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Importance of Home in the Literacy Process of Child

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A type of human service known as an intergenerational program (IGP) involves regular, planned contacts between people of different ages for the benefit of all participants. Children enter school with widely variable levels of emerging literacy, and it is generally known that these levels are an important indicator of subsequent literacy and, consequently, of academic performance in general. Children's early competency development is significantly influenced by the home learning environment. Children's language comprehension and production are particularly tightly related to the early home literacy environment (HLE), which is made up of all literacy materials and family interactions that enhance children's linguistic and literacy learning. Shared reading is a crucial component of the HLE and should begin in a child's early years and become a regular part of family life. However, little research has been done on the impact of the HLE and a child's interest in literacy on later literacy skills. In this review study, we investigated the importance of Home in the literacy process of child and how different aspects in home effect the literacy capability of child.

Keywords: Literacy process; literacy skills; school children; language.

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1. INTRODUCTION

A type of human service known as an intergenerational program (IGP) involves regular, planned contacts between people of different ages for the benefit of all participants [1]. Intergenerational program includes volunteers of all ages in a range of activities and have been around for 40 years in a number of nations. They typically result from practical worries about fostering intergenerational connections, establishing and supporting community activities, and enhancing social cohesion. Intergenerational program seeks to enhance emotional and social development, increase interaction and understanding, build meaningful relationships, and further a variety of educational or communal aims [2-4]. Before they face the formal literacy curriculum when they start kindergarten or first grade, informal literacy is crucial in preparing children for reading. There are possibilities to impart reading practices and behaviors at a young age during regular parent-child interactions and in contexts like pre-kindergarten and kindergarten. According to Piasta (2020), "efforts to assist the development of emergent literacy have garnered substantial attention recently." Literacy perspectives" indicate that strengthening early childhood experiences can set children on the path to reading success [5].

"Children enter school with widely variable levels of emerging literacy, and it is generally known that these levels are an important indicator of subsequent literacy and, consequently, of academic performance in general" [6,7]. These various emergent literacy levels must be influenced by both hereditary and environmental variables. The significance of HLE has been the subject of numerous prior research, although the findings have not always been reliable. Sénéchal and LeFevre (2002) identified two routes from the home environment to school literacy: direct instruction is essential for coding-related skills like letter knowledge, phonological awareness, and word recognition, while shared storybook reading is particularly important for enhancing oral language and comprehension skills [8]. Recent research has shown that this is a major oversimplification and that the connection between HLE and child attainment is far more intricate and multifaceted. Early studies on the subject run the risk of considering kids as passive information consumers and ignoring the importance of kids' involvement and enjoyment in early reading activities. According to recent research, parents modify the type and quantity of

literacy experiences they offer based on their child's ability. Additionally, when parental abilities are taken into account, the link between HLE and child attainment is dramatically reduced, indicating that the association may be partially explained by genetic similarities in children's and parents' cognitive ability [9-11].

The impact of the HLE and a child's interest in literacy on later literacy skills has been investigated in some earlier research. According to Martini and Sénéchal [12], after controlling for HLE and parent socioeconomic position, the child's interest in letters predicts their understanding of the alphabet. In their study of the influence of the HLE and reading interest on developing literacy skills, Frijters et al [13] found that both exhibit independent influences on vocabulary and letter sound knowledge. In this study, Frijters et al. did not account for the parents' background traits. This could be extremely important since, as was previously said, the relationship between HLE and literacy outcomes may be substantially explained by hereditary traits that parents and their children share [10,14]. "Children's linguistic development is supported from an early age by the Home Literacy Environment (HLE), which includes shared reading routines in families and various indicators of a literacy-orientated learning environment, including the number of books in a home and parental attitudes toward reading. Additionally, some studies suggest that HLE may have an impact on children's development in other areas, particularly in relation to their social and emotional skills. Single studies imply that shared reading directly helps children's socioemotional learning because HLE and shared book reading, in particular, provide opportunity to interact with kids about the socioemotional experiences of book characters" [15-17].

2. ENVIRONMENT FOR LITERACY OF CHILD AT HOME

Children benefit from reading in their growth. In order to create techniques to encourage children's literacy development, researchers have been examining the variables that affect children's literacy development. HLE is one of the aspects that have been examined the most among the many others that affect children's literacy development [19]. HLE mainly refers to the material resources that families give to their kids as well as the family activities that encourage language development in kids, such

as family books, literacy-strengthening activities between parents and kids, library visits for kids, etc [19]. HLE has a good effect on children's literacy development in the setting of alphabetic language, according to numerous research on kids with typical hearing levels. Children with typical hearing levels have also come to similar findings in the Chinese environment [20-26].

Since this is now widely accepted, research has moved past attempts to prove that environmental influences have an impact on reading development over the past 20 years. Recent research employs a variety of metrics to identify the most important environmental influence indicators and show how they affect various language and literacy development components. The home literacy environment is not a straightforward concept; rather, it includes a variety of behaviors, viewpoints, and values that function at various developmental levels and are

in turn influenced by the child's cognitive and motivational traits [27].

According to some researchers, socioeconomic class primarily functions as a predictor of parental reading attitudes, which in turn predicts the kinds of interactions parents have with their kids and those kids' early interest in reading. The development of children's language and emergent literacy skills—the building blocks of reading and writing, which are highly predictive of subsequent educational success—may be influenced significantly by these HLE activities and child motivational variables. Although the HLE's involvement in the development of phonological awareness is not yet clear, a growing body of research suggests that exposing young children to storybooks in the preschool years can help them build their vocabulary, morphosyntax, and motivation to read independently [28].

Young Children

- Read books and nursery rhymes aloud together
- Talk daily about home and community life
- Sing, draw, and tell stories

Older Children

- Play word games
- Discuss word meanings
- Point out interesting or unfamiliar words
- Ask questions before, during, and after reading

Adolescents

- Talk about learning and connect to school
- Offer a literacy rich environment
- Model reading and writing

Supporting Your Child's Literacy Development at Home

Take part in literacy experiences at home. Taking part can develop your child's reading ability, comprehension, and language skills. It could also improve your child's interest in reading, attitude towards reading, and focus.

The infographic features a central illustration of a woman and a child reading a large book together. The background is a light beige color, and the text is in a dark grey font. The activities are listed in a dark grey box on the left side of the infographic.

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Fig. 1. Child literacy development at home [18]

“Additionally, parental education of letters and words explains the variations in each child’s prior understanding of print functions and forms at the time of enrollment into school. Researchers and educators are consequently very interested in the role of the HLE in the language and reading development of kids who are at developmental risk for reading difficulties” [29,30].

2.1 The Impact of Mentalizing, Expressive Verbal Ability, Print Exposure, and The Home Literacy Environment on Third- and Fourth-graders’ Reading Comprehension:

Children who grow up at homes with a strong literacy culture typically have superior reading comprehension. This association is assumed to be indirect for children in the upper elementary grades. Inouk E. Boerma et al provide a hypothesis in which exposure to print and higher order language and cognitive skills in children—such as expressive verbal ability and mentalizing ability—ran this relationship. In their correlation study, which included 117 children aged 8 to 11, they discovered two indirect relations—exposure children’s to print and their mentalizing skills—as well as a direct relationship between the home literacy environment and reading comprehension. No substantial indirect relationship through the use of expressive language was found. They indicated that children’s home literacy environments continue to influence how well they read in the upper primary school grades. Even if their kids can read independently, parents should continue to foster a culture of literacy in their kids because there is evidence linking this to improved reading comprehension, reading behaviour, mental processing speed, and linguistic expression [31].

2.2 Role of Home Language and Literacy Environment on Children’s Language Development

Numerous studies have found that exposing kids to a variety of rich language and literacy experiences at home, including sharing books, including them in conversations, and using child-directed speech that includes recasts, extensions, and reformulations of the kid’s utterances, helps kids develop their language and literacy skills. As a result, it is important to distinguish between quantitative and qualitative components of language and literacy exposure. The quantity of language and literacy exposure,

which has been linked to children’s language and literacy development, includes, among other things, children’s more casual experiences with literacy and literacy-related material (e.g., the availability of books at home, the frequency of shared book reading) [32-36].



Fig. 2. Home literacy environment

“In particular, a varied and complex language input, a high level of decontextualization from the present, asking open-ended questions, elaborating on the child’s comments, and interacting in a responsive manner that adapts to the child’s needs are related to children’s language development. The quality of language exposure during shared book reading is also highly relevant to children’s language development” [31,37,38].

For instance, Lehl et al. (2012) demonstrated that differences in children’s language development over the following year were explained by both book exposure and the quality of parent-child interactions during a shared book reading situation (e.g., asking open-ended questions and using stimulating language), as measured when children were 3 years old; however, the correlations between pertinent elements of the home language and literacy

environment were only low to medium, and differential effects were observed for vocabulary and grammar [31,35-39].

2.3 Intergenerational Issues with Literacy and Poverty in Developing Nations

A rising area of research on children, parents, and families deals with the effects of low literacy and poverty on future generations. This concern for the negative effects of long-term poverty and the link between it and literacy is reflected in federal policy initiatives. Research on families and literacy, specifically the impact of parental literacy and parent-child literacy interactions on children's academic performance, frequently discusses the effects of poverty and low literacy. Over the past ten years, research on the effects of low literacy on kids and families has significantly grown. According to numerous additional studies, low literacy is associated with low productivity, high unemployment, low incomes, and high welfare dependency rates. Suggestions, insinuations, and data have all connected poverty and low literacy [40-51].

2.4 Intergenerational Education via a Session on Digital Literacy

"Learning for the twenty-first century, where prevalent literacy practices are increasingly mediated by digital networks, new media, and digital skills, has been the focus of educational discourse during the past ten years. The competencies necessary for success in the twenty-first century and the various subject areas through which these competencies may be taught have been the focus of research on youth and digital literacies in particular, as well as how young people are participating in digital cultures outside of schools" [52].

2.5 What Does the Community Think of Intergenerational Practice?

The numerous changes that older adults experience raise their risk of social isolation and loneliness. Due to the anticipated advantages of generations interacting, intergenerational programs for elderly individuals and young children may be able to overcome this gap. Gail Kenning et al investigate whether there is a demand in the neighborhood for intergenerational programming for senior citizens living in communities. A QR code or URL was

used to enable access to an online survey that was disseminated via social media, the networks of the study team, and snowball recruiting. Potential participants in a trial intergenerational program scheduled for the Sydney, Australia, Eastern Suburbs in 2020 had semi-structured interviews. The interviews were subjected to thematic analysis. Almost 250 individuals completed the poll. All of the participants, according to the statistics, were in favor of intergenerational programs, but opinions about who would benefit and how much varied. The study brought attention to issues that must be taken into account when creating successful and long-lasting intergenerational programs. Accessing those members of the community who are most socially isolated and lonely, for instance, was noted as a major issue [53].

2.6 How to Encourage Your Child's Literacy Development at Home

Nursery rhymes are particularly beneficial for the language and early literacy development of young children. To expose your youngster to more language, read aloud or play audiobooks at home. Display a variety of prints throughout your home. Your home's items should be labelled. This can demonstrate the value of writing, reading, and language. Give your youngster background information on a subject. Discuss daily events with your child, show her photographs, and tell her stories[42,54-56].

Play word games with older kids, discuss word definitions, and point out new or unusual terms while you read aloud. Before, during, and after reading aloud, ask questions. This may aid in your child's ability to concentrate on the story's concepts. Examine the book's cover before beginning to read, and then speculate about what might occur. Ask the child any questions he might have while you read. Talk about what happened after reading. Ask your youngster to summarize the story and make connections to his prior knowledge or personal experiences [57,58].

Engage in dialogue with teenagers, provide a space that is rich in literacy, and set a good example by reading aloud to them. Discuss your studies, publications, or current affairs. Inquire about their reading habits and engage in book discussions. Have a lot of reading material that is age- and grade-appropriate lying around your house. Set a positive example for others by reading frequently [18,59-62].

3. CONCLUSIONS

An intergenerational program (IGP) is a type of human service that incorporates regular, scheduled interactions between persons of different ages for the benefit of all participants. It is well recognized that children's levels of emerging literacy when they first start school are significant predictors of eventual literacy and, subsequently, of overall academic performance. The learning environment at home has a big impact on a child's early competency development. The early home literacy environment (HLE), which is made up of all literacy materials and family interactions that support children's linguistic and literacy learning, is particularly closely tied to the children's language comprehension and production. A key element of the HLE is shared reading, which should start in a child's early years and become a regular part of family life. The effect of the HLE and a child's interest in literacy on later literacy skills has not received much research, though. In this review study, we explore the role that the home plays in a child's literacy development and how various factors in the home affect a child's ability to read.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Kaplan MS. International programs in schools: Considerations of form and function. *International Review of Education*. 2002;48(5):305-334.
2. Ayala JS, et al. Intergenerational programs. *Journal of Intergenerational Relationships*. 2007;5(2):45-60.
3. Available:10.4324_9781315783451_previewpdf.pdf
4. Available: ageing_horizons_8_newmanetal_II.pdf
5. Piasta SB, et al. Early childhood educators' knowledge about language and literacy: Associations with practice and children's learning. *Dyslexia*. 2020;26(2):137-152.
6. Shapiro LR, Carroll JM, Solity JE. Separating the influences of prereading skills on early word and nonword reading. *Journal of Experimental Child Psychology*. 2013;116(2):278-295.
7. Storch SA, Whitehurst GJ. Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*. 2002;38(6):934.
8. Sénéchal M, LeFevre JA. Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*. 2002;73(2):445-460.
9. Sénéchal M, LeFevre JA. Continuity and change in the home literacy environment as predictors of growth in vocabulary and reading. *Child Development*. 2014;85(4):1552-1568.
10. Puglisi ML, et al. The home literacy environment is a correlate, but perhaps not a cause, of variations in children's language and literacy development. *Scientific Studies of Reading*. 2017;21(6):498-514.
11. Marjanovič Umek L, Podlesek A, Fekonja U. Assessing the home literacy environment. *European Journal of Psychological Assessment*. 2005;21(4):271-281.
12. Martini F, Sénéchal M. Learning literacy skills at home: parent teaching, expectations, and child interest. *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement*. 2012;44(3):210.
13. Frijters JC, Barron RW, Brunello M. Direct and mediated influences of home literacy and literacy interest on prereaders' oral vocabulary and early written language skill. *Journal of Educational Psychology*. 2000;92(3):466.
14. van Bergen E, et al. Why are home literacy environment and children's reading skills associated? What parental skills reveal. *Reading Research Quarterly*. 2017;52(2):147-160.
15. Niklas F, Schneider W. Home learning environment and development of child competencies from kindergarten until the end of elementary school. *Contemporary Educational Psychology*. 2017;49:263-274.
16. Rose E, et al. Long-term relations between children's language, the home literacy environment, and socioemotional development from ages 3 to 8. *Early Education and Development*. 2018;29(3):342-356.
17. Kozak S, Recchia H. Reading and the development of social understanding: Implications for the literacy classroom. *The Reading Teacher*. 2019;72(5):569-577.

18. De Villiers JG, Pyers JE. Complements to cognition: A longitudinal study of the relationship between complex syntax and false-belief-understanding. *Cognitive Development*. 2002;17(1):1037-1060.
19. Korat O, et al. Book reading mediation, SES, home literacy environment, and children's literacy: Evidence from Arabic-speaking families. *First Language*. 2013;33(2):132-154.
20. Niklas F, Schneider W, Home literacy environment and the beginning of reading and spelling. *Contemporary Educational Psychology*. 2013;38(1):40-50.
21. Fekonja U, Podlesek A, Umek L. Assessing the home literacy environment. *European Journal of Psychological Assessment*. 2005;21(4):217-281.
22. Boerma IE, Mol SE, Jolles J. Parents adjust the quality of their home literacy environment to the reading interest of their third to sixth graders. *Parenting*. 2018;18(4):243-261.
23. Carretti B, et al. Role of working memory in explaining the performance of individuals with specific reading comprehension difficulties: A meta-analysis. *Learning and Individual Differences*. 2009;19(2):246-251.
24. Guzmán-Simón F, Gil-Flores J, Pacheco-Costa A. Home literacy environment and reading comprehension in Spanish primary education. *Journal of Research in Reading*. 2020;43(2):229-247.
25. Li L, Tan CL. Home literacy environment and its influence on Singaporean children's Chinese oral and written language abilities. *Early Childhood Education Journal*. 2016;44(4):381-387.
26. Ho ESC, Lau KI. Reading engagement and reading literacy performance: Effective policy and practices at home and in school. *Journal of Research in Reading*. 2018;41 (4):657-679.
27. van Bergen E, et al. The effect of parents' literacy skills and children's preliteracy skills on the risk of dyslexia. *Journal of Abnormal Child Psychology*. 2014;42.
28. Farrant B, Zubrick S. Parent-child book reading across early childhood and child vocabulary in the early school years: Findings from the longitudinal study of Australian children. *First Language*. 2013;33:280-293.
29. Logan J, et al. Reading development in young children: Genetic and environmental influences. *Child development*. 2013 ;84.
30. Baroody A, Diamond K. Links Among Home Literacy Environment, Literacy Interest, and Emergent Literacy Skills in Preschoolers At Risk for Reading Difficulties. *Topics in Early Childhood Special Education*. 2012;32:78-87.
31. Boerma IE, Mol SE, Jolles J. The role of home literacy environment, mentalizing, expressive verbal ability, and print exposure in third and fourth graders' reading comprehension. *Scientific Studies of Reading*. 2017;21(3):179-193.
32. Barnes JL, Bloom P. Children's preference for social stories. *Developmental Psychology*. 2014;50(2):498.
33. Astington JW, Baird JA. Introduction: Why language matters. in *why language matters for theory of mind*, Apr, 2002, University of Toronto, Toronto, on, Canada; This chapter originated from the aforementioned conference. Oxford University Press; 2005.
34. Astington J, és Pelletier J. The language of mind: Its role in teaching and learning. Olson, DR és Torrance, N.(szerk.): *The handbook of education and human development*. Blackwell, Oxford. 1996:593-620.
35. Attig M, Weinert S. Häusliche Lernumwelt und Spracherwerb in den ersten Lebensjahren. *Sprache· Stimme· Gehör*. 2019;43(02):86-92.
36. Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*. 1986;51(6):1173.
37. Baydar N, et al. “It takes a village” to support the vocabulary development of children with multiple risk factors. *Developmental Psychology*. 2014;50(4):1014.
38. Bishop DV. *Test for the Reception Of Grammar (TROG), Version 2*. Medical Research Council; 1989.
39. Bradley RH, Corwyn RF. Socioeconomic status and child development. *Annual Review of Psychology*. 2002;53(1):371-399.

40. Bracken SS, Fischel JE. Family reading behavior and early literacy skills in preschool children from low-income backgrounds. *Early Education and Development*. 2008;19(1):45-67.
41. Burgess SR. The influence of speech perception, oral language ability, the home literacy environment, and pre-reading knowledge on the growth of phonological sensitivity: A one-year longitudinal investigation. *Reading and Writing*. 2002;15(7):709-737.
42. Burgess SR, Hecht SA, Lonigan CJ. Relations of the Home Literacy Environment (HLE) to the development of reading-related abilities: A one-year longitudinal study. *Reading Research Quarterly*. 2002;37(4):408-426.
43. Bus AG, Van Ijzendoorn MH, Pellegrini AD. Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*. 1995;65(1):1-21.
44. Chazan-Cohen R, et al. Low-income children's school readiness: Parent contributions over the first five years. *Early Education and Development*. 2009;20(6):958-977.
45. Christian K, Morrison FJ, Bryant FB. Predicting kindergarten academic skills: Interactions among child care, maternal education, and family literacy environments. *Early Childhood Research Quarterly*. 1998;13(3):501-521.
46. De Jong PF, Leseman PP. Lasting effects of home literacy on reading achievement in school. *Journal of School Psychology*. 2001;39(5):389-414.
47. DeTemple J, et al. On reading books to children: parents and teachers. New Mexico: Erlbaum Publisher; 2003.
48. Elbro C, Borstrøm I, Petersen DK. Predicting dyslexia from kindergarten: The importance of distinctness of phonological representations of lexical items. *Reading Research Quarterly*. 1998;33(1):36-60.
49. Ann Evans M, Saint-Aubin J. What children are looking at during shared storybook reading: Evidence from eye movement monitoring. *Psychological Science*. 2005;16(11):913-920.
50. Fletcher KL, Reese E. Picture book reading with young children: A conceptual framework. *Developmental Review*. 2005;25(1):64-103.
51. Foster MA, et al. A model of home learning environment and social risk factors in relation to children's emergent literacy and social outcomes. *Early Childhood Research Quarterly*, 2005;20(1):13-36.
52. Hébert C, Thumlert K, Jenson J. Digital parents: Intergenerational learning through a digital literacy workshop. *Journal of Research on Technology in Education*. 2022;54(1):34-91.
53. Kenning G, et al. Intergenerational practice in the community—what does the community think? *Social Sciences*. 2021; 10(10):374.
54. Lu F. The Influence of Input Modes on Discourse Comprehension of Deaf Students: Moderating Effect of Text and Test Type. *Journal of Psychological Science*. 2021;(3):737.
55. Bradley RH, et al. The home environments of children in the United States part I: Variations by age, ethnicity, and poverty status. *Child Development*. 2001;72 (6):1844-1867.
56. Bretherton I, Beeghly M. Talking about internal states: The acquisition of an explicit theory of mind. *Developmental Psychology*. 1982;18(6):906.
57. Martindale M. Children with significant hearing loss: Learning to listen, talk, and read—Evidence-based best practices. *Communication Disorders Quarterly*. 2007;28(2):73-76.
58. Conger RD, Donnellan MB. An interactionist perspective on the socioeconomic context of human development. *Annual review of psychology*. 2007;58:175.
59. Mastrantuono E, Saldaña D, Rodríguez-Ortiz IR. An eye tracking study on the perception and comprehension of unimodal and bimodal linguistic inputs by deaf adolescents. *Frontiers in Psychology*. 2017;8:1044.
60. Reynolds G, Werfel KL. Home literacy environment and emergent skills in preschool children with hearing loss. *The Journal of Deaf Studies and Deaf Education*. 2020;25(1):68-79.
61. Crosnoe R, et al. Family socioeconomic status and consistent environmental stimulation in early childhood. *Child development*. 2010;81(3):972-987.

62. Daneri MP, et al. Maternal language and child vocabulary mediate relations between socioeconomic status and executive function during early childhood. *Child Development*. 2019;90(6):2001-2018.

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