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The Effectiveness of a Play Based Social Emotional Program on Mathematics and English Language Learning Readiness in Early Childhood Education

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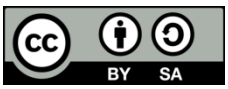
ABSTRACT

This study examines the effectiveness of a play-based social-emotional program on mathematics and English language learning readiness in early childhood education. Learning readiness at this stage is influenced not only by cognitive abilities but also by social-emotional competencies such as self-regulation, attention, cooperation, and confidence. A quasi-experimental design with a pretest–posttest control group was employed. Participants were children aged 5–6 years divided into an experimental group and a control group. The experimental group received a play-based social-emotional program integrated into daily learning activities, while the control group followed conventional instruction. Data were collected using social-emotional observation sheets, mathematics readiness assessments, and English language learning readiness assessments. Data were analyzed using descriptive statistics and independent samples t-tests. The results showed that children in the experimental group demonstrated significantly higher readiness to learn mathematics and English compared to the control group. These findings indicate that integrating social-emotional learning into play-based activities effectively supports holistic learning readiness in early childhood education.



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1. Introduction

Early childhood education (ECE) represents a foundational stage in children's development, during which essential cognitive, social, and emotional competencies are established to support later academic success. One of the most critical outcomes expected at this stage is children's readiness to engage in formal learning, including mathematics. In addition to mathematics, readiness to learn English as an early foreign or second language has become an increasingly important objective in early childhood education, particularly in contexts

where English is introduced at an early age. English language learning readiness involves children's ability to attend to linguistic input, participate in simple communicative interactions, follow instructions, and demonstrate confidence in using basic vocabulary and expressions. Similar to mathematics readiness, these abilities are strongly influenced by children's social-emotional competencies, including emotional regulation, motivation, and social engagement (Blair & Raver, 2015; Duncan et al., 2015). Mathematical learning readiness in early childhood does not merely involve the acquisition of early numeracy skills such as counting, number recognition, or identifying patterns. Rather, it encompasses a broader set of competencies that include behavioral regulation, emotional control, motivation, and social interaction, all of which influence how children participate in learning activities (Duncan et al., 2015). Longitudinal evidence consistently shows that children who enter school with stronger social-emotional readiness demonstrate more stable, sustained, and positive mathematical achievement across subsequent years of schooling (Blair & Raver, 2015).

Social-emotional skills play a central role in shaping children's learning experiences during early childhood. These skills include the ability to regulate emotions, maintain attention, follow instructions, cooperate with peers, and persist in the face of challenges (Denham et al., 2016). In mathematics learning contexts, these competencies are particularly important because mathematical tasks often require children to focus for extended periods, tolerate mistakes, and manage frustration when solutions are not immediately apparent. These social-emotional competencies are equally essential in early English language learning contexts, where children are required to listen attentively, respond verbally, engage in turn-taking, and overcome anxiety related to speaking a new language. Children who experience difficulties in emotional regulation or social interaction may withdraw from English language activities, show reluctance to speak, or display limited participation in classroom communication (Denham et al., 2016; Rimm-Kaufman et al., 2015). Research indicates that children with limited emotional regulation and social competence are more likely to disengage from mathematical activities, avoid problem-solving tasks, and develop negative attitudes toward mathematics at an early age (Rimm-Kaufman et al., 2015). Conversely, children who demonstrate strong social-emotional skills tend to show greater learning engagement and confidence in approaching mathematical problems (Ramani & Scalise, 2020).

Over the past decade, the importance of Social-Emotional Learning (SEL) as a foundation for academic development has gained substantial attention in educational research. SEL refers to the process through which children develop self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. Meta-analytic studies provide strong evidence that SEL programs produce meaningful improvements not only in social-emotional outcomes but also in academic performance, including mathematics achievement (Taylor et al., 2017). Beyond mathematics achievement, studies have also demonstrated that social-emotional learning positively contributes to early language and literacy development, including vocabulary growth, oral communication skills, and early English language acquisition. Children with stronger social-emotional competencies tend to show greater confidence in language use, higher participation in classroom discourse, and

increased willingness to experiment with new words and expressions (Taylor et al., 2017; Jones et al., 2019). These findings suggest that social-emotional competencies function as enabling factors that support children's capacity to benefit from academic instruction. Further research has emphasized that early implementation of SEL interventions is particularly effective, as social-emotional skills developed during early childhood tend to persist and influence learning trajectories over time (Jones et al., 2019).

Despite the documented benefits of SEL, its implementation in early childhood education must be developmentally appropriate. Young children learn most effectively through active engagement and concrete experiences rather than abstract instruction. In this regard, play-based learning is widely recognized as a pedagogical approach that aligns with children's natural learning processes. Play-based learning also provides a natural and meaningful context for early English language exposure, as children encounter new vocabulary, sentence structures, and communicative functions through songs, role-play, storytelling, and interactive games. These play experiences allow children to use language authentically in social situations, supporting both linguistic development and emotional engagement (Bodrova & Leong, 2017; Zosh et al., 2018). Play serves as a primary context through which young children explore their environment, experiment with ideas, and construct knowledge. Importantly, play provides opportunities for the integration of social, emotional, and cognitive development in ways that are meaningful and motivating for children (Bodrova & Leong, 2017). Through play, children practice turn-taking, negotiation, emotional expression, and problem-solving within socially rich and emotionally engaging situations (Zosh et al., 2018).

In early mathematics education, play-based learning offers a particularly powerful context for developing foundational numeracy skills. Research has shown that when mathematical concepts are embedded in play activities, children demonstrate greater understanding of numbers, patterns, spatial relationships, and quantitative reasoning. For example, structured play activities that incorporate counting, sorting, or comparing quantities have been found to enhance children's conceptual understanding of mathematics more effectively than traditional drill-based approaches (Hassinger-Das et al., 2020). In addition to cognitive benefits, play-based mathematics learning has been associated with increased intrinsic motivation, positive attitudes toward mathematics, and sustained engagement—factors that are essential components of mathematical readiness (Ramani et al., 2017). Similarly, play-based approaches have been shown to support early English language learning readiness by fostering children's listening comprehension, expressive language, and pragmatic communication skills. When English is embedded within play activities, children demonstrate higher motivation, reduced language anxiety, and greater willingness to participate in verbal interactions compared to more formal instructional approaches (Ramani et al., 2017; Hassinger-Das et al., 2020).

Recent literature increasingly emphasizes the value of integrating social-emotional objectives into play-based learning environments. When play activities are intentionally designed to promote emotional regulation, cooperation, and empathy, children are able to develop social-emotional competencies while simultaneously engaging with academic

content. This integrated approach is particularly relevant for mathematics learning, as emotionally supportive play contexts reduce anxiety, normalize mistakes, and encourage children to take intellectual risks (Whitebread et al., 2017). The integration of social-emotional objectives into play-based learning environments is therefore highly relevant not only for mathematics but also for early English language learning. Emotionally supportive play contexts encourage children to take communicative risks, make mistakes without fear, and actively engage in language use, which are essential conditions for developing early English readiness (Whitebread et al., 2017; Boaler, 2016).

Although the independent contributions of SEL and play-based learning to child development are well documented, empirical studies that explicitly examine their combined effects on mathematics learning readiness in early childhood remain limited. Many SEL-focused studies have concentrated on elementary or secondary school populations, with relatively few investigations targeting early childhood contexts (Jones et al., 2019). At the same time, research on early mathematics education often prioritizes cognitive skill acquisition while giving less attention to the social-emotional conditions that support or hinder children's readiness to learn mathematics (Sarama & Clements, 2019). As a result, there is a lack of integrated evidence demonstrating how play-based social-emotional programs influence early mathematical readiness. Moreover, while a growing body of research has examined social-emotional learning in relation to mathematics or literacy separately, empirical studies that simultaneously investigate the combined effects of play-based social-emotional programs on both mathematics and English language learning readiness in early childhood remain scarce (Sarama & Clements, 2019; Jones et al., 2019).

This gap in the literature is particularly significant given that early childhood represents a sensitive period during which social-emotional and cognitive development are deeply interconnected. Without adequate social-emotional support, children may struggle to fully benefit from mathematics instruction, regardless of the quality of the curriculum. Conversely, programs that intentionally combine play-based learning with social-emotional development may provide a more holistic and effective foundation for early mathematics learning. Such programs have the potential to enhance not only children's numeracy skills but also their confidence, persistence, and positive dispositions toward learning mathematics.

Accordingly, the present study extends prior research by examining the effectiveness of a play-based social-emotional program in enhancing early childhood readiness to learn both mathematics and English. By addressing these two foundational academic domains simultaneously, this study seeks to provide a more comprehensive understanding of how integrated social-emotional and play-based approaches can support holistic learning readiness in early childhood education.

2. Research Methodology

This study employed a quasi-experimental design using a pretest–posttest control group model to examine the effectiveness of a play-based social-emotional program on children's

readiness to learn mathematics and English language. This design was selected to allow comparison between children who participated in the intervention program and those who received conventional learning activities, while controlling for initial differences in learning readiness.

Participants and Research Setting

The participants of this study were children aged 5–6 years enrolled in early childhood education institutions. A total of 38 children participated and were divided into two groups: an experimental group and a control group. The experimental group received the play-based social-emotional program, while the control group followed regular classroom instruction without a structured social-emotional intervention. Participant selection was conducted using purposive sampling to ensure developmental equivalence between groups.

Intervention Procedure

The intervention was implemented over a period of six weeks, with play-based social-emotional activities integrated into daily classroom routines. The program consisted of cooperative games, role-play, storytelling, problem-solving play, and group activities designed to foster social-emotional competencies while embedding mathematics and English language concepts.

Mathematics concepts were introduced through play activities involving counting objects, comparing quantities, and recognizing patterns. English language exposure was integrated through songs, simple commands, storytelling, role-play, and interactive games that encouraged children to listen, respond, and communicate using basic English expressions. The control group continued with conventional learning activities without structured integration of social-emotional and play-based components.

Research Instruments

Data were collected using three main instruments:

a. Social-Emotional Skills Observation Sheet, used to assess children's emotional regulation, cooperation, attention, and persistence during learning activities.
b. Mathematics Learning Readiness Assessment, measuring children's engagement, understanding of early numeracy concepts, and attitudes toward mathematics learning.
c. English Language Learning Readiness Assessment, evaluating children's listening attention, participation in English activities, comprehension of simple instructions, and confidence in early English language use.

All instruments were developed based on relevant theoretical frameworks and were validated by experts in early childhood education. Reliability testing was conducted to ensure consistency of measurement.

Data Collection and Analysis

Pretests were administered to both groups prior to the intervention to measure initial levels of mathematics and English learning readiness. Posttests were conducted after the completion of the intervention period. Data were analyzed using descriptive statistics to

examine mean scores and standard deviations, and inferential statistics using an independent samples t-test to determine differences between the experimental and control groups. Statistical analysis was performed to identify the effectiveness of the play-based social-emotional program on both domains of learning readiness.

3. Results and Discussion

Results

The results of this study indicate that the play-based social-emotional program had a positive effect on children's readiness to learn both mathematics and English language. Overall, children in the experimental group demonstrated greater improvement in learning readiness compared to those in the control group.

Table 1. presents the scores of mathematics and English learning readiness for both groups before and after the intervention.

Table 1. Scores of Mathematics and English Learning Readiness

Learning Readiness Domain	Group	Mean	SD	Sig. (p)
Mathematics Readiness	Experimental	82.45	6.32	0.001
	Control	74.10	7.15	
English Language Readiness	Experimental	80.30	6.85	0.003
	Control	72.60	7.40	

The results presented in Table I indicate statistically significant differences between the experimental and control groups in both mathematics and English language learning readiness. Children in the experimental group obtained higher mean scores than those in the control group for mathematics readiness ($p = 0.001$) and English language readiness ($p = 0.003$). These findings suggest that the play-based social-emotional program had a significant positive effect on children's readiness to engage in early mathematics and English language learning activities.

Discussion

The findings of this study reinforce the theoretical perspective that social-emotional competencies function as foundational skills that support early academic readiness. Children who participated in the play-based social-emotional program demonstrated stronger readiness to learn mathematics, which aligns with previous research emphasizing the role of emotional regulation, attention, and persistence in early numeracy development (Blair & Raver, 2015; Ramani & Scalise, 2020). Through emotionally supportive play activities, children were able to manage frustration, tolerate mistakes, and remain engaged in mathematical tasks, thereby enhancing their learning readiness.

Similarly, the results related to English language learning readiness highlight the importance of social-emotional support in early language acquisition. Learning a new language can be emotionally demanding for young children, particularly when it involves speaking and

responding in front of peers. The play-based social-emotional program created a low-anxiety learning environment in which children felt safe to experiment with language, make mistakes, and participate actively. This finding is consistent with research suggesting that emotionally supportive and socially interactive contexts promote early language engagement and communication skills (Denham et al., 2016; Zosh et al., 2018).

The synthesis of findings across mathematics and English learning readiness suggests that play-based social-emotional learning serves as a unifying mechanism that enhances children's overall readiness to learn. Rather than treating academic domains as isolated areas, the program supported underlying competencies—such as self-regulation, cooperation, motivation, and confidence—that are transferable across learning contexts. This integrated effect supports prior evidence that social-emotional learning contributes broadly to academic outcomes when embedded within developmentally appropriate pedagogical approaches (Taylor et al., 2017; Jones et al., 2019).

Furthermore, the use of play as the primary instructional medium was a key factor in the program's effectiveness. Play allowed children to engage cognitively, socially, and emotionally while interacting with mathematical concepts and English language input in meaningful ways. This finding supports earlier studies demonstrating that play-based learning enhances both academic engagement and emotional well-being in early childhood education (Bodrova & Leong, 2017; Whitebread et al., 2017).

Overall, the results of this study provide empirical support for the integration of play-based social-emotional programs in early childhood education to enhance readiness in both mathematics and English language learning. By addressing children's emotional and social needs alongside academic objectives, educators can create more inclusive, motivating, and effective learning environments that support holistic early development.

4. Conlusion

This study concludes that a play-based social-emotional program is effective in enhancing early childhood readiness to learn mathematics and English language. Children who participated in the program demonstrated improved attention, persistence, cooperation, and confidence, which supported their engagement in early numeracy and basic English language activities. The integration of social-emotional learning into play-based activities provides a developmentally appropriate and emotionally supportive learning environment that facilitates academic readiness across multiple domains. Therefore, play-based social-emotional programs should be considered an essential component of early childhood education to support holistic learning readiness. Future research is recommended to examine long-term effects and broader implementation contexts.

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