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Home learning environment in early years and Greek parents' socio-demographics

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ABSTRACT

The home learning environment (HLE) is the first environment in which children's early learning takes place. A number of studies have provided empirical evidence that the HLE contributes to children's cognitive, socio-emotional development. This study addresses the question of the factors that can be associated with creating a positive learning environment for children at home. Pilot quantitative data was collected from 324 families through a questionnaire about the activities parents get involved with their children. The frequency of reading-related activities as well as other in-home and out-of-home learning activities was calculated. Pearson's correlation coefficient was employed to assess the relationship between parent education levels and activities within the HLE. Questionnaire reliability was examined using Cronbach's alpha coefficient. The results showed that the gender and educational level of parents had no influence on the frequency of their involvement in the activities or the type of activities they chose to engage. However, the parents' educational level has an impact on their beliefs, which influence the provision of learning opportunities and the quantity and quality of parent-child interactions. Further research on parental guidance or children's academic performance could collect more information on the factors that can create a more stimulating HLE.

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1. INTRODUCTION

Preschool years are a critical time for children to develop a foundation of early reading and mathematics skills because reading and mathematics skills can predict children's academic skills as they go through school [1]. Home learning environment (HLE) is one of the contexts within which young children develop important competencies, and which affects their long-term development. HLE encompasses a wide range of factors that relate to children's literacy and mathematics skills. Parents and other caregivers contribute to the HLE through their personal attitudes, affective responses, activity choices, and resources available to support learning [2]. A variety of research contexts supported that including parents in children's academic development can critically enhance their performance. The reason why HLE has been studied primarily in terms of its impact on student achievement in the early years of education [3], [4] may be attributed to the impact of HLE which is greater in the early years than at other stages of schooling [5]. There are many studies assuming that reading, writing and numeracy are the most important areas to study for learning environments [5]–[7]. However, there is also interest in some other activities inside and outside home that promote the child's well-being and cognitive development when parents are engaged [8], [9].

Research shows that parents' ability to provide HLE can be affected: i) children's participation in learning activities, ii) the quality of parent-child interactions and learning activities, and iii) the availability of learning materials (e.g., story and picture books, letter and number cards, and board games), which are assessed as key features of HLE that promote children's learning [5], [9]–[14]. These parent-child interactions take place at home or out-of-home but with parent's involvement. They are critical for children's learning and development because they provide everyday learning opportunities for children [15]. However, a home-based activity-in addition to literacy and numeracy learning - such as parent-child play during daily routines promotes communication skills through the expression of feelings that are important in early childhood [12], families prioritize direct teaching of literacy skills, such as learning letters/symbols of the alphabet and poems, rhymes and songs, reading words and writing characters, as in Iran, Japan, and Korea [6], [16].

Many studies [13], [14] have looked at factors that influence HLE in order to understand what can be stimulating for children. However, the socio-economic characteristics of parents have not been extensively studied. The positive role of neighborhood socioeconomic advantage for children has been extensively studied, and results revealed that neighborhood socioeconomic advantage was positively related to adolescents' initial vocabulary, reading and mathematical achievement in relation to the HLE [17]. Poverty and children's cognitive abilities have also been linked by Sosu and Schmidt [18], while Levesque *et al.* [19] also found an association between lower family socioeconomic status and poorer childhood health. Its is also expected that children form low-income families might have limited home learning resources [16]. In this regard, Duncan *et al.* [20] claimed that parents who have higher levels of education, especially mothers [21] place more value on education and invest more money in their child's future, a combination which shapes the family investment model via home learning activities and resources [20].

Määttä *et al.* [22] were studying socioeconomic background and potential home environment mediators in preschoolers' screen time and indirect associations between parents' educational level and preschoolers' screen time were found to play an important role. Specifically, parents with high levels of education had lower descriptive norms, used fewer screens in front of children, placed more emphasis on limiting children's screen time, and felt less social pressure regarding children's screen time. These factors were in turn associated with lower screen time among children of parents with higher levels of education.

Parental gender has not been widely examined, although parental socio-demographic characteristics, such as educational level, have been extensively studied [7], [23], [24]. Positive father involvement is critical to children's healthy social, emotional, and academic outcomes at all stages of development [25], [26]. Based on the explanation, we managed to map the HLE and relate it to parental demographic data. This study thus attempts to examine HLE and the socio-demographic factors (such as child gender and maternal education level) that are likely to have an impact on HLE. The research questions that directed this study are the following: i) is there a difference between the HLE of families whose parents differ in socio-demographic factors? and ii) what factors (found to be conducive to HLE in the present study) appear to correlate with parental educational level?

2. METHOD

2.1. Participants

The study is a survey based on a sample of parents drawn from participating schools in a larger urban setting in Northwestern Greece. The research area has eight (8) daycare settings and the children attended there are about 650. The sampling method employed in this study was probability-based, specifically a stratified random sampling approach. We utilized a systematic procedure to select our sample from a defined population. The population of interest consisted of parents with children attending daycare settings in the chosen urban area. To ensure the inclusiveness of our sample, we initially divided the population into strata based on key demographic factors, such as age, gender, and education level. From each stratum, we then randomly selected participants using a systematic sampling technique. By using this probability-based sampling method, we aimed to minimize bias and thus increasing the reliability of our research results. To calculate the sample size for this study, we considered a population size of 650, Z-score=1.96 for a confidence level of 95%, estimated population proportion p=0.5 and desired margin of error E=0.05 [27]. The sample size was determined of approximately 236 respondents. This calculation was based on ensuring that the results obtained from the sample would be statistically significant and representative of the larger population of parents with children attending the daycare settings in our study area.

The questionnaires were distributed through the teachers to the parents of all the children attending the settings with the request to return them within one week. In total 600 questionnaires were distributed, and 324 completed questionnaires were returned (return rate 54%). The sample comprised of 324 parents and as Table 1 indicates the overwhelming proportion of respondents were female (86.7% n=281) and age between 35-44. The age of the participants is between 18 to 56 years (58.6% were 35 to 44 years, n=190) and most of them are married (91.9%, n=298). However, almost half of them attended university (47.8%, n=155). Lastly,

the majority have another child (64.5%, n=209), whereas the average age of their children is 3.58 years (SD=.87). Participant characteristics are shown in Table 1.

Table 1. Parents' demographic characteristics

Demographics characteristics (*N*=324)		Male (*n*=43) No (%)	Female (*n*=281) No (%)
Age (years)	18-24	1 (2.3)	0 (0)
	25-34	3 (6.9)	108 (38.4)
	35-44	28 (65.1)	162 (57.6)
	45-54	10 (23.2)	11 (3.9)
	<55	1 (2.3)	0 (0)
Marital status	Married	40 (93)	258 (91.8)
	Single	1 (2.3)	12 (4.2)
	Divorced	3 (6.9)	8 (2.8)
	Separated	0 (0)	3 (1)
	Widowed	0 (0)	0 (0)
Employment status	Public Sector	13 (30.2)	83 (29.5)
	Private Sector	12 (27.9)	97 (34.5)
	Freelancer	16 (37.2)	53 (18.8)
	Unemployed	2 (4.6)	48 (17)
Education level (father/mother)	Primary	1 (2.3)/0 (0)	6 (2.1)
	Secondary	11 (25.5)/12 (27.9)	105 (37.3)
	Vocational	12 (27.9)/13 (30.2)	52 (18.5)
	University	19 (44.1)/18 (41.8)	118 (41.9)
Child's gender	Male	22 (51.1)	143 (50.8)
	Female	21 (48.8)	138 (49.1)
Child's age	1-23 months	4 (9.3)	25 (8.8)
	24-47	27 (62.7)	163 (58.1)
	<48	12 (27.9)	93 (33.1)

2.2. Measures

Parents were asked about aspects of the family situation relevant to home learning activities. Some socio-demographic factors such as the child's gender, the parents' marital status, and the family's socio-economic status. were selected as the first subscale (8 items) because they have been reported to influence parents' ability to create a stimulating HLE [11], [12]. Since previous studies have mainly focused on parent-child educational interactions and activities in assessing HLE, such as book reading and parental engagement in other developmental activities [28], such as library visits, or parent-child TV viewing behavior when assessing HLE, we identified two broad dimensions as characteristics of a stimulating HLE to be assessed in the next 27 items [12]: i) in-home activities (e.g., reading, painting, singing, and talking) [5], [12], [14], [29], and ii) out-of-home activities [3], [8], [12], [29].

The in-home activities consisted of 13 items. However, for the purposes of this study, we computed the items referred to reading (items 9-16) and included them as an independent measure. The six remaining items were used to assess the frequency of shared parent-child activities at home except for reading, such as playing with/being taught letters and numbers [9], singing with the child or teaching poems [4], playing games, painting, and drawing but also information about child's TV viewing habits. The section out-of-home activities included 7 items. Observed values ranged from 1 to 6 (1=never, 2=rarely, 3=occasionally, 4=several times a week, 5=everyday, 6=more than once a day) with a mean of M=2.87 (SD=.87).

2.3. Procedure and statistical analysis

Research data were collected from a total of 324 families through questionnaire in the current study. Study's key aim was briefly described on the first page of the questionnaire. Parents were asked to fill in questions about the behaviors and attitudes they maintain at home, which have been shown to be related to the HLE of preschoolers. For this reason, a questionnaire was distributed to parents of children aged 1 to 6 years. Participation was guaranteed to be voluntary. A thorough exploration of preschoolers' HLE s was conducted throughout the data analysis using IBM SPSS, version 22. Some parametric tests were conducted in order to test the hypotheses. The frequency of reading-related activities as well as other in-home and out-of-home learning activities was calculated using percentages, means, and standard deviations. Pearson's correlation coefficient (r) was employed to assess the relationship between parent education levels and activities within the HLE. Box plots were also utilized to visually display the data of maternal education levels and HLE scores, enabling the discovery of trends and variations. They also showed a quick visual assessment of the variability of values in the dataset. They displayed the dataset's median, top, and bottom quartiles, lowest and maximum values, and any outliers. These analyses provided valuable insights into the way Greek families participated in various parts of the HLE, how parental education affected these activities,

and how maternal education levels and HLM scores varied. Lastly, Cronbach's alpha was utilized in this study to assess the reliability of the questionnaire items measuring preschoolers' HLE and parental involvement. The obtained Cronbach's alpha coefficient was .83, indicating a high level of internal consistency among the questionnaire items, after the removal of variables 32 to 35 due to poor reliability.

2.4. Ethical issues

As the parents may not have been willing to disclose the surroundings of their home. The researchers wrote a cover letter briefly describing the true purpose of the study and ensuring confidentiality. Researchers have clearly explained what the study entails, that participants have the right to withdraw participation at any time without giving a reason, and that they can reach the researcher if they have any questions.

3. RESULTS AND DISCUSSION

3.1. Frequency of home learning activities related to reading

In this section results of quantitative and correlational analyzes are presented and then the research questions described in the methodology section will be answered. First, Table 2 introduces descriptively the reading habits of Greek families in different social groups depending on the age of the child. Given those findings, parents of underage children do not often go to libraries with their children (male parent M=1.8 and female parent M=1.52), although they started reading to them at a young age. Parents have generally been actively involved in reading aloud, regardless of their gender or the age of their child. Slightly fewer, but still a considerable average of parents spends some time reading. M=1.63) than mothers, and parents with a child aged 24-47 months old are more likely to read to their child than parents of younger children (M=5.00 vs. M=3.90). However, parents whose children are younger indicated that their children often flip through a book. Finally, mothers of children over 40 months old tend to have more books and thus provide more resources for reading in their household than those with younger children.

Table 2. Frequency of home learning activities related to reading

Home learning activities and socio-demographic factors	Male parent age (Mean)			Female parent age (Mean)		
(Parent's gender and child's age) N=324	1-23	24-47	>48	1-23	24-47	>48
How often do you read (e.g., book or a newspaper)?	3.20	3.25	3.47	3.52	3.49	3.49
How often does your partner read (e.g., book or a newspaper)?	3.30	3.50	2.84	3.24	2.98	3.01
How often do you read to your child?	3.90	5.00	4.21	4.36	4.33	4.47
How many books do you have in your household?	3.00	3.50	3.00	3.20	3.16	3.52
How old was your child when you first read to him or her?	1.80	1.28	2.21	1.52	1.66	1.55
How often does your child flip through a book?	4.05	4.50	4.32	4.52	4.38	4.36
How often do you visit a library with your child?	1.80	1.50	2.00	1.52	1.52	1.63
Overall	3.00	3.21	3.15	3.12	3.07	3.14

3.2. Frequency of other in-home learning activities (except for reading)

Among fathers who engage in other domestic activities besides reading with their children, most help their child to learn the alphabet. Fathers' involvement in teaching their children numbers or counting is lower as shown in Table 3. Parents' reports of the frequency with which their child draws or paints at home are rated high overall (M=4.05-4.79), while playing board games is not as popular with them. However, according to the data, the biggest difference between fathers and mothers is in the teaching of a song or poem. Fathers, in particular, rarely choose this type of interaction with their child at home. Mothers, on the other hand, indicated that they often engage in such activities and teach their child a song or a poem. Finally, mothers seem to be stricter when it comes to allowing their child spend time in front of the screen (mothers M=3.06–fathers M=4.15), while both mothers and fathers stated that their children do not watch too much TV (mothers M=3.94 – fathers M=3.60).

3.3. Frequency of out-of- home learning activities

The frequency of activities outside the family (e.g., sports) indicates that their involvement in experiences or activities outside the home was limited as presented in Table 4. Mothers indicate that they teach their child a sport, dance, or other physical activity (M=3.64), but they do not prefer to go out for entertainment. In particular, regardless of their gender or their child's age, parents do not often visit museums or go to the cinema. The frequency of theatre visits is slightly higher for both mothers and fathers, while the frequency of parents' participation in kindergarten meetings is higher (overall mean=2.62). Fathers whose children are 24-47 months old often discuss with their children, either during travelling (M=3.00) or when their children tell them their news (2.75).

Table 3. Frequency of other in-home learning activities (except for reading)

In-home learning activities (except for reading) and socio-demographic factors (Parent's gender and child's age) N=324	Male parent age (Mean)			Female parent age (Mean)		
	1-23	24-47	>48	1-23	24-47	>48
How often does your child paint or draw at home?	4.05	4.50	4.47	4.08	4.70	4.79
How often do you teach your child at home numbers or counting?	3.65	2.50	4.53	4.40	4.25	4.35
How often do you help your child at home to learn the alphabet?	4.55	5.00	4.11	3.52	3.38	4.02
How often do you teach your child any songs or poems at home?	1.85	1.00	1.58	5.04	4.84	4.54
How often do you use children's vocabulary in your conversation with the child?	3.65	4.25	3.74	1.56	1.43	1.24
How often do you play board games with your child at home?	3.65	3.75	3.32	2.64	3.33	3.34
How often does your child spend time in front of a screen (e.g., a tablet or a computer)?	3.90	4.25	4.32	2.80	3.25	3.15
How often does your child watch Tv?	3.50	4.00	3.32	3.72	3.83	4.27
Overall	3.6	3.65	3.67	3.47	3.62	3.72

Table 4. Frequency of out-of-home learning activities

Out-of-home learning activities and socio-demographic factors (Parent's gender and child's age) N=324	Male parent age (Mean)			Female parent age (Mean)		
	1-23	24-47	>48	1-23	24-47	>48
How often does someone at home teach the child a sport, dance, or physical activities?	3.50	2.10	3.36	3.88	3.55	3.50
How often do you go to the theatre with your child?	2.09	2.50	1.89	2.00	1.99	2.20
How often do you go to the cinema with your child?	1.50	1.65	1.86	1.84	1.53	1.75
How often do you visit a museum with your child?	1.90	1.50	1.73	1.64	1.77	1.77
How often do you talk to your child while traveling?	2.72	3.00	2.68	2.84	2.88	2.91
How often do you attend nursery school parent meetings?	2.5	2.75	2.47	2.72	2.61	2.72
How often does your child tell you about its day?	2.65	2.75	2.52	2.56	2.69	2.60
Overall	2.40	2.32	2.36	2.49	2.40	2.49

3.4. Correlations between parents' education level and home learning environments activities

Low but significant correlations between parental education level and reading activities and a low correlation for mother's and father's out-of-home educational activities (e.g. museum and theatre visits) were found, turning to the correlations between the variables of interest. The correlations between the parental education level and HLE process characteristics such as drawing or talking during a trip were low but significant. Furthermore, the correlations between the other variables and the parental education level were low and insignificant as seen in Table 5.

Table 5. Correlations between parents' education level and HLE activities

Predictors to Parent's education level N=324	Father' s education level	Mother' s education level
How often do you read (e.g., book or a newspaper)?	.148**	.117*
How often does your partner read (e.g., book or a newspaper)?	.106	.158**
How often do you read to your child?	.122*	.241**
How many books do you have in your household?	.136*	.130*
How old was your child when you first read to him or her?	.236**	.098
How often do you visit a library with your child?	.229**	.225**
How often does your child paint or draw at home?	.119*	.197**
How often do you go to the theatre with your child?	.165**	.104
How often do you visit a museum with your child?	.045	.157**
How often do you talk to your child while traveling?	.128*	.016

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The distribution was made according to the educational level of the mothers. The 324 participating parents reported the mothers' highest level of education from a five-point Likert scale covering the most common educational degrees in Greece. For start, there are no mothers with lower levels of education (primary). Therefore, the boxplots represent the distribution between mothers who have secondary, post-secondary, vocational and tertiary education. The average values for each level of education of mothers are as: 2.70 for secondary education, 2.93 for post-secondary education, 2.78 for vocational education (VET) and 2.80 for higher education as presented in Figure 1. Families with mothers' post-secondary education levels scored slightly higher than families with mothers educated in other way and families with less educated mothers scored the lowest.

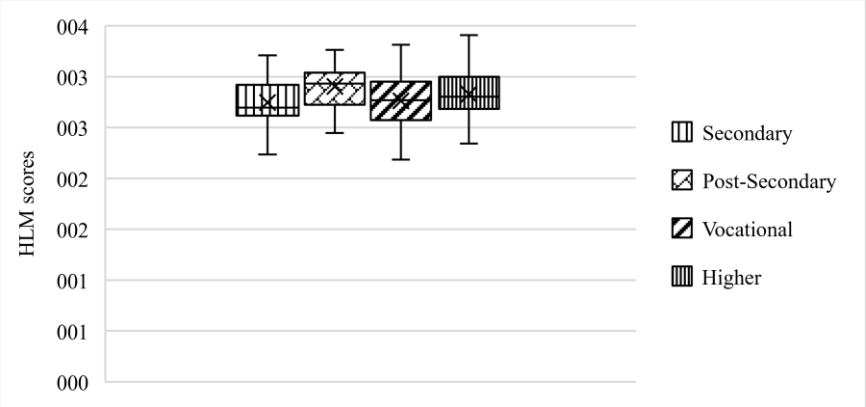

Figure 1. Box plots data of maternal education levels and HLM scores

Among mothers with secondary education, no one scored less than 2.24, as can be seen from the bottom whisker. The lowest 25% of the scores are associated with the value 2.62. The medium score is 2.70 and it is associated with the middle 50% of the group's scores. The top 25% of scores are between 2.92 and 3.21, as can be seen from the top whisker to quartile 3. The middle 50% of the values lies between 2.62 and 2.92. The median (quartile 2) is closer to the lower quartile (Q1), and along with the shape of the boxplot, the data set is skewed to the right. The interquartile range (IQR) is 0.3.

For mothers who have completed post-secondary education, the rectangle ranges from the first quartile, which is set at 2.76, to the top quartile, which is set at 3.03. The lowest 25% of scores are associated with the value 2.45. The middle value is 2.93 and the top 25% of the values are between 3.03 and 3.26 as can be seen from the top whisker to quartile 3. The middle 50% of the values are between 2.76 and 3.03. The median is closer to the upper quartile (Q3), indicating that the distribution is negatively skewed. The IQR is 0.27. The lowest 25% of VET graduates' scores are 2.18 and the higher at 3.32. The middle value is 2.78 and the top 25% of the values are between 2.95 and 3.32. The middle 50% of the values are between 2.58 and 2.95. The median is in the middle of the box and the whiskers are of equal length indicating normal distribution. The IQR is 0.37. Lastly, scores assessed from families consisted of mothers who have completed higher education, extend the rectangle from the quartile one which is set at 2.69, to the top which is set at 2.99. The lowest 25% of scores are associated with the value 2.34. The middle value is 2.80 and the top 25% of the values are between 2.99 and 3.41. The middle 50% of the values are between 2.69 and 2.99. The median is closer to the lower quartile (Q1), indicating that the distribution is positively skewed. The IQR is 0.3.

Recent research and scholars can thoroughly evaluate a wide range of home environment factors that prompt the study of parent-child interactions [1], [29]. Last decade findings link parental engagement and stimulating factors of the HLE to child cognitive development. The present research, thus, examined the frequency with which parents are involved with activities that create a positive and more stimulating learning environment for their children compared to parent's gender and level of education as well as child's age [30]. These socio-demographic factors were chosen as they were reported to influence parents' ability to stimulate their child's HLE [3], [11], [12], [15].

Overall, as for research question one, we found that the level of parental engagement in reading activities, in other activities at home and in activities outside the home did not depend on the gender of the parents. Male and female parents were moderately engaged in both at-home and out-of-home activities, but only marginally engaged in out-of-home activities. Thus, there is no socio-demographic factor that can determine the level of parental engagement in this study. In the study by Irawan *et al*. [8] the factors gender and education level had no significant influence on the intention to participate in compulsory, maintenance, and leisure activities. Moreover, in the present study participants' background characteristics were not related to specific processes in reading activities. For example, the reading habits of male and female parents are quite similar in terms of frequency and extent. Moreover, both male and female parents do not have enough books in their household for their child to read. They also do not visit the library often, so all this may not give children the support they need to benefit more from HLE [31].

There are numerous studies to have shown that parent-child reading can enhance the language skills of children who are about to enter the reading phase. However, it seems that parents of younger children show mediocre engagement in reading aloud. This is not stimulating for children, because the experience of reading together with parents, correlates with vocabulary knowledge at school and reading for pleasure [2], [10]. This is also shown by Krousorati [29], who reports that Greek families often choose literacy activities such as reading books together. However, there is some evidence in this study that parents do engage in some

other in-home activities. For example, they often teach their child the alphabet, which may help the child to read eventually. Nevertheless, they should not take on the role of teacher on a daily basis, as this quickly changes the dynamics of the parental relationship [13]. Some significant differences were found between male and female parents in such activities. In particular, mothers pay attention to teaching their child poetry or songs regardless of their age. Fathers, on the other hand, do not seem to care about teaching art. This difference in frequency is large regardless of the child's age.

Another process that seems to differ significantly between male and female parents is the vocabulary they use to talk to their child. Fathers use much more child vocabulary in their conversations with the child than mothers. Finally, differences in educational background do not seem to be matched by differences in the HLE. In the present study, mothers with high educational attainment scored slightly lower than mothers with post-secondary educational attainment. However, previous studies suggest that mothers' education indirectly influences the HLE by engaging in activities, providing learning materials and other parental behaviors that promote a positive learning environment [32]. Similar findings were presented by Lenes *et al.* [33] who argued that children with higher educated mothers were more likely to have higher vocabulary and math scores compared to children with less-educated mothers. However, the findings in the present study are smaller in primary educated mothers than higher educated.

The frequency of out-of-home activities in the current study, is low among both male and female parents, who do not seem to be interested in getting their child to engage in physical activities. None of the parents reported a high frequency of different types of activities that the child might have experienced. The decrease in parental free time due to multiple daily tasks, leads to a decrease in spontaneous play and its replacement by more structured activities within the home. In addition, there is a lack of places to play, especially in urban centers, while children's use of screens also has a negative influence [34]. Despite the benefits of enrichment activities such as going to the theatre, cinema, or museum [3], parents do not participate frequently. In the past, museums were considered boring places where only artifacts were on display and parents thought their children would be bored. Many parents are concerned about the age to start museum education in preschool, thinking that 3-year-olds will not understand the museum. An opinion likely to be influenced by the socio-economic level of the parents. In addition, for many parents the museum, the theater and the cinema are high-cost activities that they cannot afford [35].

The correlation between parents' educational level and frequency of participation in activities is not high, but it is considered significant as we interpret the data from the correlation variables to answer the second research question. The correlation between parents' educational level and frequency of participation in activities is not high, but it is considered significant as we interpret the data from the correlation variables to answer the second research question. However, the study we have presented has shown that parents' educational level has an impact on their beliefs, which influence the provision of learning opportunities and the quantity and quality of parent-child interactions that promote learning [36]. Cheung *et al.* [6] suggested that a stimulating HLE encompasses both the parents' general educational values and their views about a particular area of child development.

3.5. Practical implications

It is crucial that both educational practices and policies adopt a gender-neutral approach to family involvement, particularly in art and creative activities, thereby encouraging the active participation of both fathers and mothers in home learning activities. Moreover, teachers and schools should emphasize the importance of reading aloud to children from an early age, offering guidance to parents in establishing a literacy-rich environment at home to enhance parental engagement in reading activities. Policy measures can foster collaboration between schools and parents to support consistent in-home teaching activities by ensuring that books and library resources are readily accessible to all, thus promoting early childhood development. Furthermore, policies should address socio-demographic disparities by providing resources and support to families with lower educational backgrounds. Finally, to stimulate out-of-home activities, policies can allocate resources to make cultural and enrichment activities more accessible to all families, irrespective of their socio-economic status.

4. CONCLUSION

Further research could answer questions about children's academic performance or their social development as adults in relation to their HLE and parental engagement. Parent counselling could also be a way to train adults on how to provide a more stimulating learning environment for their children. Furthermore, it would be useful to create and implement new measurement instruments to better record and improve the HLE. In addition, improving the HLE could help parents implement more activities with a positive impact on their children's development.

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