Effectiveness of Dialogical Reading Literacy Programs in Improving Language Skills and Literacy of Early Students

Syarif Hidayatullah[*] , **Yeti Mulyati** , **Vismaia S. Damaianti**
and Tedi Permadi
Department of Indonesian language education,
Universitas Pendidikan Indonesia, Bandung, Indonesia

Abstract. Literacy programs for early childhood students are currently not optimal in involving parents in supporting program implementation. The purpose of this study was to investigate the effectiveness of the dialogical reading literacy program intervention on the development of language skills and literacy skills of early childhood students. The research method used in this study was a quasi-experimental method to test the effectiveness of a dialogical reading literacy program at home on language development and literacy in early childhood students. The 200 early childhood students participated in this study, and at the same time involved their parents. The duration of this study was one year so that the impact of this preschool-home partnership intervention could be seen more clearly. The instruments used in this study included a questionnaire to reveal students' reading habits with their families, language and literacy assessments, receptive and expressive vocabulary assessments, taxonomic ability assessments, print awareness assessments, and activity sheets for dialogic reading activities. Validity and reliability tests were carried out empirically. Data analysis in this study used a linear hierarchical model with two levels of random intercept. The research findings show that the dialogical reading literacy program has proven effective in improving students' reading skills and literacy. Overall improvement was seen in four aspects of students' language skills and literacy, namely skills of receptive vocabulary, skills of expressive vocabulary, skills of print awareness, and taxonomy skills. So, the intervention of dialogical reading literacy programs by involving parents in dialogic reading activities is very effective in language development and early childhood literacy. This happens because there is mutual trust, a positive relationship between mentors and students, clear and focused goals, and is balanced between stimulus and response. The implication of this research is that parents must be active in carrying out reading activities together with their children to support language and literacy

[*]Corresponding author: Syarif Hidayatullah; syarifbahagia@upi.edu

development, so that they are better prepared when they enter a school age.

1. Introduction

Parental involvement in supporting students' academic achievement is a very important component. The involvement of parents has also been initiated for a long time in supporting several literacy programs that are usually carried out for early childhood students (Sampa et al., 2018; Walgermo et al., 2018). Most of the programs for early childhood students involving parents of students have a significant impact on the success of the program. Parental involvement in this program may have an indirect effect in changing parental views and people's habits, as well as having a direct effect on early childhood students. The involvement of people in early childhood education programs is a correlation between the two microsystems to support developments in the lives of early childhood students (Thomas et al., 2020; Wood, 2021). Optimizing the potential for early childhood development can be done by establishing a relationship between parents and children so as to create mutual trust, a positive impression, clear goals, and a responsive relationship. Parental involvement in optimizing early childhood students has become one of the accreditation criteria at the kindergarten education level (Bean et al., 2020; Hadianto et al., 2021a). However, research on the role of parental involvement in helping to optimize the development of early childhood students is still limited. The majority of studies on the role of parents are seen from the correlation between socio-economic status, educational level of parents, and parenting style on early childhood cognitive development (Incognito & Pinto, 2023; Thomas et al., 2020).

Although these correlational studies are vital, they are not optimal in seeing parents as a very important factor in supporting the potential development of early childhood, for example the role in strengthening basic or emergency literacy, strengthening early reading skills and basic numeracy. These abilities are often the main focus that is strengthened for early childhood students so that they are better prepared for when they enter school age (Esmaeeli et al., 2019; Krijnen et al., 2020). There is still little research that examines the causal relationship of the role of parents in supporting literacy skills and language skills of early childhood students. Therefore, through this study, researchers tested the role of parental involvement in carrying out dialogic reading activities on the development of students' literacy skills and language skills in general. To find out the effectiveness of the role of parents on language skills and literacy, an experimental design with random data collection is needed.

Most previous research still involved a relatively small sample of less than 100 students. The majority of the reading interventions had not used dialogic reading interventions, the research design only investigated the relationship between literacy skills and students' affective, gender, and socio-economic status. The difference between this study and previous research lies in the dialogic reading intervention involving parents, a fairly representative sample, and sufficient

duration of the intervention. In addition, the abilities investigated are not only literacy skills, but also include language skills and emergency literacy which are needed by young students. Language skills and literacy assessed in this study were more compared to previous studies, which only focused on one ability. Involving several abilities in research is done so that research findings reveal more complex aspects of language skills and literacy which can be improved through dialogic reading activities. So, this research adds new findings in the field of early childhood literacy.

2. Literature Review

2.1 Involvement of the role of parents in early childhood education programs

Several previous studies confirmed that the role of involving people in supporting early childhood education programs can be carried out in several ways, namely communication between teachers and parents about students, volunteering to teach in class, and carrying out certain activities at home in support of educational programs, such as literacy programs (Gasser et al., 2022; Lepola et al., 2023; Piasta et al., 2020). The role of parental involvement in supporting a program is a form of intervention that can be carried out to support the success of the program. This has been proven in several previous studies, which confirmed that it has a positive relationship in supporting several reading programs that have been carried out in various countries, such as the US, Korea, Japan, and Finland (Nevo & Vaknin-Nusbaum, 2018; Niu et al., 2021; Wood, 2021). Most of the parental support for the implementation of early childhood education programs is carried out at home with prior debriefing (Lepola et al., 2023; Piasta et al., 2020). Parents who are involved in early childhood education program activities will receive work instructions to be carried out while supporting children at home (Nevo & Vaknin-Nusbaum, 2018; Niu et al., 2021). The current research differs from previous research, in that it emphasizes direct parental training rather than the introduction of interventions. Research when researchers utilize the abilities and relationships between parents and teachers, where the role of parents is the main intervention through dialogic reading activities with an introduction to the benefits of children's literacy and language development. Through this method, external validity is maintained and practical.

2.2 Dialogical reading intervention in early childhood students

The development of spoken language skills will begin rapidly when they start to enter the age of 2-5 years, but indeed every child will experience developmental differences depending on their environment (Lucas et al., 2021; Meng, 2021). The difference in the development of this ability is of course caused by the experience the child gets from his family environment and the early childhood programs he has received. One of them is a literacy program that can optimize literacy skills at that time and is able to predict abilities in the future. The role of parents in supporting early childhood education programs is effective, even though it takes a relatively short time and has been proven in several reading education programs with various methods of support from their parents (Jung, 2019; Lenhart et al., 2022; Morgan & Meier, 2008). Several previous studies have confirmed that a literacy environment created at home with various methods (narrative activities, interactive reading activities, listening activities, etc.) can facilitate students to

acquire literacy and language skills (Huennekens & Xu, 2016; Jones & Christian, 2021). Dialogical reading activities are used as a form of activity that can be carried out by parents in supporting the optimization of language development and emergency literacy of early age students (2-6 years) (Elek et al., 2022). In dialogic reading activities, the role of students changes from their role as passive listeners to active readers and creators of story meaning (O'Sullivan, 2021).

In dialogic reading activities, parents can use several strategies or techniques while reading, for example, by asking short questions, giving opportunities to retell, asking to give examples, asking to explain the meaning of vocabulary, etc (Edwards-Groves & Davidson, 2020; O'Sullivan, 2021). The vocabulary that is usually used to optimize students' language skills and literacy is receptive vocabulary. Students who receive interventions for reading books with their parents tend to have better language and literacy skills than students who have never read books with their parents (Bowling & Cabell, 2019; Cameron et al., 2019). Students who initially had low reading skills and low language development experienced very rapid development after receiving intervention through reading books with their parents at home. The difference between the current research and previous research lies in the intervention of dialogic reading activities carried out by parents, in order to improve the language skills and literacy of early childhood students during one year of education in kindergarten (Eviatar et al., 2018; Hannon et al., 2020). Teaching reading activities according to procedures to parents of students is carried out using a diffusion approach through various strategies including bulletins, communication between teachers and parents, information leaflets for parents, and parent education at school (Hadianto et al., 2021b; Zettler-Greeley et al., 2018). The intervention used in this study adopts Bronfenbrenner's theory, which states that parental involvement in early childhood education can support more optimally in developing students' potential language skills and literacy (Simpson et al., 2020; Zhang et al., 2020). So, the purpose of this study was to test the effectiveness of the partnership by involving parents in dialogic reading activities to improve language skills and early literacy of early childhood students.

3. Methodology
3.1 Research Design
The method used in this study is an experimental method with a quasi-experimental design to test the effectiveness of partnerships, by involving parents in dialogic reading activities to improve language skills and early literacy in early childhood students (Kim, 2011; O'Sullivan, 2021). The experimental group received the intervention of dialogic reading activities with parents, while the control group did not receive the intervention. This dialogical reading literacy activity is carried out in the context of implementing a family literacy program in supporting the development of early-age students' literacy skills.

3.2 Participants
The participants involved in this study totalled 200 early childhood students who were grouped into two groups, namely the experimental group and the control group. The sample selection was carried out randomly from several kindergartens in the Jakarta area, Indonesia. There are several criteria in selecting the

kindergartens involved in the research, namely the profit and non-profit status of the institution and the accreditation status. This dialogical reading literacy program is carried out in families who have low to middle socio-economic status, students who have poor reading ability scores, parents' educational degrees are at the secondary and undergraduate levels, and a low intensity of reading books together or telling stories with parents. The gender percentage of participants involved was 45% male and 55% female. Each parent filled out a willingness to be involved in this dialogic reading literacy program. The involvement of students and parents in this research was voluntary. Sampling indicators in this study are presented in table 1. Students involved in this study were in the 3-4 years age range.

Table 1: Sampling

Sample grouping factors	Number of certified early childhood education	Contacted educational program	Recruited education program	Experiment group: Students	Control group: Students
Low socio-economic status Not accredited	7	5	0	0	0
Low socio-economic status/Not accredited	4	3	3	1 (15)	1 (20)
Medium or high socio-economic status/ Not accredited	9	7	4	2 (15)	3 (25)
Middle or high socio-economic status/Not accredited	10	7	4	3 (20)	4 (20)
Middle or high socio-economic status /Accredited	15	11	5	4 (50)	4 (35)
Total	465	33	16	10 (100)	5 (100)

3.3 Intervention

The teachers involved in this study received training workshops on students' language development. The teacher's role in this study was to assist in the implementation of interventions that guide students' parents in implementing dialogic reading literacy programs, so that they need to be equipped with the technical implementation of literacy programs through workshops. The training workshops include activities to develop language skills and literacy, instruction on methods that can be used to support the development of language skills and literacy in early childhood students, dialogic reading methods, demonstration models of dialogic reading activities through video and practice. The two groups (experimental and control) received the same book to use while receiving the dialogic reading activity intervention with their parents. The duration of the implementation of this dialogic reading activity is carried out for a year. Furthermore, teachers who are in charge of accompanying parents and students who are included in the experimental group receive additional workshops on involving parents in this dialogic reading activity. This teacher accompanies

parents to carry out dialogic reading activities. The assistance is carried out through providing books to be used, distributing bulletins, parent-teacher meetings, parent workshops on dialogic book reading activities, and communication and monitoring. Dialogical reading activities are carried out by parents of students during the intervention according to procedures that have been instructed by the teacher. Teachers are also given guidance in carrying out dialogic reading activities and guidelines for practicing new vocabulary for students. The guide contains steps and question strategies that can be used to build interactive dialogues during group reading activities. Parents of students whose children were in the control group were only given instructions to read the same story book for 20-30 minutes each day. All participants involved in the research were carried out voluntarily and without coercion.

3.4 Research Instrument and Data Collecting

Several assessments were carried out to investigate students' initial abilities and literacy habits experienced by students in their families. The assessment was carried out on the character and habits of literacy in the family, language skills and literacy, ability to master receptive vocabulary, expressive vocabulary, taxonomy skills, and print convention skills.

3.4.1 Family literacy characters and habits

To investigate the literacy habits and characters of families, the researcher adopted Stony Brook's survey of family reading activities (Whitehurst 1992). This questionnaire survey uses a Likert scale consisting of 45 items that include family demographics, reading practice habits, and reading attitudes. Parents of students were asked to complete the questionnaire so that the data was valid. Examples of questions used in the questionnaire include a) What is the highest educational level of the student's parents? b) What is the intensity of reading books together with you in a week? c) How many minutes of time are used for reading activities in a day?

3.4.2 Assessment of language skills and literacy of early childhood students

Prior to the intervention phase, the researcher collected data on students' language skills and literacy at each kindergarten. Initial data collection was carried out for 2 weeks, and then intervention was carried out for two semesters of kindergarten education. After the intervention, a posttest was carried out to see the results of the intervention and finally a follow-up test was carried out after the posttest with an interval of two weeks after the posttest was carried out. This initial ability test is carried out on emergency language skills and literacy needed by early childhood and is not tied to other variables. The initial ability test was carried out for 30 minutes for each student. Some students are able to complete in one visit, some others require up to two visits. All students who participated in this study were able to complete the initial proficiency test, although some of them required two visits to their educational institutions.

3.4.3 Assessment of receptive vocabulary skills

Assessment of students' receptive vocabulary skills was carried out using a test adopted from the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn 2007). In this test, students are asked to show some objects using pictures. The raw scores generated in this test are adjusted to the percentile ranking of students in the

student population in Jakarta, Indonesia. Based on the results of the analysis of the reliability score of this test, a score of 0.94 was obtained, and the average reliability score among the assessors before data collection was carried out, was 0.96 Cohen's Kappa in all pairs tested by 10 examiners. The reliability score range is 0.89-0.99. Furthermore, the Reliable Change Index (RCI) score is 2.35 which is greater than the reliable score at the pretest. This reflects that the intervention received by early childhood students has a significant impact on change.

3.4.4 Assessment of expressive vocabulary skills
Expressive vocabulary skills were assessed using Gardner's Expressive One Word Picture Vocabulary Test (2000). This test is carried out by instructing students to name objects from the pictures they have obtained. The raw score generated through this test is adjusted for the age percentile level of students in the population. Furthermore, from the results of the analysis, the reliability score of this test is a raw score of 0.96, and a standard score of 0.98. Reliability scores between testers get an average score of 0.99 Cohen's Kappa on all assessors with the lowest score range to the highest 0.96-1.05.

3.4.5 Taxonomy Ability Assessment
Taxonomic ability is the student's ability to classify objects in the student's superordinate group. Students implicitly have the ability to organize noun meanings based on categorical relationships. In addition, vocabulary skills at an early age also have a correlation with taxonomic organizational abilities in cognitive learning. Taxonomic ability was assessed using expressive vocabulary ability tests. Taxonomic ability was assessed using the same test that was carried out on the expressive vocabulary ability test, namely the Expressive One Word Picture Vocabulary Test. This test provides several images that require students' taxonomy abilities. Students are given several pictures such as tigers, wolves, elephants, etc. and students are asked to name the word that represents the group of animals. The percentage of students' correct answers analyzed were those that required taxonomy skills. The Reliable Change Index score for this assessment (RCI) is 4.3, which has a relatively higher value than the pretest score of 1.88. This means that the intervention has a significant impact on change.

3.4.6 Print Awareness Capabilities
Print awareness ability is the ability of students to understand the nature and procedures of using books or other prints. This ability to print was assessed using Story and Print Concepts and a survey of the experiences of students and their parents using print conventions. In this test, students are asked to demonstrate procedures for using books starting from showing the cover of the book and further reading instructions. There are 10 items for this survey. The internal reliability score in this test was 0.76, the reliability score between Cohen's Kappa assessors at the time of data collection got an average score of 0.95. The range of reliability scores is in the range of 0.91-0.97 scores for all test pairs. The Reliable Change Index (RCI) score in the post-test phase was 3.03, which was relatively higher than the reliable score of 1.98 in the pre-test phase, which means that the intervention had a significant impact.

3.4.7 Dialogical Reading Activity Provisions

In the post-test phase, the assessment of dialogic reading ability was carried out through retrospective reports, conducted by parents of students in the treatment group and teachers in both groups. Report items use a Likert scale with a five-point scale to assess the frequency of dialogic reading activities during the last one week at the time of the intervention. Frequency point scale, namely point 1: not doing, point 5: more than 5 times a week and an average of 3.80 with a range of points 2-5.

3.5 Data analysis

Data analysis in this study used a linear hierarchical model with two levels, namely random intercept and t test. The t test was used to test the effectiveness of the dialogical reading literacy program intervention in early childhood students. To find the increase in students' emergency literacy skills, the variable level of literacy ability at the pretest stage and the marital status of parents were used as control variables. Pre-test scores and parents' marital status were also used in covariate analysis, because they had correlations with several independent variables. The linear hierarchical model was used to determine the correlation between dependent and independent variables that influence each other and contribute to language skills and literacy of early students.

4. Results

4.1 Initial ability of the students

To find out the initial ability in both groups, a pre-test was carried out. The results of the survey test on the characteristics and habits of family literacy and the pre-test scores of the two groups are compared to those presented in table 2. In addition, comparisons were also made on the results of the T-test. From the results of the T-test, no significant difference was found between the two groups with an alpha level of 0.22. From the results of the initial analysis, there are several variables that have a strong and consistent correlation, namely language skills in the pre-test phase. Based on the results of the analysis, the marital status of students' parents has a relationship with language skills and other variables such as parents' education level, socio-economic status, and the number of books frequently used at home. Therefore, these variables are used in covariate analysis to minimize missed variances in the analysis model.

In the pre-test phase, the data in the two groups are certainly not too different. Based on the results of the analysis in table 2, there was no significant difference found in the SES variables (parental education, parental income, and use of picture books in dialogic reading activities). There was a slight difference, students who lived with complete parents did more reading together every year at around 62, compared to parents who were incomplete due to separation or death, namely only 38% of the intensity of reading books together with them. The level of random intercept is appropriate if only using the level one predictor, because it is used to test differences in the treatment group. The pre-test value of literacy skills and the effect of dialogic reading on the post-test phase was used as a predictor variable to address this objective of learning.

Table 2: Differences in the experimental and control groups

Variable	Treatment group (n = 100)	Control group (n = 100)	t	P
Student characteristics				
Age of student (in months)	37.58	38.90	.85	ns
Percentage of male students	45%	54%	.13	ns
Percentage of students with a full day of education	50%	68%	.18	ns
Characteristics of family				
Activities of family literacy	3.40	3.51	.46	ns
Book at home	4.82	4.80	.43	.ns
Number of children living in the house	2.05	2.20	.48	ns
Highest education of parents	5.21	6.12	−.52	ns
Annual income	5.89	6.23	.52	Ns
Percentage of parents who are married	90%	83%	.75	ns
Pre-test score				
Receptive vocabulary skills	115.71	114.42	−.50	ns
Expressive vocabulary skills	104.65	103.50	−.01	ns
Print Awareness capability	4.62	4.89	.70	ns
Taxonomy capabilities	18.92	25.23	1.20	ns

4.2 Dialogical reading skills

In the post-test phase, both parents of students who were included in the experimental group and teachers filled out a survey of retrospective questions to find out the frequency of using dialogic reading in the last week of the post-test phase. From the results of this survey, parents of students in the experimental group had a better frequency of using dialogic reading compared to the control group. Parents of students in the experimental group took books out of the house more often. From the results of the report, the parents of the students in the experimental group at least did the dialogue reading activity 4 times and at most 7 times a week

Table 3. Development of students' language skills score in each phase

	Skills of Receptive vocabulary	Skills of Expressive vocabulary	Print awareness	Taxonomy skill
Pre-test (n = 100)				
Experiment group	114.25 (9.89)	105.12 (12.44)	4.31 (3.10)	20.89 (21.31)
Control group	113.60 (13.03)	104.32 (11.32)	4.80 (3.52)	23.62 (21.06)
Post-test (n = 100)				
Experiment group	120.21 (13.32)	107.80 (11.67)	5.62 (3.68)	25.80 (20.10)
Control group	114.61 (14.44)	105.90 (12.34)	5.61 (3.51)	15.14 (14.70)
Follow-up (n = 200)				
Experiment group	135.50 (12.91)	114.10 (14.50)	7.02 (3.41)	43.21 (23.89)
Control group	120.40 (14.10)	107.90 (16.05)	5.72 (3.52)	26.32 (24.90)

The assessment results for the three phases of pretest, posttest, and follow-up of language skills and literacy in each group are presented in table 3. The scores for language skills and literacy in the posttest phase are contrasted in the table to see the differences in each phase. A hierarchical linear model analysis was used to investigate the effect of a dialogical reading literacy program intervention through accompanying parents at home. The hierarchical analysis model with two random intercept levels was used for students at level 1 and level 2. This analysis was used to control for dependency because the samples were taken from the same level. In addition, hierarchical analysis was also used to examine differences in abilities in each group using the appropriate analysis. Pre-test scores of language skills and parents' marital status as control variables were used as predictors for language skills in both the post-test phase, and the follow-up phase.

Table 4: Results of the linear model analysis of the effect of the intervention on language skills in the post-test phase

Stable effect	Skills of Receptive vocabulary			Skills of Expressive vocabulary		
	B	SE	t	B	SE	t
Intercept	37.30	13.91	3.90*	34.60	8.42	5.48**
Level 1 (student level)						
Pretest score	0.72	0.13	6.51***	0.70	0.08	9.50***
Marital status of students' parents	5.20	3.71	1.53	8.06	3.63	3.80**
Level 2 (program level)						
Homework conditions	5.13	2.70	1.61	4.89	3.08	1.82†
Random effect	Variance	Variance				
Variant of program residuals	4.51	4.16				
Child residue variant	92.40	40.10				
Fixed effect	Print awareness	Taxonomy skill				
	B	SE	t	B	SE	t
Intercept	1.51	0.80	1.80	0.04	6.80	0.005
Level 1 (student level)						
Pre-test score	0.72	0.12	6.50***	0.25	0.14	3.07*
Marital status of students' parents	0.98	0.73	1.42	12.70	7.25	1.90†
Level 2 (Program level)						
Homework assignment conditions	0.40	0.60	0.70	12.30	4.63	3.75*

Random effect	Variance	Variance
Variant of program residuals	0.31	0.36
Child residue variant	3.40	289.70

†p < .10. *p < .05. **p < .01. ***p < .001

Table 5: The results of the analysis of the linear model of the effect of the intervention on language skills in the follow-up phase

Fixed effect	Receptive vocabulary skills			Expressive vocabulary skills		
	B	SE	t	B	SE	t
Intercept	33.45	16.60	3.09 *	20.80	13.51	2.61
Level 1 (student level)						
Pretest score	0.72	0.17	4.91***	0.8	0.14	6.90***
Marital status of students' parents	5.70	4.16	1.40	9.10	4.30	2.15*
Level 2 (program level)						
Homework conditions	9.36	4.3	4.01*	5.80	3.08	1.90 +
Random effect	Variance	Variance				
Variant of program residuals	4.60	5.30				
Child residue variant	105.40	82.50				
Stabel effect	Print awareness	Taxonomy skill				
	B	SE	t	B	SE	t
Intercept	1.20	0.81	1.45	−0.80	9.10	−0.09
Level 1 (student level)						
Pretest score	0.82	0.15	7.15***	0.40	0.20	2.70*
Marital status of students' parents	0.90	0.75	1.25	18.31	9.51	3.05*
Level 2 (Program level)						
Homework assignment conditions	2.04	0.60	3.60**	23.90	6.62	4.62**
Random effect	Variance	Variance				
Variant of program residuals	0.25	4.50				
Child residue variant	2.80					

*p < .05. **p < .01. ***p < .001

Analysis using a hierarchical model was used to determine the effect of the treatment on the four language skills and initial literacy, namely receptive vocabulary, expressive vocabulary, print awareness, and taxonomy skills. The

results of the analysis of the effect of the intervention in the post-test and follow-up phases are presented in table 4 and table 5. The coefficients in the table are used as predictor metrics at level 2 which correspond to the effect on the experimental group because natural effects in hierarchical analysis have no natural effects. Based on the results of the analysis, the coefficients describe the change in each unit in the results of the intervention. So, the increase in the unit of language results is interpreted in the form of a distribution by dividing the coefficient value by the standard deviation for each language ability and literacy pre-test score. Based on the results of the analysis in tables 4 and 5, it shows two estimates of variance, namely the residual variance of the dialogic reading literacy program and the residual variance of students.

4.3 Students' language skills and literacy in the posttest phase
Based on the results of the analysis in table 4, the dialogic reading literacy program has a significant impact on the results of students' language skills and literacy. One of the most visible improvements in language skills is taxonomy skills. The ability to understand taxonomy words increased with an average of 12.28, and a standard deviation of 0.59 compared to the control group. The pre-test score at factor level 1 appears to be the strongest and most consistent predictor of language skills in the posttest phase. Furthermore, after considering variables at the student level and treatment conditions, there were no other significant variables in the program. Furthermore, based on the results of the analysis, the intra-class correlation for each variable is relatively small which indicates that students in each group have different language skills, but there is a slight difference in the average score between the dialogical reading literacy program and the kindergarten education program.

4.4 Students' initial language and literacy skills in the follow-up phase
To find out the effect of the intervention more comprehensively, the researcher re-tested the students' language skills and literacy in the follow-up phase. By controlling for each student's pre-test score and the marital status variable of the student's parents, the results of the analysis show that students' language skills and literacy are able to predict a significant increase in three of the four aspects of students' language ability and literacy, namely receptive vocabulary skills, print awareness skills, and taxonomic abilities. The score of improvement in aspects of receptive vocabulary has increased with an average score of 9.40 (representing a change with SD 0.86, an increase in the print awareness ability score of 2.05 with an SD of 0.86 represents an increase, then an increase in the taxonomy ability score is 22.85 with an SD of 1.10 representing a change, and the vocabulary ability score receptive experienced a not too significant increase of 5.80 with SD 0.48 representing a change (p=0.09). All improvements in each aspect of language were higher than the control group. Apart from these variables, there were no other variables which experienced a significant increase in the garden education program. In this case, the intra-class relationship for each variable considered is quite small, indicating that the students' language abilities are quite diverse.

Table 6: Results of hierarchical linear model analysis of the impact of literacy levels on results in the posttest phase

Stable effect	Skills of Receptive vocabulary			Skills of Expressive vocabulary		
	B	SE	t	B	SE	t
Intercept	128.18	1.40	92.42***	113.87	2.35	55.93***
Level 1 (Students level)						
Initial early literacy level	−15.73	1.90	−7.83***	−13.60	2.51	−5.10***
Chance effect	Variance	Variance				
Program residual variance	8.29	13.71*				
Students residual variance	80.42	60.80				
Fixed effect	Print awareness	Taxonomy Skill				
	B	SE	t	B	SE	t
Intercept	7.10	0.64	10.90***	30.88	5.21	8.42***
Level 1 (Students level)						
Initial early literacy level	−2.50	0.71	−3.80**	−7.06	5.88	−1.20
Chance effect	Variance	Variance				
Program residual variance	0.98*	0.40				
Students residual variance	4.30	384.89				

*p < .01. *** p < .001

4.5 Follow-up test of moderating the impact of the intervention on students' language skills and literacy

The moderation test uses a linear hierarchical random intercept model involving explanatory variables at the micro level. At level 1, the predictor variables used were language skills and initial literacy in the post-test phase of students. Language and literacy abilities in the pretest phase were divided into high literacy groups and groups of students who had low literacy with a median split (1: for low literacy, 0: for high literacy presented in Tables 6 and 7). To investigate the after-effect of this literacy level using a dummy variable. The test results showed that students with high language and literacy levels experienced an increase with a greater average in the posttest phase. The increase in the group of students whose literacy was high in every aspect was the receptive vocabulary aspect of 15.73 with SD 1.24 increase, the expressive vocabulary aspect 13.60 with SD 1.18 increase, and the print awareness aspect of 2.50 with SD 0.95 increase in the posttest phase. From the results of the moderation test analysis, taxonomic abilities did not show a significant increase based on language skills and literacy levels. In the post-test phase, the variables that looked significant were aspects of receptive vocabulary ability and print awareness ability with (p <0.05). The intraclass relationship in each outcome variable is 20% for aspects of receptive vocabulary and print awareness abilities. This indicates that the abilities of the students in each group were not much different between students who received reading instruction from their kindergarten and those who received the intervention in the dialogical reading literacy program (presented in table 6).

Table 7: Results of hierarchical linear model analysis of the impact of the initial literacy level on the results of language skills and literacy in the follow-up phase

Stable effect	Receptive vocabulary skills			Expressive vocabulary skills		
	B	SE	t	B	SE	T
Intercept	140.30	2.81	50.61***	120.41	4.50	35.20***
Level 1 (Students level)						
Initial early literacy level	−18.13	4.62	−5.91***	−15.60	5.32	−2.80*
Chance effect	Variance	Variance				
Program residual variance	0.91	0.40				
Students residual variance	89.85	156.21				
Stable effect	Print awareness	Taxonomy Skill				
	B	SE	t	B	SE	t
Intercept	7.82	0.80	11.30***	52.10	7.52	8.91***
Level 1 (Students level)						
Initial early literacy level	−3.90	0.70	−4.20***	−13.81	9.30	−1.40
Chance effect	Variance	Variance				
Program residual variance	2.52**	0.62				
Students residual variance	2.52	489.33				

*p < .05. **p < .01. ***p < .001

The same findings in the group of students who have high literacy language skills in the follow-up phase show a large average increase in each aspect (presented in table 7). This increase was seen in the receptive vocabulary aspect of -18.13 with an increase in SD of 1.35, expressive vocabulary ability of 15.60 with a change in SD of 1.02, and print awareness ability of 3.90 with an SD change of 1.17. In the significant phase, the variable that appeared significant in the education program was print awareness ability (p <0.01). The intra-class relationship on this variable is 50%, which indicates that students' abilities are not much different. Furthermore, there is a large difference between the impact of the kindergarten education program and the results of the dialogical reading literacy program intervention. So, students who had good language skills and literacy experienced a more significant increase than the group of students with low initial language skills and literacy in the post-test and follow-up phases.

4.5 Student family literacy activities and rate of use of dialogic reading program
To investigate the role of students' family literacy activities, researchers used a random intercept model of a hierarchical linear model at the same two levels involving micro-level explanatory variables. The pre-test score resulting from the family literacy activity survey was used as a predictor variable at level 1. In the post-test phase, the family literacy activity score increased for every one pound, with an average of 3.40 on a print awareness ability scale. Other abilities did not show a significant increase based on family literacy activities. Furthermore,

during the follow-up phase, no significant impact was found from aspects of family literacy activities on language skills and literacy. To measure the frequency of using dialogic reading during the intervention, the researcher used a random intercept model of a two-level hierarchical linear model involving micro-level explanatory variables used as predictor variables. The impact of the frequency of use of dialogic reading during the intervention on language skills and initial literacy in the post-test and follow-up phases of the experimental group was investigated using a linear hierarchical model analysis test. From the results of the analysis, parents of students who intensely use dialogic reading during the intervention have a significant impact on students' language skills and literacy, compared to parents who rarely do so during the intervention.

5. Discussion

This study examines the effectiveness of the dialogical reading literacy program intervention by involving parents of students on the development of language skills and literacy in early childhood students. The involvement of parents in this program uses a train-the-trainer approach for the diffusion of the use of dialogic reading by parents of students. Workshop debriefing was carried out for kindergarten teachers to be conveyed to the parents of students while at the same time providing assistance to the dialogical reading literacy program carried out by parents of students to their children involved in research (Hooper et al., 2020; Huennekens & Xu, 2016). The general research findings indicate that there is a significant impact of the dialogical reading literacy program on language skills and initial literacy of early childhood students. The increase in language skills and literacy in four aspects was significant from the pre-test to the post-test, then three of the four aspects experienced a significant increase in the follow-up phase. These findings indicate that the dialogic reading literacy program intervention had a significant impact on students' language skills and literacy even after the intervention was completed (Meng, 2021; Morgan & Meier, 2008). The findings still increased students' abilities in the follow-up phase because during the intervention parents intensively used their verbal abilities when carrying out dialogic reading activities. This made the parents' verbal abilities increase and automatically without coercion, the parents of these students voluntarily built the habit of dialogic reading activities even though the intervention phase had ended (Lepola et al., 2023; Olszewski & Cullen-Conway, 2021). This dialogic reading activity builds active interaction with their children which in the end students' language skills and literacy also increase and even stabilize over a long period of time (Faulk, 2018; Hooper et al., 2020). So, this dialogical reading literacy program not only improves students' language skills and literacy, but also trains the verbal abilities of students' parents so that a more intensive habit of reading books together at home is created.

The effect of the intervention in this study revealed a wider variance in language skills and initial literacy, than some previous studies that focused only on abilities such as early childhood executive functioning abilities or vocabulary mastery abilities. This study proves that dialectical reading literacy programs can increase students' linguistic awareness in general to prepare students to enter school age (Cameron et al., 2019; Hannon et al., 2020). The dialogic reading literacy program is one of the comprehensive programs in developing early-age students'

emergency literacy skills, which become the basic foundation for students to develop and become a tool for accessing more complex knowledge (Barone et al., 2019; Bean et al., 2020; Westerveld et al., 2020). This research strengthens previous research that tested the effectiveness of dialogic reading strategies, but applied by non-parent teachers (Hadianto et al., 2022; Mansour, 2020; Simpson et al., 2020). The findings of previous research also proved to be effective in increasing students' language skills and literacy, but this increase did not occur in the follow-up phase because the habit of reading together with parents at home was not formed (Mansour, 2020; Zhang et al., 2020). In contrast to this study, which involved parents in the program, they were indirectly able to form the habit of reading books together even though the intervention phase had been completed. This is evidenced by the stable and even increasing skills of language and literacy in the follow-up phase.

The increase in students' language skills and literacy as a result of the intervention with a standard deviation of 0.48-1.10 represents an effect size in the moderate to high effect range. To analyze these findings, students in the experimental group were able to improve their receptive vocabulary skills with a standard deviation of 0.90, which had a higher score than the control group. According to Krijnen et al., (2020); Walgermo et al., (2018), student's receptive vocabulary skills can be increased within a span of 4 months using dialogical reading literacy program, which is faster than the students without dialogic reading intervention. One aspect of language that showed the most significant difference was the difference between the experimental and control groups, but this difference was equivalent to a standard deviation of up to 0.48. This means that the treatment group experienced faster development of their language skills than the control group. Based on these findings, the impact of the dialogic literacy literacy program initiated by this researcher by involving parents of students had a stronger impact compared to previous research which only relied on the role of early childhood education teachers (Barone et al., 2019; Edwards-Groves & Davidson, 2020). The finding of this strong impact is in accordance with the theory from Bronfenbrenne (1979), which states that the potential for the development of this mesosystem will be more optimal if there is mutual trust, has a positive relationship between chaperone and student, is goal oriented, and is balanced between stimulus and response (Bowling & Cabell, 2019; Huennekens & Xu, 2016). Positive relationships such as mutual trust, balance in providing stimulus and response, and goal-oriented can be created by individuals who have positive attachments, for example parents and students. The role of parents in accompanying their children is optimized through informal communication with teachers during the intervention phase. This is consistent with the theory that communication between parents and teachers will be more effective in supporting the development of early childhood students (Faulk, 2018; Meng, 2021; Morgan & Meier, 2008).

6. Conclusion and implications

Dialogical reading literacy programs have proven effective in improving students' reading skills and literacy. Overall improvement was seen in four aspects of students' language skills and literacy, namely skills of receptive vocabulary, skills of expressive vocabulary, skills of print awareness, and taxonomy skills. The role

of parents in this dialogical reading literacy program is effective because there is mutual trust, a positive relationship between mentors and students, is goal oriented, and is balanced between stimulus and response. The implication of this research is the need for parental support in developing the potential of early childhood, especially in developing basic competencies and main competencies that need to be possessed by early childhood. In addition, early childhood education institutions must coordinate with parents of students on a regular basis to monitor the development of students' literacy and academic abilities, collaboration between teachers and parents of early childhood students will be more optimal to develop language skills, literacy and other cognitive abilities what students really need.

7. Limitation and Recommendation

This study has several limitations, including samples that have not accommodated various groups of families, only focusing on families who have middle to low socio-economic status, sampling areas that are only from certain areas, retrospective self-reports that report the intensity of using dialogic reading may not be enough to monitor, not paying attention to gender variables in the data analysis which might affect the results, and competence only focuses on language skills and literacy. Based on the deficiencies of the study, the researcher recommends several things for further research, including the selection of samples that must be more complex from various socio-economic status groups, students must be taken from various regions that may receive different early childhood education programs, self-reports for supervision during interventions need to be complemented by other methods such as supervision through filling out more comprehensive forms, involving gender in data processing to see the role of gender, and targeted competencies that can be expanded to a cognitive level that may have a relationship with language skills and literacy.

8. References

Barone, C., Chambuleyron, E., Vonnak, R., & Assirelli, G. (2019). Home-based shared book reading interventions and children's language skills: a meta-analysis of randomised controlled trials. *Educational Research and Evaluation*, *25*(5–6), 270–298. https://doi.org/10.1080/13803611.2020.1814820

Bean, A. F., Perez, B. I., Dynia, J. M., Kaderavek, J. N., & Justice, L. M. (2020). Book-Reading Engagement in Children with Autism and Language Impairment: Associations with Emergent-Literacy Skills. *Journal of Autism and Developmental Disorders*, *50*(3), 1018–1030. https://doi.org/10.1007/s10803-019-04306-4

Bowling, E. C. C., & Cabell, S. Q. (2019). Developing Readers: Understanding Concept of Word in Text Development in Emergent Readers. *Early Childhood Education Journal*, *47*(2), 143–151. https://doi.org/10.1007/s10643-018-0902-1

Cameron, T. A., Carroll, J. L. D., Taumoepeau, M., & Schaughency, E. (2019). How Do New Zealand Teachers Assess Children's Oral Language and Literacy Skills at School Entry? *New Zealand Journal of Educational Studies*, *54*(1), 69–97. https://doi.org/10.1007/s40841-019-00133-4

Edwards-Groves, C., & Davidson, C. (2020). Special Issue: Talk and interaction in the dialogic classroom: pedagogy, practice and change. *Australian Journal of Language and Literacy*, *43*(1), 4–4. https://doi.org/10.1007/bf03652039

Elek, C., Gray, S., West, S., & Goldfeld, S. (2022). Effects of a professional development program on emergent literacy-promoting practices and environments in early

childhood education and care. *Early Years*, *42*(1), 88–103. https://doi.org/10.1080/09575146.2021.1898342

Esmaeeli, Z., Kyle, F. E., & Lundetræ, K. (2019). Contribution of family risk, emergent literacy and environmental protective factors in children's reading difficulties at the end of second-grade. *Reading and Writing*, *32*(9), 2375–2399. https://doi.org/10.1007/s11145-019-09948-5

Eviatar, Z., Taha, H., & Shwartz, M. (2018). Metalinguistic awareness and literacy among semitic-bilingual learners: a cross-language perspective. *Reading and Writing*, *31*(8), 1869–1891. https://doi.org/10.1007/s11145-018-9850-9

Faulk, N. (2018). Bringing Scale and Structure to the Online Information Literacy Program. *Journal of Library and Information Services in Distance Learning*, *12*(3–4), 198–208. https://doi.org/10.1080/1533290X.2018.1498633

Gasser, L., Dammert, Y., & Murphy, P. K. (2022). How Do Children Socially Learn from Narrative Fiction: Getting the Lesson, Simulating Social Worlds, or Dialogic Inquiry? In *Educational Psychology Review* (Vol. 34, Issue 3). Springer US. https://doi.org/10.1007/s10648-022-09667-4

Hadianto, D., Damaianti, V. S., Mulyati, Y., & Sastromiharjo, A. (2021a). Does reading comprehension competence determine level of solving mathematical word problems competence? *Journal of Physics: Conference Series*, *1806*(1). https://doi.org/10.1088/1742-6596/1806/1/012049

Hadianto, D., Damaianti, V. S., Mulyati, Y., & Sastromiharjo, A. (2021b). Enhancing scientific argumentation skill through partnership comprehensive literacy. *Journal of Physics: Conference Series*, *2098*(1). https://doi.org/10.1088/1742-6596/2098/1/012015

Hadianto, D., S. Damaianti, V., Mulyati, Y., & Sastromiharjo, A. (2022). Effectiveness of Literacy Teaching Design Integrating Local Culture Discourse and Activities to Enhance Reading Skills. *Cogent Education*, *9*(1), 0–13. https://doi.org/10.1080/2331186X.2021.2016040

Hannon, P., Nutbrown, C., & Morgan, A. (2020). Effects of extending disadvantaged families' teaching of emergent literacy. *Research Papers in Education*, *35*(3), 310–336. https://doi.org/10.1080/02671522.2019.1568531

Hooper, S. R., Costa, L. J. C., Green, M. B., Catlett, S. R., Barker, A., Fernandez, E., & Faldowski, R. A. (2020). The relationship of teacher ratings of executive functions to emergent literacy in Head Start. *Reading and Writing*, *33*(4), 963–989. https://doi.org/10.1007/s11145-019-09992-1

Huennekens, M. E., & Xu, Y. (2016). Using dialogic reading to enhance emergent literacy skills of young dual language learners. *Early Child Development and Care*, *186*(2), 324–340. https://doi.org/10.1080/03004430.2015.1031125

Incognito, O., & Pinto, G. (2023). Longitudinal effects of family and school context on the development on emergent literacy skills in preschoolers. *Current Psychology*, *42*(12), 9819–9829. https://doi.org/10.1007/s12144-021-02274-6

Jones, C. J., & Christian, M. (2021). The Results of a Randomized Control Trial Evaluation of the SPARK Literacy Program: An Innovative Approach that Pairs One-on-One Tutoring with Family Engagement. *Journal of Education for Students Placed at Risk*, *26*(3), 185–209. https://doi.org/10.1080/10824669.2020.1809419

Jung, Y. (2019). Associations between in-the-moment behavior of children, family literacy program use, and Latina mother-child book reading. *Early Child Development and Care*, *189*(13), 2071–2084. https://doi.org/10.1080/03004430.2018.1438423

Kim, D. (2011). Dialogic meaning construction and emergent reading domains among four young English language learners in second-language reading. *Multilingual Education*, *1*(1), 1–21. https://doi.org/10.1186/2191-5059-1-2

Krijnen, E., van Steensel, R., Meeuwisse, M., Jongerling, J., & Severiens, S. (2020). Exploring a refined model of home literacy activities and associations with children's emergent literacy skills. In *Reading and Writing* (Vol. 33, Issue 1). Springer Netherlands. https://doi.org/10.1007/s11145-019-09957-4

Lenhart, J., Suggate, S. P., & Lenhard, W. (2022). Shared-Reading Onset and Emergent Literacy Development. *Early Education and Development*, *33*(4), 589–607. https://doi.org/10.1080/10409289.2021.1915651

Lepola, J., Kajamies, A., Laakkonen, E., & Collins, M. F. (2023). Opportunities to Talk Matter in Shared Reading: The Mediating Roles of Children's Engagement and Verbal Participation in Narrative Listening Comprehension. *Early Education and Development*, *00*(00), 1–23. https://doi.org/10.1080/10409289.2023.2188865

Lucas, C., Hood, P., & Coyle, D. (2021). Blossoming in English: Preschool Children's Emergent Literacy Skills in English. *Journal of Research in Childhood Education*, *35*(3), 477–502. https://doi.org/10.1080/02568543.2020.1742256

Mansour, N. (2020). The dissonance between scientific evidence, diversity and dialogic pedagogy in the science classroom. *International Journal of Science Education*, *42*(2), 190–217. https://doi.org/10.1080/09500693.2019.1706114

Meng, C. (2021). Parent–child interactions longitudinally mediate the association between shared literacy activities and emergent literacy and oral language skills. *Reading and Writing*, *34*(6), 1593–1612. https://doi.org/10.1007/s11145-021-10130-z

Morgan, P. L., & Meier, C. R. (2008). Dialogic Reading's Potential to Improve Children's Emergent Literacy Skills and Behavior. *Preventing School Failure: Alternative Education for Children and Youth*, *52*(4), 11–16. https://doi.org/10.3200/psfl.52.4.11-16

Nevo, E., & Vaknin-Nusbaum, V. (2018). Joint Reading of Informational Science Text Versus Narrative Stories: How Does each Affect Language and Literacy Abilities Among Kindergarteners? *Reading Psychology*, *39*(8), 787–819. https://doi.org/10.1080/02702711.2018.1547343

Niu, W., Cheng, L., Xu, W., Zhang, Q., & Zhang, X. (2021). Improving Resilience of a Child with ADHD: A Context Specific Intervention Program through Dialogic and Guided Reading. *International Journal of Disability, Development and Education*, *68*(6), 788–805. https://doi.org/10.1080/1034912X.2021.1929085

O'Sullivan, J. (2021). Replacing a reading scheme with dialogic reading: an action research case study in 15 London nurseries. *International Journal of Early Years Education*, *29*(1), 25–40. https://doi.org/10.1080/09669760.2020.1754172

Olszewski, A., & Cullen-Conway, M. (2021). Social Media Accompanying Reading Together: A SMART Approach to Promote Literacy Engagement. *Reading and Writing Quarterly*, *37*(5), 479–494. https://doi.org/10.1080/10573569.2021.1902442

Piasta, S. B., Soto Ramirez, P., Farley, K. S., Justice, L. M., & Park, S. (2020). Exploring the nature of associations between educators' knowledge and their emergent literacy classroom practices. *Reading and Writing*, *33*(6), 1399–1422. https://doi.org/10.1007/s11145-019-10013-4

Sampa, F. K., Ojanen, E., Westerholm, J., Ketonen, R., & Lyytinen, H. (2018). Literacy programs efficacy for developing children's early reading skills in familiar language in zambia. *Journal of Psychology in Africa*, *28*(2), 128–135. https://doi.org/10.1080/14330237.2018.1435050

Simpson, K., Paynter, J., Wicks, R. T., & Westerveld, M. F. (2020). Early Literacy Learning Experiences across Home and Community Libraries for Young Children Who Have Autism. *Advances in Neurodevelopmental Disorders*, *4*(1), 74–84. https://doi.org/10.1007/s41252-019-00145-7

Thomas, N., Colin, C., & Leybaert, J. (2020). Interactive Reading to Improve Language and Emergent Literacy Skills of Preschool Children from Low Socioeconomic and Language-Minority Backgrounds. *Early Childhood Education Journal*, *48*(5), 549–560. https://doi.org/10.1007/s10643-020-01022-y

Walgermo, B. R., Foldnes, N., Uppstad, P. H., & Solheim, O. J. (2018). Developmental dynamics of early reading skill, literacy interest and readers' self-concept within the first year of formal schooling. *Reading and Writing*, *31*(6), 1379–1399. https://doi.org/10.1007/s11145-018-9843-8

Westerveld, M. F., Paynter, J., Brignell, A., & Reilly, S. (2020). No Differences in Code-Related Emergent Literacy Skills in Well-Matched 4-Year-Old Children With and Without ASD. *Journal of Autism and Developmental Disorders*, *50*(8), 3060–3065. https://doi.org/10.1007/s10803-020-04407-5

Wood, J. (2021). A dialogic technology-mediated model of feedback uptake and literacy. *Assessment and Evaluation in Higher Education*, *46*(8), 1173–1190. https://doi.org/10.1080/02602938.2020.1852174

Zettler-Greeley, C. M., Bailet, L. L., Murphy, S., DeLucca, T., & Branum-Martin, L. (2018). Efficacy of the Nemours BrightStart! Early Literacy Program: Treatment Outcomes From a Randomized Trial With At-Risk Prekindergartners. *Early Education and Development*, *29*(6), 873–892. https://doi.org/10.1080/10409289.2018.1475202

Zhang, S. Z., Inoue, T., Shu, H., & Georgiou, G. K. (2020). How does home literacy environment influence reading comprehension in Chinese? Evidence from a 3-year longitudinal study. *Reading and Writing*, *33*(7), 1745–1767. https://doi.org/10.1007/s11145-019-09991-2