	Frequency	48	76	32	156
		Percentage	30.8	48.7	20.5	100
	How often do you engage children in simple problem-solving or sequencing tasks?	Frequency	56	70	30	156
		Percentage	35.9	44.9	19.2	100

19.2%. These results suggest that while many foundational practices are integrated into classroom instruction with moderate frequency, the "always" category remains low across both literacy and numeracy, indicating potential areas for strengthening consistency in teaching practices. Table 6 presents early literacy and numeracy teaching materials and resources in PPE program.

Table 6 provides insights into the types of early literacy and numeracy teaching materials and resources utilized in a preschool program for education (PPE). For literacy instruction, a notable majority of educators (67.3%) utilize storybooks, indicating a strong preference for traditional, narrative-based learning tools. In contrast, digital resources are less common, with only 32.7% of educators incorporating them. This suggests a focus on tangible, accessible materials that promote reading engagement among young children.

In terms of numeracy activities, the data reveals a varied approach. The predominant resource is manipulatives, such as blocks and counters, used by 43.6% of educators, which aligns with hands-on learning strategies essential for developing foundational math skills. Worksheets are also used by 32.7% of educators, indicating a more structured approach to numeracy instruction. Notably, digital resources are absent from this category, reflecting a potential gap in integrating technology into numeracy education. Additionally, 23.7% of educators reported using other resources, which could encompass a wide range of materials that are not specified. Overall, the data highlights a reliance on physical, interactive materials for both literacy and numeracy, with less emphasis on digital integration in early childhood education. Table 7 presents assessment practice of early literacy and numeracy skills in PPE program

Table 7 portrays, an assessment practices, when assessing literacy skills, 32 teachers use observation, 98 use formal assessments, 14 use informal assessments, and 12 use parent feedback. In assessing numeracy skills, 18 teachers use observation, 112 use formal assessments, 14 use informal assessments, and 12 use parent feedback. Lastly, for teacher professional development, 147 teachers have received training in teaching literacy or numeracy skills, while 9 have not received any training.

Table 8 presents data on the professional development practices of teachers participating in the PPE (Pre-Primary Education) program, specifically regarding their training in teaching literacy and numeracy skills. The findings indicate that a substantial majority of teachers, 147 out of 156 respondents (94.3%), have received training in these essential skills. This high percentage suggests a strong commitment to enhancing teaching quality and improving student outcomes in foundational literacy and numeracy. Conversely, only 9 teachers (5.7%) reported not having received such training, highlighting a potential area for improvement and suggesting that a small minority may lack the necessary support to effectively teach these critical skills. Overall, the data reflect a positive trend in

Table 6. Early literacy and numeracy teaching materials and resources in PPE program

Variable	Statement	Measure	Story books	Flashcards	Digital	Others
Materials and resources	What types of materials do you use for literacy instruction?	Frequency	105	-	-	51
		Percentage	67.3%			32.7%
	What types of materials do you use for numeracy instruction?	Measure	Manipulative (blocks, counters)	Worksheets	Digital resource	Others
		Frequency	68	51	-	37
		Percentage	43.6%	32.7%	-	23.7%

Table 7. Assessment practice of early literacy and numeracy skills in PPE program

Variable	Statement	Measure	Observation	Formal assessment	Informal assessment	Parent feedback
Assessment practice	How do you assess children's literacy skills?	Frequency	32	98	14	12
		Percentage	20.51	62.82	8.97	7.69
	How do you assess children's numeracy skills?	18	112	14	12	18
		11.53	71.79	8.97	7.69	11.53

Table 8. Practices of teachers' professional development in PPE program

Variable	Statement	Options	Measure	
Teachers professional development	Have you received any training in teaching literacy or numeracy skills?	Yes	Frequency	147
			Percentage	94.3
		No	Frequency	9
			Percentage	5.7

Table 9. Do teachers hold a certificate in early childhood education?

Variable	Statement	Options	Measure	
Professional in preschool education	Are you graduate in early childhood education?	Yes	Frequency	36
			Percentage	23%
		No	Frequency	120
			Percentage	77%

professional development among teachers in the PPE program, emphasizing the importance of ongoing training in early childhood education.

Table 9 presents data on whether teachers hold a certificate in early childhood education, revealing significant insights into their qualifications. Out of the respondents, only 36 teachers, representing 23%, confirmed that they are graduates in early childhood education. In contrast, a substantial majority of 120 teachers, or 77%, indicated that they do not possess this qualification. This disparity suggests a potential gap in specialized training among educators in preschool settings, which could have implications for the quality of early childhood education provided. The overwhelming percentage of teachers lacking formal education in this field highlights the importance of professional development and training programs to enhance the competencies of preschool educators.The participant in the interview highlights a significant concern regarding the qualifications of teachers in early childhood education. The participant emphasize that:

> *Many preschool teachers currently working with young children lack the necessary expertise, skills, and knowledge that are crucial for effective teaching in this foundational stage. This situation leads to a sense of disappointment among parents, as they feel that their expectations for quality education are unmet. The participant expresses regret about enrolling their children in preschool, suggesting that they believe the educational environment may not provide the nurturing and developmental support that is essential for young learners* (Interviewee #12).

This sentiment reflects broader anxieties about the quality of early education and its impact on children's growth and learning.

Generally, the practices of early numeracy and literacy in the study area show a varied but generally engaged approach from teachers. A significant number of teachers incorporate literacy and numeracy activities into their classrooms, with a larger proportion engaging in numeracy activities often, compared to literacy activities. In the interview, a participant highlighted that

> *Teachers primarily rely on traditional educational materials, including storybooks and worksheets, for instruction. This approach reflects a conventional teaching style focused on structured learning. Furthermore, assessment practices tend to be formal, with most teachers using standardized tests and evaluations. Only a minority of educators incorporate informal assessment methods or seek feedback from parents, indicating a potential gap in diverse evaluation strategies that could enhance student learning and engagement* (Interviewee #11).

Moreover, the majority of teachers claimed that they have received professional training in literacy and numeracy instruction, suggesting a foundation of knowledge and skills to support effective teaching in these areas.

Factors that Affect the Practice of Early Literacy and Numeracy Skills of PPE Program

In this research objective, the researcher employed interview both parents and school principals. One of the primary challenges identified by most of the respondent is the poor infrastructure in schools, which significantly affects the teaching and learning process. As one of interviewee from school principal mentioned as:-

> *The scarcity of modern teaching materials and necessary equipment for literacy and numeracy instruction has created a barrier to effective teaching. Without essential resources such as books, visual aids, and manipulates, teachers face difficulty in engaging students meaningfully. This lack of resources not only hampers the learning experience but also limits the potential for students to develop literacy and numeracy skills at an early age* (Interviewee #2).

Another challenge pointed by interviewee is the limited access to technology, which could greatly enhance the teaching and learning experience. Further mentioned that:

> *Digital technologies such as computers, tablets, and educational software that can support literacy and numeracy activities are either scarce or almost nonexistent in many schools. The absence of technology restricts the ability to introduce innovative teaching methods and deprives students of the opportunity to engage with digital learning tools that are essential in today's educational landscape (*Interviewee #7).

The curriculum relevance is another obstacle to effective literacy and numeracy instruction. One of the respondent mentioned that "There is inconsistency in the curriculum employed across different schools, with some schools using outdated or irrelevant curricula that do not align with current educational standards" (Interviewee #1). This inconsistency prevents teachers from following a structured, unified approach, leading to a lack of coherence in the skills students are expected to learn. It also makes it difficult for educators to implement effective teaching strategies and measure progress consistently.

Othe participant pointed out that parental engagement in children's learning is also a significant challenge. Many parents are either unaware of or do not actively support their children's academic progress. This lack of involvement can be detrimental, as parents play a crucial role in reinforcing literacy and numeracy skills at home. One of the respondent mentioned that reacted that "without encouragement, supervision, and assistance with homework, students may struggle to keep up with their learning. Effective parent-teacher collaboration is essential to creating a supportive learning environment, but this is often lacking in the study area (Interviewee #6).

Child readiness is another issue contributing to the challenge early children learing of literacy and numeracy skills. A number of children fall asleep in class, which may be attributed to either boring class schedules or the fact that parents are not ensuring adequate rest at home. One of interviewee added that:

> *Lack of sufficient sleep can lead to poor concentration, reduced engagement, and slower learning, making it difficult for students to absorb literacy and numeracy skills. Additionally, schools often fail to adjust their schedules to cater to the needs of young children, which may further exacerbate this problem* (Interviewee #8).

Most of interviewees mentioned that support from school administration has been noted as insufficient. One of participant articulated that:-

> *Many school administrators do not provide the necessary backing or resources for teachers to effectively implement literacy and numeracy instruction. Without strong leadership and support, schools struggle to overcome the challenges mentioned earlier. Administrators play a critical role in facilitating teacher development, ensuring the availability of resources, and creating a positive school culture, but when this support is lacking, it becomes more difficult to address the challenges that teachers face (Interviewee #9).*

Generally, the challenges to implementing effective literacy and numeracy skills in the study area are multifaceted and interconnected. Infrastructure and resource shortages, limited access to technology, and inconsistent curricula present significant barriers to effective teaching. In addition, the lack of parental engagement and insufficient child readiness contribute to difficulties in achieving educational goals. Finally, weak support from school administrations compounds these issues, making it harder for teachers to create conducive learning environments. To improve literacy and numeracy skills, it is essential for stakeholders—teachers, parents, administrators, and the community—to work together to address these challenges. Investing in infrastructure, providing technological access, aligning curricula, engaging parents, and ensuring adequate sleep and readiness for students were key to improving educational outcomes in the study area.

DISCUSSION

Practices of Early Literacy and Numeracy Skills of Children in the Pre-primary Education Program

One of the main objectives of the study was to examine practices of early literacy and numeracy skills of children in the Pre-primary education program at Adama City Administration. The obtained result revealed that the practices of early numeracy and literacy in the study area show a varied but generally engaged approach from teachers. A significant number of teachers incorporate literacy and numeracy activities into their classrooms, with a larger proportion engaging in numeracy activities often, compared to literacy activities. Teachers predominantly use traditional materials such as storybooks and worksheets. Assessment practices are largely formal, with a smaller number of teachers using informal methods or relying on parent feedback (Assefa & Sintayehu, 2019).

Moreover, the majority of teachers claimed that they have received professional training in literacy and numeracy instruction, suggesting a foundation of knowledge and skills to support effective teaching in these areas. Consistent with the present study Tesfaye (2018), who investigated early

childhood education in Oromia region found that although many teachers had received training, there was still variability in the application of this training in the classroom. Some teachers utilized the training effectively, while others struggled to implement strategies in their classrooms due to a lack of resources and support. This aligns with the present study's observation that teachers generally had training but faced challenges in applying it consistently, particularly in literacy instruction.

In the same vein consistent with the present study as regard the reliance on traditional materials such as storybooks and worksheets is a common finding in studies across Ethiopia. For example Tadesse (2020) reported that early childhood educators in Ethiopia predominantly use printed materials like storybooks and worksheets. While these materials are valuable, Tadesse noted that there was limited incorporation of modern or interactive materials, such as educational technologies, which could potentially enhance the engagement and learning of young children. Similarly, Abdi (2017) found that early childhood education in Ethiopia tends to focus on formal assessments, which are often limited to written tests or quizzes, even at the Pre-primary level. While formal assessments can provide a clear indication of children's progress, Abdi argues that they may not always accurately reflect the developmental progress of young children, as informal or observational assessments are often more appropriate for this age group. This observation is consistent with the study's finding that only a smaller number of teachers rely on informal assessment methods.

In support of the present findings, research studies conducted in different parts of Ethiopia revealed that despite challenges, there are also numerous positive practices and initiatives aimed at improving the literacy and numeracy skills of children in Ethiopia (Bati & Workneh, 2020). One of the problem is lack of support earlychildhood to success their future (Helfrecht *et.al*, 2020). Non-governmental organizations and community-based programs significantly provide supplementary education, literacy campaigns, and access to learning materials. Furthermore, the Ethiopian government has been implementing policies and strategies to enhance the quality of education and increase access to schools, particularly in rural areas (Frost & Rolleston, 2013). Overall, while there are obstacles to overcome, there are also dedicated efforts and promising practices that are working towards improving the literacy and numeracy skills of children in Ethiopia.One promising practice that has shown positive results is the use of innovative teaching methods and technology to make learning more engaging and accessible (Haile & Mendisu, 2023).

Challenges of Early Literacy and Numeracy Skills in the Pre-primary Education Program

The present study revealed that, the challenges to implementing effective literacy and numeracy skills in the study area are multifaceted and interconnected. Infrastructure and resource shortages, limited access to technology, and inconsistent curricula present significant barriers to effective teaching. In addition, the lack of parental engagement and insufficient child readiness contribute to difficulties in achieving educational goals. Weak support from school administrations compounds these issues, making it harder for teachers to create conducive learning environments. To improve literacy and numeracy skills, it is essential for stakeholders—teachers, parents, administrators, and the community—to work together to address these challenges. Investing in infrastructure, providing technological access, aligning curricula, engaging parents, school leadership and ensuring adequate sleep and readiness for students will be key to improving educational outcomes in the study area (Alemu & Abdillahi, 2020).

In support of the present study, Mekonnen (2019), have consistently pointed out the lack of infrastructure and resources in schools as a major barrier to effective teaching, particularly in rural and peri-urban areas. Mekonnen's study in Addis Ababa indicated that limited access to basic teaching materials, such as books, teaching aids, and educational technology, significantly affected the quality of education.

Furthermore, Kebede (2018) and Ahmed and Sintayehu (2022) noted that inadequate facilities, including classrooms with insufficient space and basic amenities, hinder the delivery of effective numeracy and literacy lessons. This is consistent with findings from Tadesse (2020), who observed that in many Ethiopian schools, the use of educational technology is either limited or nonexistent, contributing to poor learning outcomes in both literacy and numeracy. Morover, research by conducted by Assefa and Sintayehu (2019) and Tesfaye (2018) found that when parents actively participated in their children's learning, particularly in the home environment, children showed improved literacy and numeracy skills. Uunderfunded schools, particularly in rural and low-income areas, struggle to provide the necessary resources for effective teaching and low compassion for teaching staff are bigesst challenges (Baker & Cotto2020; Sintayehu & Hussien,2021). The study suggested that inadequate funding and a lack of coordination in curriculum design contributed to poor educational outcomes in both literacy and numeracy.

CONCLUSUION

Based on the major findings of the study, the following conclusions were made:

- Teachers in the Adama City Pre-Primary Education (PPE) program adopt varied approaches in teaching early literacy and numeracy skills. A significant number of teachers integrate numeracy activities into their classrooms more frequently than literacy activities. This suggests a greater focus on numeracy skills, which may indicate that numeracy is considered a more immediate priority or easier to address with the resources available.
- Traditional teaching tools, such as storybooks, worksheets, and other printed materials, are predominantly used in the classroom. This highlights a reliance on conventional methods that may lack the interactive and engaging elements needed to develop the foundational skills of young learners. Despite the potential benefits of these traditional tools, their limitations suggest that there

is room to innovate and integrate modern educational tools, such as digital resources or interactive learning materials, which could enhance students' engagement and learning outcomes.

- The study revealed substantial gaps in children's early literacy skills, particularly in areas such as letter identification, sound recognition, and listening comprehension. These gaps indicate that many children enter primary school without a strong literacy foundation, which may affect their ability to succeed as they progress through the education system. This issue is consistent with other studies across Ethiopia, which also report similar deficits in literacy skills, particularly in rural and under-resourced areas.
- Numeracy skills are similarly underdeveloped among children in the PPE program. The study found that children struggle with basic concepts like number identification, simple arithmetic, and digit span, suggesting a lack of sufficient focus on numeracy during the early education years. This aligns with findings from other parts of Ethiopia, where numeracy instruction tends to be underemphasized in early childhood education programs, leading to challenges in later academic stages.
- The study identified a lack of parental involvement as a key barrier to children's development in early literacy and numeracy. Parents play a crucial role in fostering a literacy-rich environment at home, and their engagement can greatly enhance children's learning experiences. In the absence of strong parental support, children are less likely to reach their full potential in early education programs.
- One of the primary challenges affecting the effective delivery of literacy and numeracy instruction is the lack of resources, including teaching materials, classrooms, and technology. This shortage limits the ability of teachers to implement diverse and engaging teaching methods. It also prevents students from accessing the tools they need to fully develop their skills, creating disparities in educational outcomes.
- The study found that the curricula followed by schools in Adama City vary in quality and content. This inconsistency leads to disparities in the level of education provided across different schools. A more standardized and aligned curriculum would ensure that all children have access to the same foundational skills in literacy and numeracy, regardless of the school they attend.
- To address these challenges and improve early literacy and numeracy outcomes, it is essential that teachers, parents, school administrators, and the community collaborate more effectively. By working together to overcome barriers such as resource shortages and inconsistent curricula, all stakeholders can help create a more supportive learning environment for young children. Investing in infrastructure, engaging parents, and ensuring that teachers receive the support and training they need will be key to fostering better educational outcomes in the future.

Based on the major findings and conclusion of the study, the following recommendation were made:

- A study revealed a shortage of skilled personnel in early education. To address this issue, the Ministry of Education emphasized the need to train qualified individuals who can enhance children's literacy and numeracy skills. This initiative aims to empower young learners and equip them with essential abilities for their future development.
- The Adama City Education Office, in collaboration with the Oromia Regional Education Bureau, is strongly encouraged to facilitate ongoing professional development and support for teachers. This initiative aims to ensure that educators effectively apply literacy and numeracy strategies in the classroom.
- A recent study highlighted the presence of an unconducive environment and unattractive classrooms in preschools. In response, national and regional governments are collaborating to improve quality by tackling barriers to enhance children's literacy and numeracy skills.
- Preschools are encouraged to incorporate modern educational technologies and interactive materials into their teaching practices. By doing so, they can enhance student engagement and improve learning outcomes. Integrating these tools creates a dynamic learning environment, fostering curiosity and creativity among young learners while effectively supporting their developmental needs and educational goals.
- In consultation with various stakeholders and associated organizations, it is recommended that preschools address resource shortages, including books, teaching aids, and classroom materials. Ensuring that teachers have the necessary tools will enhance the effectiveness of instruction.
- Preschools should promote increased parental involvement in their children's education, both at school and home. Engaging parents in learning activities enhances literacy and numeracy skills, creating a supportive environment for children. By fostering collaboration between educators and families, preschools can ensure that children receive the guidance they need to thrive in their early learning experiences.
- The Adama City Education Office, in consultation with the Regional Educational Bureau, proposed the development of a consistent and standardized curriculum that emphasizes both literacy and numeracy skills. This initiative aims to ensure that all schools deliver a comparable quality of education.
- PreSchool leaders should enhance support for teachers by improving resource allocation, offering professional development opportunities, and fostering a positive teaching environment.

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