



The development of Early Childhood intellectual Capacities in the Child Development Centers of the Local Administrative Organizations, Chaiphum

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Abstract

Background and Aim: The early stage of childhood is a crucial period that significantly impacts a child's learning and growth trajectory. Research has shown a strong connection between cognitive ability, developmental milestones during this phase, and future outcomes in adolescence and adulthood. Therefore, it is imperative for preschool learning programs to prioritize age-appropriate and holistic development. To enhance the intellectual capabilities of preschoolers, an integrated learning activity program was implemented and analyzed for its effectiveness in improving young learners' intellectual and other developmental factors.

Material and Methods: This study used pre- and post-test experimental designs. Through a multi-stage random sampling procedure, 113 preschoolers were chosen from five sub-district centers in Nai Faai, Nai Sineun, Ban Lao, Tha Hinong, and Huen. Developmental Assessment Scales, developed by the researcher, were used to compare cognitive abilities and development levels of children aged 24, 36, and 48 months before and after the 8-week Integrated learning program. The reliability of the scales was 0.85, 0.80, and 0.83, respectively. The t-test was employed for comparison analysis.

Results: The results indicated that the motor skills, language, problem-solving, and personal-social awareness of preschoolers aged 24, 36, and 48 months significantly improved at the .01 level after participating in the integrated learning activities.

Conclusions: Integrated learning activities could effectively support and enhance intellectual capacities and age-appropriate development.

Keywords: Intellectual Capacities; Aged-Appropriated Development; Early Childhood Education; Integrated Learning

Introduction

During early childhood, there is a crucial period for the development of physical, cognitive, and socioemotional aspects, which serves as the basis for later adult development and education (Olaleye et al., 2009). Insufficient or inadequate early childhood programs can lead to negative consequences in later life. According to data from the Department of Mental Health (2015), 27.5 percent of preschool children experienced developmental delays, with 42 percent of these cases occurring in children aged between 4 and 5 years old. As these children progress into elementary levels, 30 percent exhibit IQ scores below the average range. A subsequent IQ survey of grade one students conducted by the Department of Health in 2011, 2014, and 2016 reported mean IQ scores of 94.0, 93.1, and 98.2, respectively, all within the average range. However, more recent data from 2017 indicates that only 67.5% of Thai preschool children were developmentally appropriate (Department of Health, 2017). These findings underscore the importance of cognitive capacities and the need for effective preschool education to foster children's developmental milestones during these crucial years, ensuring future academic and social success.

Early childhood education in Thailand caters to children from birth to 6 years of age, focusing on physical growth and development in a holistic manner that addresses cognitive, social, and emotional aspects while recognizing individual needs and abilities. An integrated curriculum design that incorporates an understanding of child development was identified in the Basic Education Core Curriculum B.E. 2551, supporting the view that early childhood education can enhance cognitive abilities. Cognitive abilities in





kindergarten have been found to correlate with school readiness (Davies et al., 2016) and serve as the best predictor for later school achievement (e.g., Duncan et al., 2007; Claessens et al., 2009; Claessens & Engel, 2013), while the consistency of social skills and socioemotional capacities in predicting later success is less pronounced (Davies et al., 2016). Extensive research has discussed effective pedagogical strategies for developing cognitive capacities in early childhood. Burger (2014) suggested focusing on three major areas: language, mathematics, and socio-emotional development, to enhance children's problem-solving abilities in daily life.

Integrated learning management involves organizing learning experiences according to learners' interests and abilities, and linking daily activities to the same subject under a common topic. This approach aims to change learners' behavior by enabling them to apply knowledge, skills, and attitudes to solve problems and utilize them effectively in their daily lives (Moonkam & Moonkan, 2002: 184-191). Integrated learning curricula represent a holistic approach to learning and may offer an alternative method for developing cognitive capacities in preschool children of different age points. This is because integrated learning activities offer opportunities for children to connect their personal and classroom experiences, making the development of skills and knowledge more meaningful (Kevin, 2015). One qualitative study reported that the ability to process surrounding information in meaningful ways can be achieved by implementing integrated learning in preschool children (Sutik et al., 2022). However, there are still gaps in the literature that quantitatively explore the effectiveness of an integrated activity program in the preschooler group. Therefore, it is important to establish the effectiveness of an integrated activity program on the development of intellectual capacities in preschool children attending the Early Childhood Development Centers of the Local Administrative Administration Organizations in Chaiyaphum Province. The findings will guide local organizations in developing guidelines to support early childhood development and provide educational information for parents.

Objective

1. To enhance cognitive capacities and various areas of development of preschool children through an integrated learning program in the Early Childhood Development Centers of the Local Administrative Administration Organizations in Chaiyaphum Province.
2. To study the effectiveness of the integrated learning program on cognitive capacities and other development levels of preschool children.

Literature Review

The first five years of life provide great opportunities for learning and development, with cognitive and socioemotional capacities developed during this period likely to influence later learning outcomes in education and adulthood. Successful early learning can accelerate later development, while a poor start may slow down or inhibit developmental processes (OECD, 2020). The critical period for positive learning ends around seven years of age when brain malleability decreases (Stiles & Jernigan, 2010). If core foundation skills are not developed by age 7, a child is more likely to face difficulties in social and behavioral aspects during adolescence and adulthood (Heckman, 2006).

Longitudinal research that followed preschool children into adulthood consistently found significant relationships between early childhood experiences and later outcomes (Shuey & Kankaraš, 2018). Children who fail to develop critical beginning skills such as language and self-regulation are likely to confront challenges in academic achievement and experience negative outcomes in adulthood. Moreover, test scores at age 5 can better predict adult outcomes than scores in primary school (Bartik, 2014), emphasizing the importance of early-year education as a foundation for positive cognitive capacities and development. Shuey & Kankaraš (2018) also observed that early academic skills, such as language literacy and numerical knowledge, were positively associated with educational achievement in adulthood. Visual-motor skills and self-regulation were also predictors of later educational attainment. Early self-regulation



skills strongly predicted degree completion by age 25, surpassing the predictive power of reading and mathematical scores at age 21 (McClelland et al., 2013).

During the first five years of early childhood learning, four key areas play a crucial role in development: literacy, numeracy, self-regulation, and socioemotional skills (OECD, 2020).

Early Literacy Skills: This encompasses vocabulary, listening comprehension, and phonological awareness. Listening comprehension focuses on understanding spoken language, both explicitly and implicitly. Phonological awareness involves the ability to detect, analyze, and manipulate the sounds of spoken language. These skills serve as the foundation and predictors for later literacy development, forming the basis for future communication and social connections.

Early Numerical Skills: This area involves number and shape identification, understanding numbers, counting, as well as pattern and shape detection. Children can learn to apply basic numerical concepts and reasoning, enabling them to understand measurement and develop organized thinking patterns through numerical concepts.

Self-regulation: Self-regulation is a mental process required for attentional focus, planning, remembering verbal instructions, and multitasking. It serves as a predictor for the later development of executive functions (EF), which include working memory, mental flexibility, and inhibitory control (Jones et al., 2016). Early development of self-regulation helps children become more persistent in achieving goals and develop the ability to delay gratification (Mischel et al., 1989).

Socio-emotional Skills: From an early age, children can form relationships with themselves and others. They learn to identify and control their emotions and actions and develop an understanding of different perspectives and empathy toward others.

Additionally, visual and motor skills are also important contributors to a child's learning and development. All these areas are significant predictors of later schooling outcomes, and they often overlap. Hence, it is not necessary to measure every skill individually to gain an accurate understanding of a child's overall development (OECD, 2020). In this research, motor skills (gross and fine), language, problem-solving, and personal and social skills will be assessed to measure the cognitive and developmental capacity of preschool children.

Conceptual Framework

The previous literature on the relationship between education and the development of higher-order thinking skills (Luria, 1976) along with the cognitive development theory of Vygotsky suggested that a child's conceptual development contributed to the development of higher psychological functions (Gredler and Shields, 2008) are the bases for this study. Since instruction has a significant impact on thinking and development, it was hypothesized that an integrated learning program could effectively enhance cognitive capacities and various areas of development in preschoolers aged 24, 36, and 48 months.

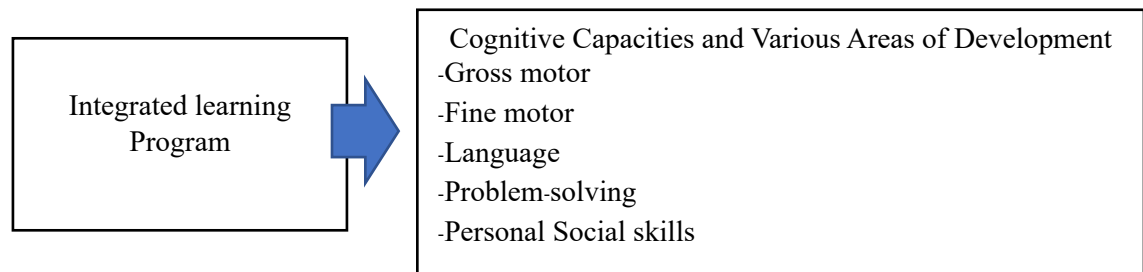


Figure 1 Conceptual Framework



Methodology

The sample consisted of 113 preschool children from the Early Childhood Development Centers of five Subdistrict Administrative Organizations in Chaiyaphum Province, namely Na Fai, Na Si Nuan, Ban Lao, Tha Hin, and Huai Ton. The samples were selected using a multi-stage random sampling method.

Timing Scope: Semester 2, Academic Year 2022

This research was conducted through the following process:

1. The teachers utilized an 8-unit integrated learning experience management plan to provide 8-week learning experience activities for early childhood children (information on the curricula development can be found in Sripai et al., 2017).

2. The measurements used for assessing cognitive capacities and other areas of development were developed based on the theoretical concepts of childhood development, expert comments, and question items from various developmental screening tools. The measurements were designed for three different age groups: 24, 36, and 48 months. The construction and quality verification details of the tool are presented as follows (Table 1):

Table 1 Aged Appropriate Development Criteria for Various Areas of Cognitive Capacities and Development for Children Aged 24, 36, and 48 months.

Cognitive Capacities & Developmental Areas	Aged-Appropriate Development Criteria		
	24 months	36 months	48 months
Gross motor	38.07	36.99	32.78
Fine motor	35.16	18.07	15.18
Communication	25.17	30.99	30.72
Problem-solving	29.78	30.29	31.30
Personal Social skills	31.54	35.33	26.60

2.1 The cognitive and development measures are teacher rating scales that assess five areas of early childhood development: gross motor, fine motor, language, problem-solving, and personal-social skills. Teachers rate whether the child can perform or achieve the tasks/skills in each developmental area through behavioral observation or by asking the child to perform instructed activities. Rating scales range from 0 (not yet), 5 (sometimes), and 10 (yes). The evaluation criteria for each aspect are as follows:

2.2 Question items of the cognitive and development measure were reviewed by the experts and modified based on their opinions. The item language was improved to be more concise, clearer, and culturally appropriate for the sample group. The congruence between the measurements and the behaviors was then assessed using the IOC (Index of Item Objective Congruence) with the following evaluation criteria:

+1 when it is certain that the cognitive and development tests measure the behavior being assessed.

0 when it is uncertain if the cognitive and development tests measure the behavior being assessed.

-1 when it is certain that the cognitive and development tests do not measure the behavior being assessed.

2.3 The cognitive and development measures were further modified based on the experts' opinions obtained during the process described in 2.2. The IOC values ranged from 0.66 to 1.00.

2.4 The final revised versions of the cognitive and development measures were evaluated with 30 preschool children at the Child Development Center, who had similar characteristics to the samples. Two raters, who were well familiar with the test, participated in the evaluation.



2.5 The scores obtained from the evaluation of the two raters were used to determine the quality of the test. The reliability of each rater was assessed using Pearson's Product Moment Correlation, and the correlation coefficient was 0.85, indicating high reliability.

3. An experimental using a one-group pre-posttest design was employed in this study (Saiyos & Saiyos, 1995). Results were measured before and during the experimental period. The samples' behaviors were observed to assess their development level and cognitive capacities through regular activities for a period of 1 week before the experiment. The experimental process began with integrated learning experience activities over a period of 8 weeks. One week after the completion of the learning program, cognitive capacities and different areas of development were assessed. The experimental model was as follows:

$$O_1 \times O_2$$

When O_1 = The cognitive capacities and developmental level before the experiment
 O_2 = The cognitive capacities and developmental level after the experiment

4. The Experiment Process

The experiment was conducted in the second semester of the academic year 2022 for 8 weeks, 5 days per week, 90 minutes per day, a total of 40 times with the experimental plan outlined below:

4.1 Pre-experiment Assessment: Before the experiment, the samples' cognitive capacities and developmental levels were assessed using the measurements during regular activities, which included movement and rhythmic activities from 09:00 a.m. to 09:15 a.m., experience-enhancement activities from 09:15 a.m. to 09:30 a.m., and creative and free play activities from 09:30 a.m. to 10:30 a.m. The data were analyzed for the individual baseline scores of each cognitive capacity and developmental area.

4.2 Experiment Period: During the experiment, the learning experience activities were organized by the integrated plan for early childhood children. These activities took place from 09:00 a.m. to 10:30 a.m. for a period of 8 weeks, 5 days per week, with each session lasting 90 minutes.

4.3 Post-experiment Assessment: After the experiment, the samples' cognitive capacities and developmental levels were reassessed using the measurements. The data were analyzed to determine mean scores and standard deviation.

5. Hypothesis Testing: Hypothesis testing was conducted to compare the samples' cognitive capacities and developmental levels before and after the learning experience activities were organized according to the integrated activity plan for early childhood children, using a dependent samples t-test.

Results

The analysis results from the scores of cognitive capacities and different developmental areas of preschool children are presented in Table 2-4. These scores were observed once before the activities were organized, within one week, and once after the integrated activities were organized.



Table 2 Descriptive statistics of the scores on cognitive capacities and development in various aspects of early childhood children aged 24 months (n=16)

Cognitive capacities & Developmental aspects	Before			After		
	\bar{X}	S.D.	Meet aged-appropriated criteria (persons)	\bar{X}	S.D.	Meet aged-appropriated criteria (persons)
Gross motor	16.25	6.708	0	27.19	7.952	10
Fine motor	17.19	5.764	0	30.00	8.563	3
Communication	17.19	4.820	0	29.38	6.021	11
Problem-solving	18.13	3.594	0	30.94	5.234	5
Personal Social skills	17.50	3.162	0	31.88	3.096	3

From Table 2, it can be observed that before the integrated learning experience activities were organized, the scores on behaviors showing cognitive capacities and development in various aspects for all early childhood children aged 24 months did not meet the aged-appropriated criteria. However, after the integrated learning experience activities were organized, ten early preschool children passed the age-appropriated development criteria for gross motor; 3 children passed the criteria for fine motor; 11 children passed the criteria for problem-solving; 5 children passed the criteria for personal-social skills, and 3 children passed the criteria for communication. These data are also illustrated in Figure 1.

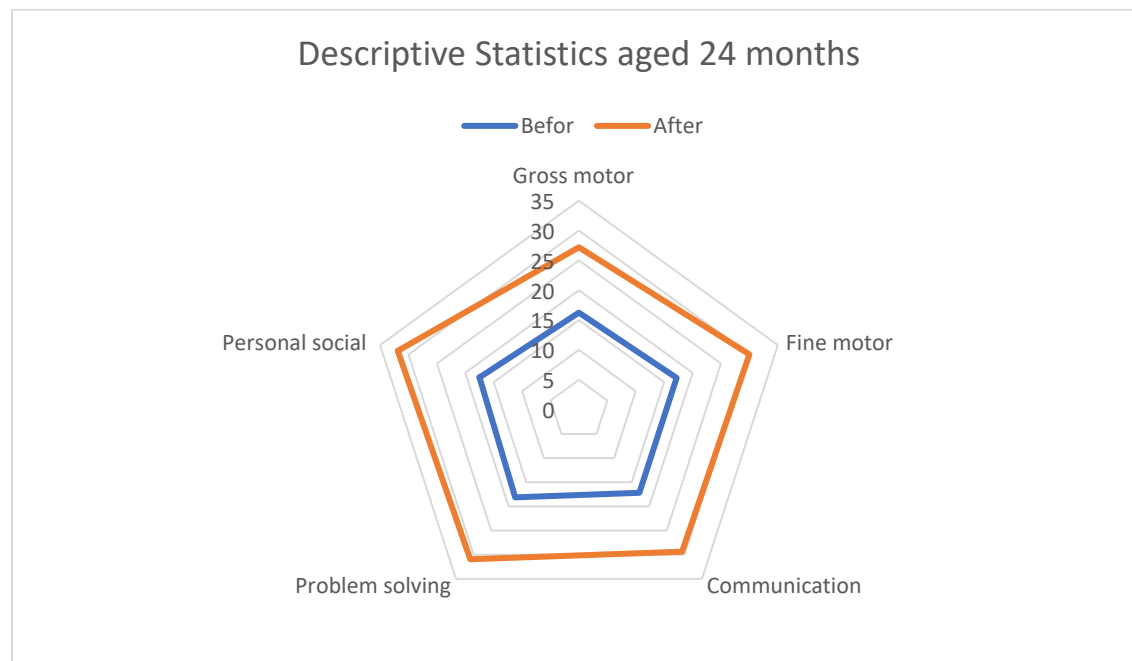


Figure 1 Descriptive Statistics show mean scores of cognitive ability and development before and after participating in integrated learning activities of the 24-month group.



Table 3 Basic statistics of the scores on behaviors showing cognitive capacities and development in various aspects of early childhood children aged 36 months (n=56)

Cognitive capacities & Developmental aspects	Before			After		
	\bar{X}	S.D.	Meet aged-appropriated criteria (persons)	\bar{X}	S.D.	Meet aged-appropriated criteria (persons)
Gross motor	25.66	11.72	13	44.55	13.59	39
Fine motor	25.36	13.84	25	40.98	17.54	50
Communication	33.21	11.01	35	49.91	11.57	53
Problem-solving	21.52	9.67	22	35.98	11.21	41
Personal Social skills	30.45	9.82	25	51.88	8.92	50

From Table 3, it can be observed that based on the scores on behaviors showing cognitive capacities and development in different aspects of preschool children aged 36 months before the organization of the activities, 13 children passed the aged-appropriated criteria for gross motor; 25 children passed the criteria for fine motor; 35 children passed the criteria for language; 22 children passed the criteria for problem-solving, and 25 children passed the criteria for personal-social skills.

However, after the integrated learning experience activities were organized, the number of children who passed the aged-appropriated criteria increased significantly: 39 children passed the criteria for gross motor; 50 children passed the criteria for fine motor; 53 children passed the criteria for communication; 41 children passed the criteria for problem-solving, and 50 children passed the criteria for personal-social skills. These data are also presented in Figure 2.

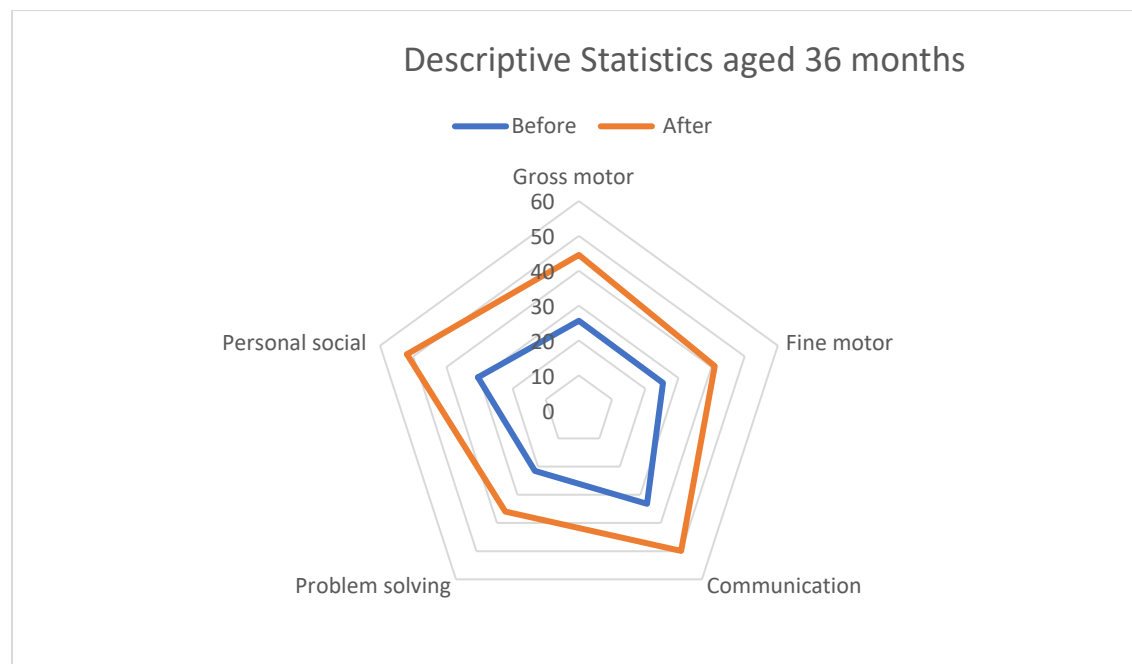


Figure 2 Descriptive Statistics show mean scores of cognitive ability and development before and after participating in integrated learning activities of the 36-month group.



Table 4 Basic statistics of the scores on behaviors showing cognitive capacities and development in various aspects of early childhood children aged 48 months (n=43)

Cognitive capacities & Developmental aspects	Before			After		
	\bar{X}	S.D.	Meet aged-appropriated criteria (persons)	\bar{X}	S.D.	Meet aged-appropriated criteria (persons)
Gross motor	35.58	9.52	30	52.67	12.26	42
Fine motor	31.98	11.80	25	47.56	16.66	39
Communication	34.19	12.19	20	51.40	14.02	38
Problem-solving	34.19	9.44	23	51.63	10.50	41
Personal Social skills	43.84	8.78	25	57.33	5.70	42

From Table 4, it can be observed that based on the scores on behaviors showing cognitive capacities and development in different aspects of preschool children aged 36 months before the organization of the activities, 30 children passed the aged-appropriated criteria for gross motor; 25 children passed the criteria for fine motor; 20 children passed the criteria for communication; 23 children passed the criteria for problem-solving, and 25 children passed the criteria for personal-social skills.

However, after the integrated learning experience activities were organized, the number of children who passed the aged-appropriated criteria increased significantly: 42 children passed the criteria for gross motor; 39 children passed the criteria for fine motor; 38 children passed the criteria for communication; 41 children passed the criteria for problem-solving, and 42 children passed the criteria for personal-social skills. These data are also illustrated in Figure 3.

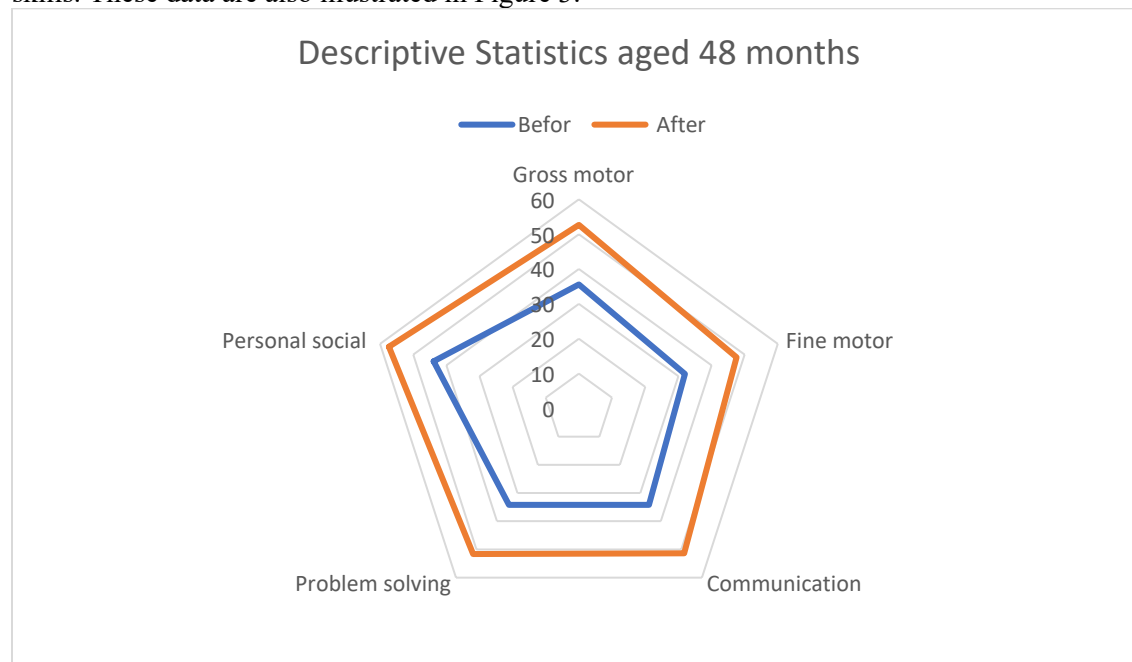


Figure 3 Descriptive Statistics show mean scores of cognitive ability and development before and after participating in integrated learning activities of the 48-month group.



Part 2: Comparative Analysis of IQ Development Behaviors in Early Childhood Children

The comparative analysis results of the scores on behaviors cognitive capacities and various aspects of early childhood development before and after the organization of activities were analyzed using a dependent samples t-test (Srisa-ard, 2002: 109). The analysis results are presented in Tables 5-7.

Table 5 Comparative Analysis Results of Cognitive Capacities and Development in Different Aspects of Early Childhood Children Aged 24 Months Before and After the Organization of Integrated Activities

Cognitive capacities & Developmental aspects	Mean				t	p
	Before		After			
	\bar{X}	S.D.	\bar{X}	S.D.		
Gross motor	16.25	6.708	27.19	7.952	8.359	.000**
Fine motor	17.19	5.764	30.00	8.563	9.373	.000**
Communication	17.19	4.820	29.38	6.021	9.459	.000**
Problem-solving	18.13	3.594	30.94	5.234	9.373	.000**
Personal Social skills	17.50	3.162	31.88	3.096	12.011	.000**

**statistically significant at .01 level

The findings from Table 5 suggested that the scores for gross motor, fine motor, communication, problem-solving, and personal-social skills were significantly higher at the .01 level. These data are also illustrated in Figure 4.

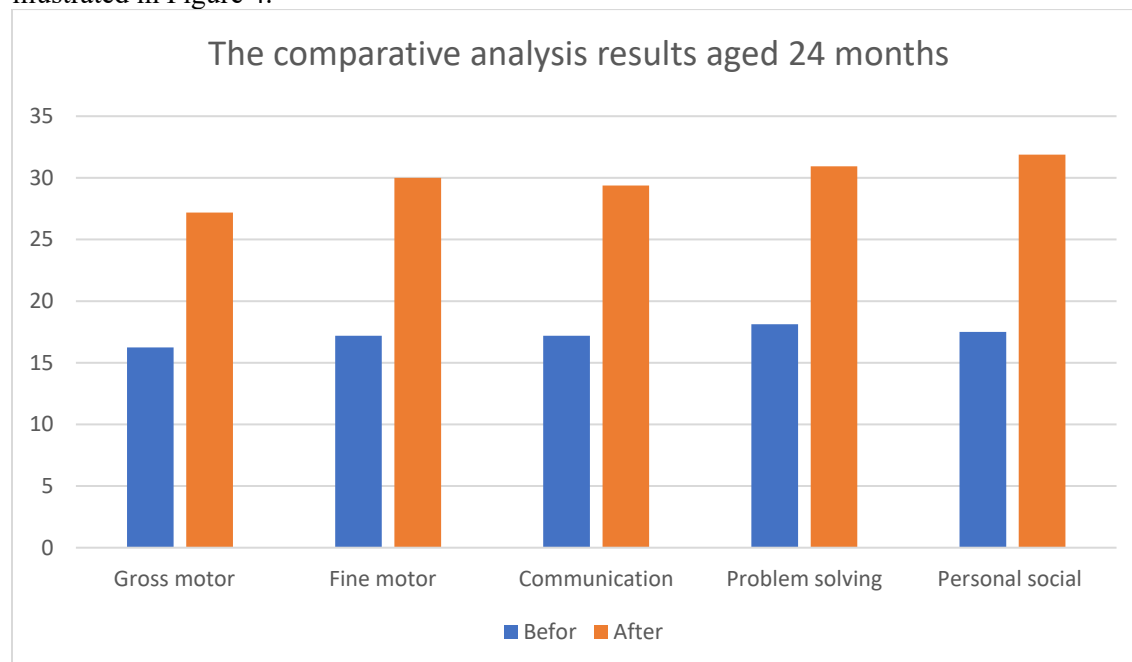


Figure 4 Comparative analysis results of the scores on cognitive capacity and development before and after participating in integrated activities for the 24-month group.



Table 6 Comparative Analysis Results of Cognitive Capacities and Development in Different Aspects of Early Childhood Children Aged 36 Months Before and After the Organization of Integrated Activities

Cognitive capacities & Developmental aspects	Mean				t	p
	Before		After			
	\bar{X}	S.D.	\bar{X}	S.D.		
Gross motor	25.66	11.72	44.55	13.59	19.917	.000**
Fine motor	25.36	13.84	40.98	17.54	16.094	.000**
Communication	33.21	11.01	49.91	11.57	15.632	.000**
Problem-solving	21.52	9.67	35.98	11.21	14.455	.000**
Personal Social skills	30.45	9.82	51.88	8.92	22.948	.000**

**statistically significant at .01 level

Table 6 presents the comparative analysis results of cognitive capacities and development in various aspects of preschool children aged 36 Months before and after the organization of integrated activities. It was revealed that the scores for gross motor, fine motor, communication, problem-solving, and personal-social skills were significantly higher at the .01 level. This data is also shown in Figure 5.

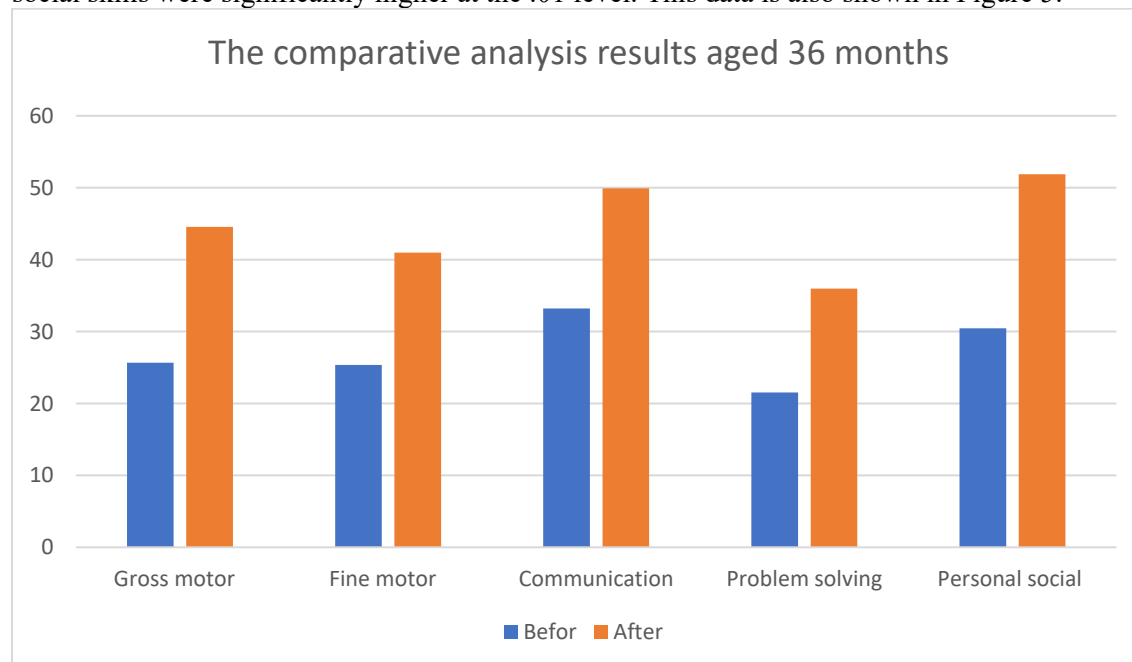


Figure 5 Comparative analysis results of the scores on cognitive capacity and development before and after participating in integrated activities for the 36-month group.



Table 7 Comparative Analysis Results of Cognitive Capacities and Development in Different Aspects of Early Childhood Children Aged 48 Months Before and After the Organization of Integrated Activities

Cognitive capacities & Developmental aspects	Mean				t	p
	Before		After			
	\bar{X}	S.D.	\bar{X}	S.D.		
Gross motor	35.58	9.52	52.67	12.26	14.214	.000**
Fine motor	31.98	11.80	47.56	16.66	14.768	.000**
Communication	34.19	12.19	51.40	14.02	15.539	.000**
Problem-solving	34.19	9.44	51.63	10.50	25.907	.000**
Personal Social skills	43.84	8.78	57.33	5.70	14.212	.000**

**statistically significant at .01 level

The findings from Table 7 suggested that the scores for gross motor, fine motor, communication, problem-solving, and personal-social skills were significantly higher at the .01 level. These data are also illustrated in Figure 6

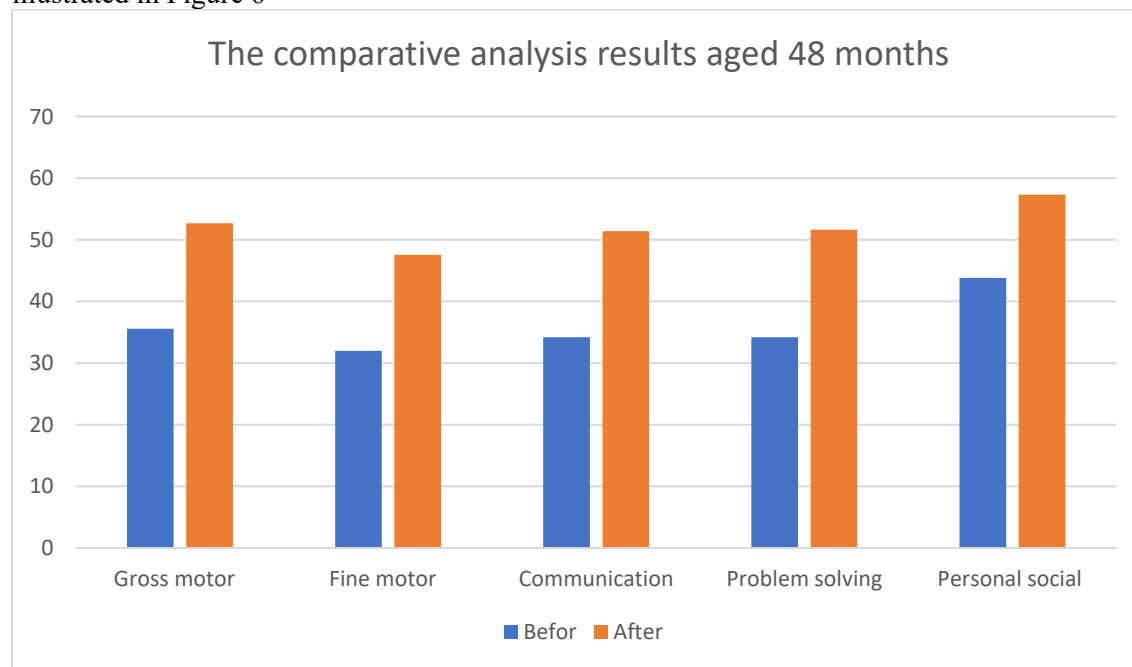


Figure 6 Comparative analysis results of the scores on cognitive capacity and development before and after participating in integrated activities for the 48-month group

Discussion and Conclusion

The findings revealed that the scores on cognitive capacities and development of 113 preschoolers in the three age groups from the Early Childhood Development Centers of the Local Administrative Administration Organizations in Chaiyaphum Province were higher after participating in the 8-week integrated learning activities. Moreover, upon comparing the scores on the behaviors indicating cognitive capacities and development before and after the organization of integrated learning activities, the scores for gross motor, fine motor, language, problem-solving, and personal-social skills were significantly higher at the .01 level.



The positive outcomes observed in this study can be attributed to the learning experience provided through integrated activities, which were designed to enhance children's readiness in various aspects through play. Play activities play a crucial role in the intellectual development of children of different ages. These activities are driven by the children themselves and are influenced by their thoughts and interests, rather than being directed by external factors. As children progress through different stages of intellectual development, their play evolves accordingly, with each developmental stage representing a distinct pattern of thought classification over time. As a result, the cognitive capacities, and various aspects of development of the three target groups significantly improved.

These findings supported previous research conducted by Thaneerat (2019), who utilized an integrated guidance activities package to enhance attentive mental skills in preschool children at Anuban Nong Bua Lamphu School in Nong Bua Lamphu Province. The study reported a significant increase in the attentive mental level of the experimental group at a statistically significant level of .01 after engaging in the guidance activities. Likewise, Surinchompoo (2019) examined the impact of using fairy tales to develop Executive Function (EF) skills in preschool children, leading to a significant improvement in EF skills, as indicated by the mean score after learning through Big Book stories at a statistically significant level of .05. Subsequent research by Rangsiyanon et al. (2019) investigated the development of an Executive Function (EF) model for preschool children through the school participation process under Suan Dusit University's network. The study demonstrated substantial enhancements in overall EF development and each aspect of EF after implementing the model at a highly statistically significant level of .001. Moreover, based on anecdotal evidence, teachers and parents confirmed the remarkable development of EF skills in most preschool children after employing the model. Additionally, Imnamkhao (2020) developed an early childhood program focused on promoting EF skills, with results indicating that 94.57% of children demonstrated age-appropriate development, while 86.56% of children aged 2-3 years exhibited EF skills at the moderate to the highest level. Similarly, 96% of children aged 3-4 years demonstrated moderate to the highest levels of EF skills.

Recommendation

The results of the study indicate positive outcomes across various domains, including cognition, motor development, communication, and socio-emotional skills, in preschool children aged 24, 36, and 48 months who participated in an 8-week integrated learning program. These findings hold significant implications for early childhood education and warrant attention in educational practices.

To effectively apply these findings in preschool settings, certain recommendations are suggested. First, before the implementation of the integrated activity program, it is crucial to conduct a comprehensive examination and understanding of the four main activities involved: movement, creative play, free play, and experience enhancement. This understanding should encompass the process of organizing the activities, the materials used, and the methods of evaluation. Such preparation will ensure that the program is well-structured and optimally beneficial for the children's development.

Additionally, during the organization of activities, it is essential for the teachers responsible for preschool children to observe and assess the children's behaviors. This practice allows for the monitoring of their cognitive capacities and developmental progress. By closely tracking their performances, teachers can identify areas of improvement and adapt the activities to cater to individual needs effectively. Furthermore, to accurately assess the children's cognitive capacities and development, the teachers/educators should ensure the proper preparation of equipment and utilize age-appropriate tests corresponding to the specific age group of the children involved. This will ensure that the assessment process is valid, reliable, and relevant to the developmental stage of each child.

The integrated learning program in this study was specifically designed for preschoolers, residing in a rural district in the North-Eastern region of Thailand. The sample group used in this study also



possessed unique characteristics and learning requirements. For future research, it is recommended to customize the integrated learning program to suit the specific local and cultural context. Potential areas of focus could include language readiness, thinking skills, mathematics, science, or other domains, aiming to promote holistic and culturally relevant development while facilitating meaningful learning experiences.

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