Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) **www.educare.aliah.ac.in**

STATUS OF FOUNDATIONAL LITERACY & NUMERACY AMONG PRIMARY SCHOOL STUDENTS OF ODISHA

Soumyabrata Mahapatra
Doctoral Research Scholar, Department of Education,
Ravenshaw University, Cuttack, India, ORCID ID: 0000-0001-7699-9162
Sudarshan Mishra
Professor, Department of Education, Ravenshaw University
Cuttack, India, ORCID ID: 0000-0002-7198-8955
Tapan Kumar Sahu
B.Ed. student, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh. Email:
tapansahu625@gmail.com

ABSTRACT

Foundational literacy and numeracy skills are the essential for childhood education, contributing to academic achievement and social empowerment. This study examines the status of FLN among fourth grade students in government primary schools in the Cuttack district of Odisha, focusing on their proficiency levels, gender-based differences, and relationship between literacy skills and numeracy. Correlational research design was adopted involving 97 school students from six selected schools through cluster sampling. Self-developed tools assessed literacy skills, including reading comprehension, oral fluency, and writing as well as numeracy skills such as arithmetic operation, geometry, and measurements. The data were analysed using descriptive statistics, t-tests, and Pearsons corelation. The results indicate moderate proficiency in FLN, with notable gaps in advanced literacy (comprehension and expression) and numeracy (advanced reasoning). Girls outperformed boys in literacy while no significant gender differences were found in numeracy. A moderate positive corelation was identified between literacy and numeracy, highlighting their interdependence. The findings underscore the need for equity focused educational reforms, targeted teacher training, and innovative teaching practices to address disparities and improve foundational competencies.

***Keywords**:* Foundational Literacy, Numeracy, Primary School Students, Correlational design, Students' Proficiency.

INTRODUCTION

Foundational literacy and numeracy comprising to read, write, comprehend, and perform very basic numerical tasks are indispensable components of the development framework. Thes skills not only facilitate academic success but also empower individuals to engage actively in society, contributing to their personal wellbeing and the overall progress of their communities. The advent of the industrial revolution and subsequent educational reforms broadened access to literacy and numeracy, thereby addressing gaps in social equity and skills distribution (Awgichew,2022). In todays' digital age, new dimension of the literacy such as digital literacy, further amplify the role of foundational skills in navigating complex technological and social landscapes (Spink, Cloney, Berry, 2022). The theoretical frameworks provide critical insights into the development and importance of FLN. Vygotsky's socio-cultural theory posits that cognitive development is deeply embedded in social interactions, with language serving as

fundamental tool for communication and learning (Purpura, Hume, Sims & Lonigan, 2011). His works emphasizes the role of cultural and linguistic exchanges in shaping a child's ability to acquire literacy skills and numeracy skills. Similarly, Piaget's theory of cognitive development identifies the sensory-motor and preoperational stages as key phases where children construct foundational knowledge through interactions and with their environment (Pasnak et al., 2009).

In the Indian context the significant of FLN has been underscored by various policy initiatives. The National Policy of Education (1986) emphasised the holistic development of the children through foundational learning. More recently the national educational policy has set ambitious target aiming to achieve universal FLN by 2025 though establishment of National Mission on Foundational Literacy and Numeracy (NMFLN). Initiatives like NIPUN Bharat (2021) prioritise ensuring foundational skills by Grade 3, leveraging teacher capacity program, high quality learning materials, and digital tools to achieve these objectives (Kumar & Behera, 2022) Additionally, innovative programs such as Vidya Pravesh and Toy based pedagogy emphases experiential and play based learning method that can align with culturally relevant teaching practices (Vasoya & Vansdadiya, 2023).

LITERATURE REVIEW

Empirical studies farther illustrate the multifaceted factors influencing FLN. Research by Kumar & Ray (2023) highlights that socioeconomic background, parental education and school environment significantly effect a child's literacy and numeracy attainment. Family engagement and community involvement emerge as a critical enabler, fostering a supportive ecosystem for early learning (Ball & Govinda, 2014). In contrast, the COVID-19 pandemic exacerbated existing educational disparities, with students in rural and unprivileged settings experiencing substantial setbacks in achieving foundational competencies (Spink, Cloney, Berry, 2022). Globally studies reveal patterns and challenges in achieving FLN. Wong et al., (2020) observed that effective assessment practices in Singapore's primary schools significantly enhanced learning outcomes. In Australia, longitudinal research indicated gender -based differences, with girl excelling in literacy and boys progressing slightly faster in numeracy during the initial years of schooling (Meiers et al., 2006). In Malaysia, Md- Ali, Karim and Yusof (2016) identified the essential characteristics of effective educators, including structured pedagogy, strategic approaches, and robust content knowledge, as pivotal in driving FLN outcomes. The findings collectively underscored the universal importance of early and targeted interventions in addressing the liturgy and numeracy gaps. Evidences suggest integrating play based and digital learning approached significantly enhance students' engagement and learning outcomes (Vasoya & Vansdadiya, 2023). Additionally, teacher training program such as NISTHA 3.0, designed to equip educators with participatory and child centred pedagogical skills play a vital role in fostering effective FLN instruction (Awgichew,2022). Mastery of FLN is critical not only for academic progression but also for fostering problem-solving ability and critical thinking ability essential in today's global society.

RATIONALE

The body of international and national research highlights the significant impact of FLN on the cognitive development of children. Various studies have underscored that FLN skills are not only fundamental for academic achievement but also crucial for social empowerment

employability and personal wellbeing. The rationale of this study is therefore to explore the multi-faceted factors influencing foundational literacy and numeracy and contribute to the ongoing dialogue on how best to address these challenges in India. By examining the interplay of socioeconomic background. Teaching methodologies, and policies intervention, this research aims to offer insights that can inform both practice and policy. Although there are several studies and policy measures in existence, there are still considerable gaps in our understanding of FLN disparity at a regional level, particularly in Odisha. Hence, the gaps of the research are found in the fooling areas which has influenced the research interest of the investigators with a critical academic understanding.

Gap of Knowledge: National and international research has adequately explored FLN (Md-Ali, Karim, & Ray, 2023; Kumar & Behera, 2022), however, empirical data on FLN is limited regarding the specific socio-economic and educational context that situates Odisha. The study aims to respond to this gap by contextualizing the findings around FLN determinants in Odisha.

Gap of Variables: A major proportion of current research reviewed focused on isolated variables in FLN such as teaching practices, curriculum design, or socio-economic status (Spink, Cloney, & Berry, 2022; Vansdadiya & Vasoya, 2023); there are no empirical studies that examine this issue integrated model incorporating several variables such as the school building, gender, and inequalities inherent to policy. In this research the investigators looked at FLN using an integrated model.

Gap of Methodologies: Most literature discusses the use of survey methodologies or standardized assessments such as NAPLAN (Rothman & McMillan, 2003). In the same vein, there is very little literature that takes a mixed-method approach to encompass both quantitative and qualitative perspectives of teachers as well as students. In this research the investigators aimed to fill the gap of mixed-methodologies that articulate quantitative data and qualitative narrative about FLN. By addressing these gaps, the research intended to develop these gaps in knowledge through in-depth analysis of FLN development in the Cuttack district.

Further, the study aimed to identify all socio-economic, pedagogical and policy measures that generate insight into FLN and contribute to better educational interventions and policymaking in SDG 4.

STATEMENT OF THE PROBLEM

Foundational Literacy skills Numeracy skills are the fundamental building blocks of education encompassing essential skills in reading writing, and mathematics. This foundation skills are critical for academic success across all subjects and are essential for individuals to fully participate in society, pursue further education, and navigate everyday tasks effectively. Therefore, the study stated “Status of Foundational Literacy and Numeracy among Primary School Students of Odisha.”

OPERATIONAL DEFINITION

Foundational Literacy

Foundational literacy is defined in the study as fourth-grade students' levels of proficiency in reading comprehension, oral fluency, and written communication, measured through standardized assessment protocols.

Numeracy

Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

Numeracy is defined in this study as the competence of the primary school students in operations and concepts of arithmetic, geometric and measurement concepts, using a standardized assessment protocol.

Primary School Students

Primary School Students refers to children attending govt funded primary schools in the Cuttack district, Odisha, and is specifically referring to fourth-grade students. These children are representative of the sample population to determine FLN proficiency.

Correlational Design

A research approach used to study the statistical relationship between two or more variables without intervention or manipulation. A correlational design has been used in this study to assess the relationship between foundational literacy and foundational numeracy using Pearson's correlation coefficient, providing empirical evidence to assess the interrelationships of the two constructs.

Student Proficiency

In this study, student proficiency is operationalized as the assessed performance of fourth graders attending government primary schools located in the Cuttack district, in reading comprehension, oral fluency, writing, the ability to perform arithmetic operations, geometric reasoning, and measurement.

OBJECTIVES

1. To study the level of FLN among the primary school students of the Cuttack district
2. To compare the FLN score of students in relation to their gender.
3. To find out the relationship between Foundational Literacy skills and Numeracy skills of primary school students of Cuttack district.

HYPOTHESES

H_{01} There exist no significant difference between the mean score of foundational literacy in relation to their gender.

H_{02} There exist no significant difference between the mean score of foundational numeracy in relation to their gender.

H_{03} There exist no significant relationship between the foundation literacy and numeracy of primary school students of the Cuttack district.

DELIMITATIONS

i. The study is delimited to the government primary schools of Cuttack district.
ii. Sample are delimited to 4th-class students, teachers, and parents.
iii. Tools and techniques are delimited to the interview schedule and self-made numeracy literacy test.
iv. Foundational literacy tests are delimited to reading fluency, reading comprehension, and writing.
v. Foundational numeracy test delimited to pre-number concepts, shapes, spatial and measurement.

METHODS

Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

Correlational research design was used to assess the relationship between foundational literacy and numeracy among fourth-grade students. Further, the study utilised quantitative approaches to gather data. The study was investigated in Six government primary schools in the Cuttack district of Odisha. A total of 97 fourth-grade students, along with their teachers and parents participated in this study. Cluster sampling techniques was used to select student, while purposive sampling techniques was applied to select teachers and schools. Two self-made tests were developed to access literacy skills and numeracy skills. The data analysis was performed using descriptive and inferential statistical techniques, including the t-test and Persson's correlation to examine the relationship between literacy skills and numeracy skills.

RESULTS

Status of foundational literacy among government primary school students

Table: status of foundational literacy

Question no.	Question type	Mark obtained by students with frequency & percentage										
		0	1	2	3	4	5	6	7	8	9	10
1	Paragraph reading and answering question	14 (14.43 %)	12(12.37 %)	9(9.27%)	15(15.46%)	16(16.49 %)	31(31.95 %)					
2	Writing 5 sentences by watching picture	21(21.24 %)	9(9.27%)	8(8.24%)	12(12.37%)	24(24.74 %)	23(23.71 %)					
3	Written test	9(9.27 %)	3(3.09%)	7(7.21%)	11(11.34%)	12(12.37 %)	14(14.43 %)	8(8.24 %)	6(6.18 %)	6(6.18 %)	13(13.40 %)	8(8.24)
4	Oral test	8(8.245 %)	2(2.06%)	10(10.30 %)	26(26.80%)	26(26.80 %)	25(25.77 %)					

The analysis of the data indicates that the foundational literacy assessment comprising four items with a total of 25 marks, reveals variations in students' abilities. In item 1 (reading comprehension, 5 marks), 31.95% of students achieved full marks, showcasing strong reading proficiency, while 16.49 scored 4 marks, indicating good comprehension. However, 29.73% scored 2 or fewer marks, reflecting significant gaps in reading reading skills. In item 2 (picture description, 5 marks) 23.71% of students scored full marks, demonstrating excellent expressive

Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

abilities, while 21.64% scored 0, highlighting poor linguistics and writing skills. In item 3 (listening & writing, 10 marks), 32.98% achieved full marks, pointing to strong listening and writing proficiency, while 22.68% scored 3 or fewer marks, exhibiting challenges in comprehension and transcription. At last, in item 4 (oral reading, 5 marks) 25.77% demonstrated excellent reading skills while 8.24% scored 0. Indicating a lack of foundational literacy. These results underscored the urgent need for targeted interventions to address disparities in foundational literacy and linguistics skills.

Status of foundational numeracy among government primary school students

Table: foundational numeracy

Question number	**Question type**	**Total correct answer given by students**	
		Numbers	Percentage (%)
1,2,3,7,20	addition	80	82.47
4,5,6,8	subtraction	44	45.36
9	watch	60	61.85
10	weight	75	77.31
11, 15	geometry	82	84.53
13,14,24	division	38	39.17
16,17	Number system	57	58.76
12,18,23	multiplication	55	56.70
19	Addition & division	24	24.74
21,22	Measurement of unit	22	22.68
25	Addition & subtraction	45	46.39

The foundational numeracy test included 25 items, covering various mathematical concepts (addition, subtraction, multiplication, division, number system, geometry, a unit of measurement, and applied concepts). Among these, 82% of students correctly answered the addition questions (items 1,2,3,7,20), while 18% did not perform. Subtraction (items 4,5,6,8) was correctly solved by 45%, and 55%, and time reading (item 9) had a 61% success rate. Weight comparison (item 10) was correct for 77% and geometry (items 11, 15) was answered correctly by 84%. However, division (13, 14, 24) had accuracy, and multiplication (items 12, 18, 23) saw 56% correct answer. Number systems (items 16, 17) were understood by 58% while 24% succeeded in addition and substruction (item 19). Measurement (Items 21, 22) was correctly answered by only 22%, and 46% succeeded in combined addition and subtraction. (item 25). Further, this result highlights significant gaps, particularly in subtraction, division, and measurement.

Level of FLN among the Government primary school students of Cuttack district

Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Literacy	97	24	2	26	14.87	.695	6.849	-.154	.245	-1.124	.485
Numeracy	97	51	3	54	14.61	.697	6.869	1.862	.245	10.013	.485
Valid N (listwise)	97										

The above table shows the FLN among the fourth-grade students in Cuttack district. The mean score of the literacy skills is 14.87 and the numeracy skills is 14.61. similarly, the standard deviations of the literacy and numeracy skill is 6.84 and 6.86.

Table 4.1.4 Zscore (Literacy)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5.00000	20	20.6	20.6	20.6
	6.00000	54	55.7	55.7	76.3
	7.00000	23	23.7	23.7	100.0
	Total	97	100.0	100.0	

Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

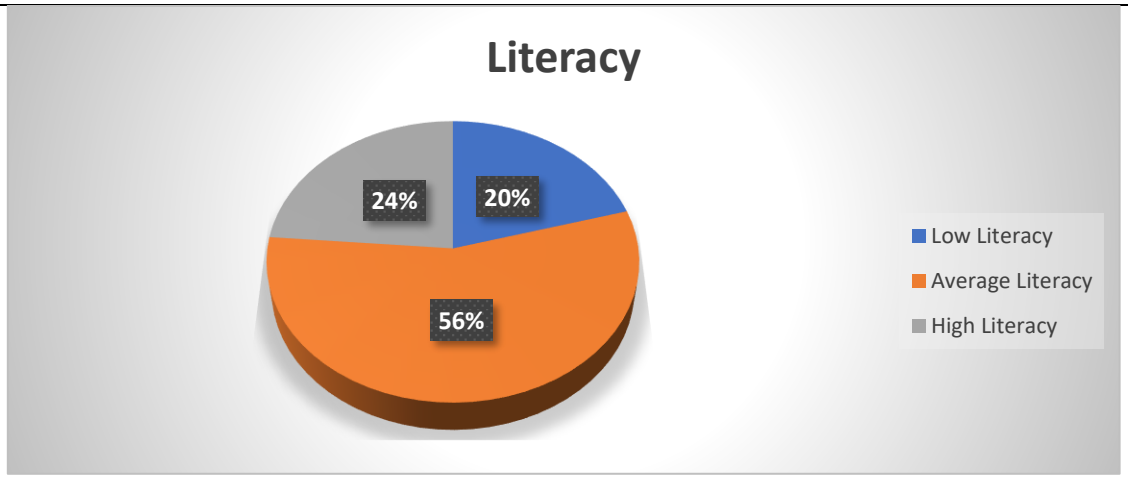
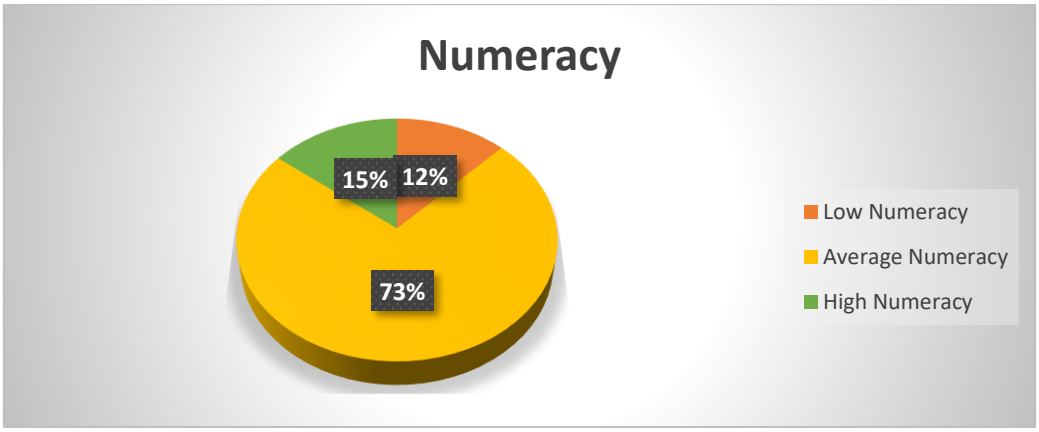


Figure 4.1.1

From the above analysis it is clear that the present literacy and numeracy status of Cuttack is average. concerning literacy proficiency, around 20% of fourth-grade students in the Cuttack district exhibit an inability to read, write, comprehend, and respond to Odia language textbooks. In contrast, approximately 24% of students demonstrate proficiency in these literacy skills. Moreover, a considerable proportion of students exhibit partial proficiency in reading, writing, comprehending, and responding to Odia language textbooks. This indicates a diverse range of literacy proficiency levels among fourth-grade students, with a significant portion requiring additional support to enhance their literacy skills.

Table 4.1.5 Zscore(Numeracy)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5.00000	11	11.3	11.3	11.3
	5.73501	1	1.0	1.0	12.4
	6.00000	71	73.2	73.2	85.6
	7.00000	14	14.4	14.4	100.0
	Total	97	100.0	100.0	

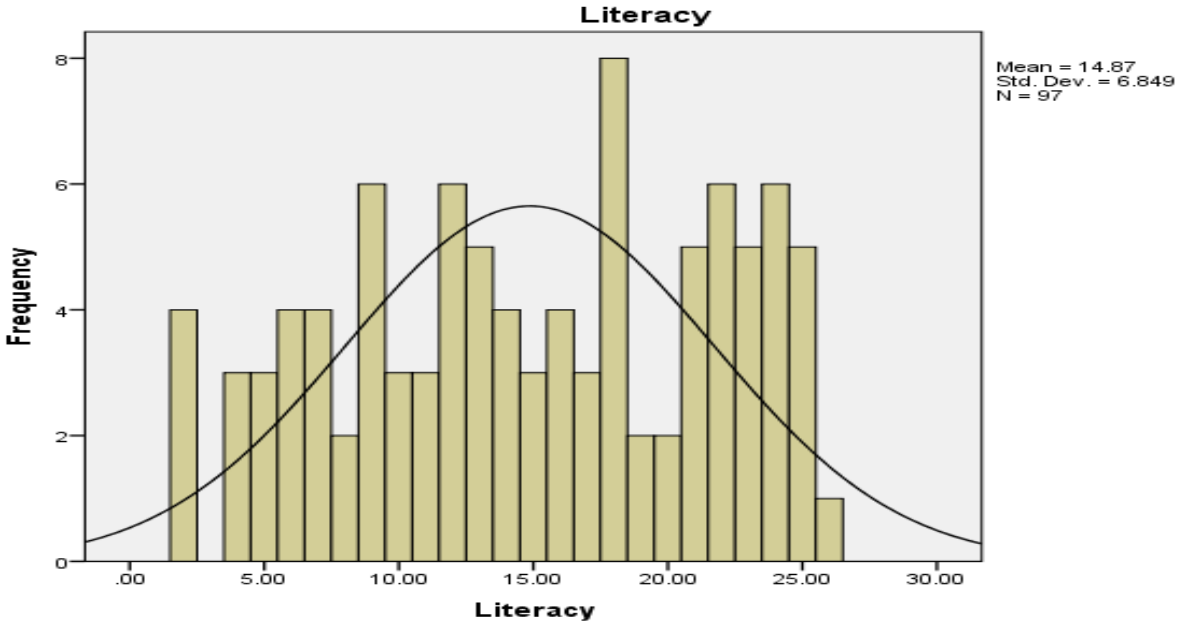


Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

Figure 4.1.2

Similarly, majority of fourth-grade students in the Cuttack district demonstrate an average level of numeracy proficiency, with approximately 73% falling within this category. A smaller proportion of students, constituting around 15%, exhibit high levels of numeracy achievement, while approximately 12% of students lack foundational numeracy skills, indicating a difficulty in performing basic arithmetic operations. This suggests a notable variation in numeracy attainment levels among the student population, with only a subset demonstrating proficiency in basic arithmetic, while a significant portion struggle to achieve foundational numeracy skills.

Figure 4.1.3



Journal of Educare (JoE)
(A Peer Reviewed Bi-Annual Journal)
ISSN: 3048-9652 (Online) www.educare.aliah.ac.in

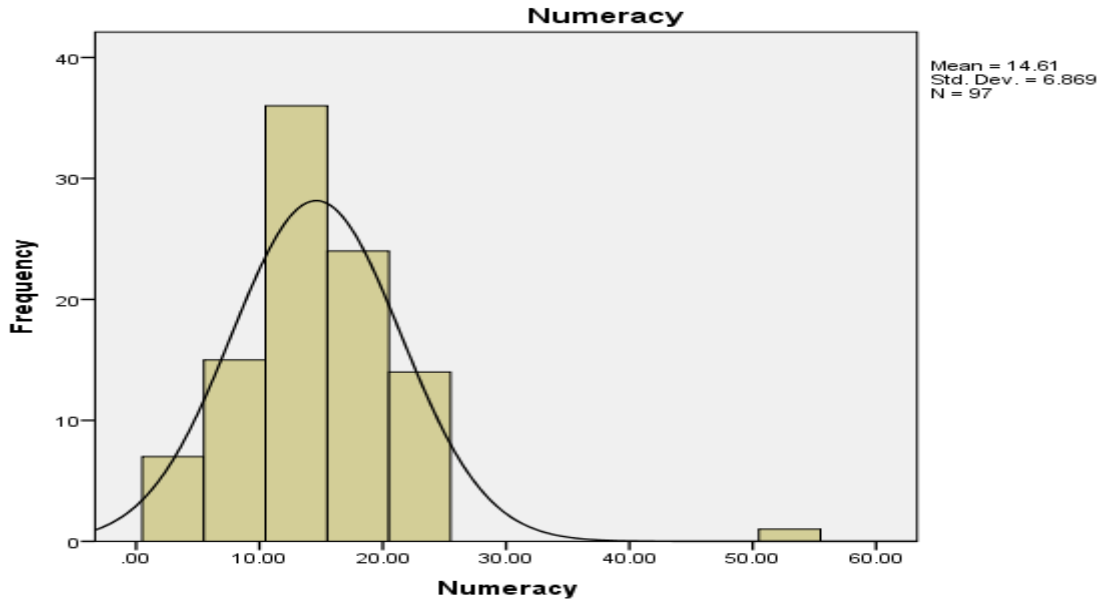


Figure 4.1.4

Relationship between FLN among the Government primary school students

To access the relationship scores of foundational literacy skills and numeracy skills, Pearson's product-moment technique was used which is given the following table-

Table 4.1.8 Correlations

		Literacy	Numeracy
Literacy	Pearson Correlation	1	.587**
	Sig. (2-tailed)		.000
	N	97	97
Numeracy	Pearson Correlation	.587**	1
	Sig. (2-tailed)	.000	
	N	97	97

**. Correlation found significant at 0.01 level (2-tailed).

From above table it can be interpreted, with a correlation coefficient of .587 and significance level at 0.01, it indicates a moderate positive relation between foundational literacy and numeracy. So, the null hypothesis ($H_0$3) "There is no significant relationship between foundational literacy and numeracy of Government primary school students of Cuttack district" is rejected at 0.01 significant level.

FINDINGS & DISCUSSION

1. **Level of FLN Among Primary School Students**

   The research revealed different levels of literacy skills and numeracy skills among primary school participants from Cuttack district in Odisha. The average score for literacy was 14.87 (SD=6.84), with 24% showing proficient skills and 20% not capable of

foundational literacy skills. Writing a paragraph showed clear issues with comprehension because, while 31.95% of the students scored the maximum score possible, 29.73% of the students scored only two marks (or less). For the picture description, 23.71% of the students scored the maximum indicating a higher number of students were able to describe the picture, while 21.24% of the students scored zero, demonstrating challenge in expressive writing. Average scores for numeracy was 14.61 (SD=6.86). Students did well in addition (82.47%), but less successful in subtraction (45.36%) and division (39.17%). The measurement tasks were the most challenging for students with an average score of 22.68%. The data suggests students struggle with applying numeracy concepts. The Z-scores show about 20.6% scored below the mean in literacy while 23.7% scored above the mean; for numeracy there were 11.3% scored below the mean, while 14.4% scored above the mean. The findings were consistent with Ball & Govinda (2015), and more recently, Spink, Cloney, & Berry (2022) demonstrating the explicit difference in availability of resources and inequity in instruction. The data indicates the need for targeted interventions, which is particularly important for comprehension and problem solving, especially in rural and under-resourced areas.

2. **Comparison of literacy scores by gender.**

A comprehensive analysis of Literacy scores between genders found that the mean scores of literacies of girls 16.33 (SD=6.77) compared to 13.23 (SD= 6.62) for boys (t=2.26, p=0.026). this analysis depicts the superior proficiency of girls in tasks as comprehension and writing tasks compared to boys. This outcome is consistent with Meiers et al. (2006), who reported slight gender advantages favouring girls in literacy acquisition. Sociocultural factors, such as differing parental expectation and gender norms may contribute to these disparities. (Md-Ali, Karim, & Yousof, 2016). The t-test ($p<0.05$) also indicated that these differences in foundational literacy scores were significant leading to the rejection of the null hypotheses H_{01}: there exist no significant difference in literacy scores by gender.

3. **Comparison of numeracy scores by gender.**

In contrast to literacy, the mean numeracy score for boy (14.15, SD=5.31) and girls (15.01, SD= 8.05) has no significant gender-based difference in numeracy scores. Both boys and girls achieved an average proficiency in basic arithmetic operation. Such as addition (82.47%), but struggled similarly with advanced concept like measurements (22.68%) and division (39.17%). The parity in numeracy performances suggests that instructional quality rather than gender specific factors plays a critical role in shaping outcomes. The findings supported by the previous literature suggesting minimal gender-based distinctions in early numeracy skills (Md-Ali, Karim, & Yousof, 2016). Further t-test analysis confirmed the absence of significant difference ($p>0.05$), supporting the retention of null hypotheses, which was H_{02}: There exist no significant difference in numeracy score by gender.

4. **Relationship between literacy and numeracy:**

A moderate positive corelation ($r =0.587$, $P< 0.01$**) was identified between literacy and numeracy scores, indicating that students with strong foundational literacy skills tended to perform good in numeracy tasks requiring textual interpretation. This interdependence aligns with the findings of study conducted by Purpura et al. (2011), who demonstrated the predictive relationship between early literacy kills and numeracy

development. The hypotheses that "there is no significant relationship between foundational literacy and numeracy" is rejected, with evidence supporting a robust linkage between these skills.

SUMMARIZATION

This study investigates the level of FLN skills of fourth grade students in government primary schools in Cuttack district, Odisha, specifically looking at varying levels of proficiency, gender differences and the collaborative nature between literacy and numeracy. In a correlational study designed to assess 97 students, from 6 schools, students were evaluated in the areas of reading comprehension and oral fluency, writing, arithmetic operations, geometry, and measurements. The results were moderate levels of proficiency FLN with advanced literacy (comprehension and written expression), and numeracy (reasoning and applied concepts) clearly lacking. Girls displayed higher levels of literacy than boys, however, no significant differences existed in numeracy. The findings highlight the need for educational interventions relative to equity, a focus on teacher capacity improvement and overall pedagogical innovation to address the inequalities and improve learning.

RECOMMENDATIONS

To optimize the FLN outcomes, the research recommends to purposefully designed remediation for low achieving learners, more teacher training on interactive teaching methods, and gender-responsive curricula. Digital tools can be used as pedagogical tools structured for learning purposes, particularly in low-resourced contexts. Increasing family engagement, as well as employing formative assessments will also support early learning. Policy reform should ensure that attempts are made at local implementation of national programs like NIPUN Bharat and Vidya Pravesh to make sure programs are being implemented with fidelity and sustainability.

IMPLICATIONS

The results carry important implications for policy of education, pedagogy, and future research. In rural or socioeconomically disadvantaged regions, enhancing FLN requires equitable policies and early intervention programs. Pedagogy should be learner-centred, and utilize contextualized and competency-based practices, to foster engagement and learning. Addressing gender inequality requires gender-equitable access to literacy and numeracy. Future research should be more geographically and demographically representative and use longitudinal designs to examine long-term outcomes. There are also scalable possibilities to improve foundational competencies and reduce educational disparities with the integration of digital and AI-supported learning.

CONCLUSION

Linguistic and numerical competence is indispensable to academic growth, cognitive development, and civic engagement. This paper highlighted that there is an urgent need to address inequities in competence acquisition among primary school pupils in Cuttack, Odisha. While pupils have developed certain basic competencies, we are still seeing gaps in comprehension, expressive writing, and problem-solving reasoning, especially among disadvantaged pupils. To address this, we must prioritize the effective implementation of

initiatives such as NIPUN Bharat and Vidya Pravesh, other scales to advance reading and apprehension skills, educator learning and training opportunity, and likewise innovate pedagogical approaches to teach basic literacy skills. Making foundational education a universal right to educational equity and empowering individuals to contribute to the betterment of society through equitable pathways to quality education.

ETHICAL STATEMENT

In the conduct of this research, we have abided by the principles of ethical academic publishing and research integrity. Data collection and analysis were conducted in accordance with ethical guidelines and considerations: confidentiality, informed consent, and the welfare of participants were all assured. The research adheres to the ethics of institutional and national standards and maintains transparency, objectivity, and ethics of academic integrity.

REFERENCE

Awgichew, S. (2022). Functionality of literacy and numeracy in first cycle primary school: A look in to the curriculum and instructional process. *International Journal of Education and Literacy Studies*, *10*(3), 101-112. https://journals.aiac.org.au/index.php/IJELS/article/view/7364

Ball, J., Paris, S. G., & Govinda, R. (2014). Literacy and numeracy skills among children in developing countries. In *Learning and education in developing countries: Research and policy for the post-2015 UN development goals* (pp. 26-41). New York: Palgrave Macmillan US. https://link.springer.com/chapter/10.1057/9781137455970_2

Bar, L., & Shaul, S. (2021). Early Numeracy and Literacy Skills Among Monolingual and Bilingual Kindergarten Children. *Frontiers in psychology*, *12*, 732569. https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2021.732569/full

Bashir, R., & Jan, T. (2023). Foundational literacy and numeracy (NEP 2020) – Urgency, essential skills, challenges, and the integration of key areas. *International Journal of Indian Psychology.* Retrieved from https://www.ijip.in/

Black, S., & Yasukawa, K. (1970). Time for National Renewal: Australian adult literacy and numeracy as 'foundation skills.' Literacy and Numeracy Studies, 18(2), 43–57. https://doi.org/10.5130/lns.v18i2.1897

Dash, A. & Mishra, Y. (2023) Community involvement: An extended hand to achieve goals of foundational literacy and numeracy. International research journal of modernization https://www.irjmets.com

Getenet, S. (2023). The influence of students' prior numeracy achievement on later numeracy achievement as a function of gender and year levels. *Mathematics Education Research Journal*, 1-22. https://link.springer.com/article/10.1007/s13394-023-00469-7

Kumar, M., & Behera, B. (2022). Influence of home environment on children's foundational literacy and numeracy skills: A systematic synthesis with India in focus. Asian Journal

for Mathematics Education, 1(3), 359–380. https://doi.org/10.1177/27527263221129366

Md-Ali, R., Karim, H. B. B. A., & Yusof, F. M. (2016). Experienced Primary School Teachers' Thoughts on Effective Teachers of Literacy and Numeracy. *Malaysian Journal of Learning and Instruction*, *13*(1), 43-62. https://eric.ed.gov/?id=EJ1134519

Meiers, M., Khoo, S. T., Rowe, K., Stephanou, A., Anderson, P., & Nolan, K. (2006). *Growth in literacy and numeracy in the first three years of school* (ACER Research Monograph No. 61). Australian Council for Educational Research. https://core.ac.uk/download/pdf/36780193.pdf

Ming, H. Wong & Paris, S.G.(2010). Formulate assessment of literacy and numeracy in primary grades. Annual meeting of the American educational research association https://repository.nie.edu.sg/bitstream/10497/19232/1/AERA-2010-WongHM.pdf

Ministry of Education, Government of India. (2019, August 21). *NISHTHA: National Initiative for School Heads' and Teachers' Holistic Advancement – Integrated teacher training programme* [PDF]. Department of School Education & Literacy. https://dsel.education.gov.in/sites/default/files/miscellaneous/NISHTHA-en.pdf

Ministry of Human Resource Development. (2020). *National Education Policy 2020*. Government of India. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

Musliman, R., Ariffin, S. R., & Din, R. (2013). Assessing students' spatial intelligence for literacy and numeracy skills. Procedia – Social and Behavioral Sciences, 90, 695–701. https://doi.org/10.1016/j.sbspro.2013.07.142

Musliman, R., Ariffin, S. R., & Din, R. (2013). Assessing students' spatial intelligence for literacy and numeracy skills. *Procedia-Social and Behavioral Sciences*, *90*, 695-701. https://www.sciencedirect.com/science/article/pii/S1877042813020302

Nag, S., Chait, S., Torgerson, C. & Snowling, M.J. (2014) Literacy, foundational learning and assessment in developing countries. Education rigorous literature riene

Pasnak, R., Kidd, J. K., Gadzichowski, M. K., Gallington, D. A., Saracina, R. P., & Addison, K. T. (2009). Promoting early abstraction to promote early literacy and numeracy. Journal of Applied Developmental Psychology, 30(3), 239–249. https://doi.org/10.1016/j.appdev.2008.12.006

Pasnak, R., Kidd, J. K., Gadzichowski, M. K., Gallington, D. A., Saracina, R. P., & Addison, K. T. (2009). Promoting early abstraction to promote early literacy and numeracy. *Journal of Applied Developmental Psychology*, *30*(3), 239-249. https://www.sciencedirect.com/science/article/pii/S0193397308001457

Purdie, N., Reid, K., Frigo, T., Stone, A., &and Kleinheinz, E. (2011). Literacy and numeracy learning: lesson from the longitudinal literacy and numeracy study for indigenous students. ASER Research monograph

https://research.acer.edu.au/cgi/viewcontent.cgi?article=1006&context=acer_monographs

Purpura, D. J., Hume, L. E., Sims, D. M., & Lonigan, C. J. (2011). Early literacy and early numeracy: The value of including early literacy skills in the prediction of numeracy development. Journal of Experimental Child Psychology, 110(4), 647–658. https://doi.org/10.1016/j.jecp.2011.07.004

Purpura, D. J., Hume, L. E., Sims, D. M., & Lonigan, C. J. (2011). Early literacy and early numeracy: The value of including early literacy skills in the prediction of numeracy development. *Journal of experimental child psychology*, *110*(4), 647-658. https://www.sciencedirect.com/science/article/abs/pii/S0022096511001810

Rothman, S. & McMillan, J. (2003) Influence on achievement in literacy and numeracy. Australian council for educational research https://research.acer.edu.au/lsay_research/40/

School education in Pakistan: (2019). https://doi.org/10.22617/tcs190039

Spink, J., Cloney, D., & Berry, A. (2022). *THE LEARNING GAP SERIES-ONE Beyond letters and numbers: the COVID-19 pandemic and foundational literacy and numeracy in Indonesia*. https://research.acer.edu.au/int_research/7/

Vasoya, N. H., & Vansdadiya, R. P. (2023). Effective Strategies for promoting foundational literacy and numeracy in early childhood education. Journal of Social Sciences, 19(1), 92–95. https://doi.org/10.3844/jssp.2023.92.95

Vasoya, N., & Vansdadiya, R. (2023). Effective Strategies for Promoting Foundational Literacy and Numeracy in Early Childhood Education. *Journal of Social Sciences*, *19*(1), 92-95. https://doi.org/10.3844/jssp.2023.92.95

Wong, H. M., & Paris, S. G. (2010, March). Formative assessments of literacy and numeracy in primary grades. Paper presented at the 2010 Annual Meeting of the American Educational Research Association, 5 March 2010, Denver, Colorado. Retrieved 6 December 2017, from the AERA Online Paper Repository at http://www.aera.net/Publications/OnlinePaper-Repository

Wong, Hwei Ming & Kwek, Dennis & Tan, Kelvin. (2020). Changing Assessments and the Examination Culture in Singapore: A Review and Analysis of Singapore's Assessment Policies. Asia Pacific Journal of Education. 40. 433-457. 10.1080/02188791.2020.1838886

Wong, Hwei Ming. (2017). Implementing self-assessment in Singapore primary schools: effects on students' perceptions of self-assessment. Pedagogies: An International Journal. 12. 1-19. 10.1080/1554480X.2017.1362348

Zhang, Y. (2006). Urban-Rural literacy gaps in Sub-Saharan Africa: the roles of socioeconomic status and school quality. Comparative Education Review, 50(4), 581–602. https://doi.org/10.1086/507056