Utilizing Eduball in Enhancing Pre-Literacy Skills Among Kindergarten Learners

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ABSTRACT

This study explored how using Eduball, a set of educational balls with letters and symbols, can help improve the pre-literacy skills of kindergarten students. These skills include recognizing letters, sounds, and forms, which are essential for learning to read and write. The research was conducted at Musuan Integrated School in Bukidnon, Philippines, involving two groups of learners aged 5 to 6. One group used Eduball in their learning, while the other group followed traditional methods. The study used pretests and post-tests to measure the children's skills before and after the intervention. Results showed that learners who used Eduball improved more in recognizing uppercase and lowercase letters and identifying letter sounds than those who did not use the tool. Many students who started at the "pre-developing" level moved to "developing" or even "proficient" after using Eduball. The findings suggest that combining movement and play with learning, like what Eduball offers, can make lessons more engaging and effective for young children. This is especially helpful in rural schools with limited resources, where traditional teaching methods may not fully meet the needs of active learners. The study supports that children learn better when active, involved, and having fun. It also highlights the importance of introducing cost-effective and innovative tools like Eduball to improve early literacy, especially when students struggle with basic reading skills. Teachers, parents, and school leaders can all benefit from this approach, which encourages learning through play and supports a more joyful and interactive classroom experience.

Keywords: Eduball, Pre-Literacy Skills, Early Childhood, Letter Recognition, Play- Based Learning

INTRODUCTION

In the early years of education, developing pre-literacy skills such as recognizing letter names, sounds, and forms is fundamental to a child's reading and writing success. These skills are particularly crucial during the kindergarten stage, which serves as a critical period for building the foundational abilities necessary for future academic achievement. One innovative tool designed to support this development is Eduball or the Educational Ball, a pedagogical innovation originally developed in Poland. Eduball consists of softballs printed with letters, numbers, and symbols, allowing young learners to engage in physical activities while simultaneously practicing literacy concepts. By integrating cognitive learning with movement-based tasks, Eduball aligns with kinesthetic learning principles and promotes engagement, retention, and enjoyment among early learners. This educational approach responds to increasing calls within the early childhood education field for multisensory and interactive strategies that accommodate diverse learning styles.

This study investigates the effectiveness of utilizing Eduball in enhancing pre-literacy skills among kindergarten learners at Musuan Integrated School, a rural public school in Maramag, Bukidnon. The research is grounded in Vygotsky's theory of social constructivism, which posits that learning is most effective when learners are actively engaged in meaningful, socially driven tasks. The study addresses the persistent issue of low literacy performance among Filipino learners, a problem highlighted by national and international assessments. Despite evidence suggesting the benefits of physical activity in boosting cognitive development,

limited studies have explored how tools like Eduball can directly impact literacy development in early childhood, particularly in under-resourced settings. Specifically, the research aims to (a) assess the pre-literacy skill levels of learners exposed and not exposed to Eduball and (b) determine whether there is a significant difference in the pretest and post-test scores between the two groups. The findings of this study may contribute to early childhood education practices by offering evidence on the value of incorporating movement-based learning tools to improve literacy outcomes, especially in schools facing resource constraints. The hypothesis tested is that there is a significant difference in the level of pre-literacy skills of kindergarten learners before and after exposure to Eduball. The findings of this research may benefit learners by providing a more enjoyable, active learning experience; teachers by offering an innovative instructional strategy; school administrators by informing curriculum decisions; parents by encouraging active involvement in their children's literacy development; and future researchers by contributing to the growing field of kinesthetic and movement-based learning in early childhood education.

METHODOLOGY

The study employed a quantitative, quasi-experimental research design to assess the effectiveness of Eduball in enhancing pre-literacy skills among kindergarten learners at Musuan Integrated School. The research utilized intact groups, where one group engaged in Eduball activities while a control group followed traditional teaching methods. The participants, aged 5 to 6 years old and identified as needing additional literacy support, were randomly selected from three kindergarten classrooms. A standardized pre-literacy assessment was administered as both a pretest and post-test, measuring skills such as uppercase and lowercase letter recognition and letter sound identification. The study aimed to evaluate whether Eduball significantly improved pre-literacy skills compared to traditional approaches. Data collection involved obtaining necessary approvals, securing informed consent from parents, and conducting the Eduball activities over two weeks. The pretest was administered to establish baseline skills, followed by engaging activities that included a "letter shooting game" to reinforce learning. After the intervention, a post-test was conducted to measure progress. The data analysis utilized descriptive statistics and ANCOVA to compare pretest and post-test scores, accounting for initial skill differences. Ethical considerations were upheld throughout the study, ensuring confidentiality and adherence to local cultural norms. The findings aimed to highlight the effectiveness of Eduball in improving foundational literacy skills in a rural educational context.

RESULTS AND DISCUSSION

The study's findings revealed that kindergarten learners exposed to Eduball showed greater improvement in their pre-literacy skills compared to those who received traditional instruction. Learners in the experimental group made significant gains in uppercase and lowercase letter identification, as well as letter sound recognition. Many of these learners advanced from the "Pre-Developing" level to either "Developing" or "Proficient" after participating in Eduball activities, a progress that was notably more substantial than that of the control group. The use of Eduball provided an engaging, interactive learning experience that aligned well with kinesthetic and multisensory learning theories, allowing learners to retain concepts more effectively through movement and play. These results affirm that Eduball is a valuable educational tool for enhancing early literacy, particularly in rural or under-resourced settings where traditional methods may fall short in addressing the diverse learning needs of young children.

The figures below illustrate the comparative results between the experimental group, who participated in the Eduball intervention, and the control group, who received traditional instruction. Each group consisted of 15 kindergarten learners, with the experimental group engaging in physically active, multisensory learning through Eduball, while the control group followed conventional teaching methods. The data reflect the performance of both groups during the pre-test and post-test phases, specifically assessing their ability to identify uppercase letters, lowercase letters, and recognize letter sounds. This presentation of data also includes the percentage distribution of learners across three reading levels pre-developing, developing, and proficient based on their assessment outcomes. These levels provide a clearer understanding of the learners' pre-literacy development, allowing for a more meaningful comparison between the instructional strategies used. By highlighting both numerical scores and performance categories, the data emphasize not only the statistical improvements observed but also the practical significance of using interactive learning tools like Eduball to

enhance early literacy skills in young children.

Level of Pre- Literacy Skills Among Kindergarten

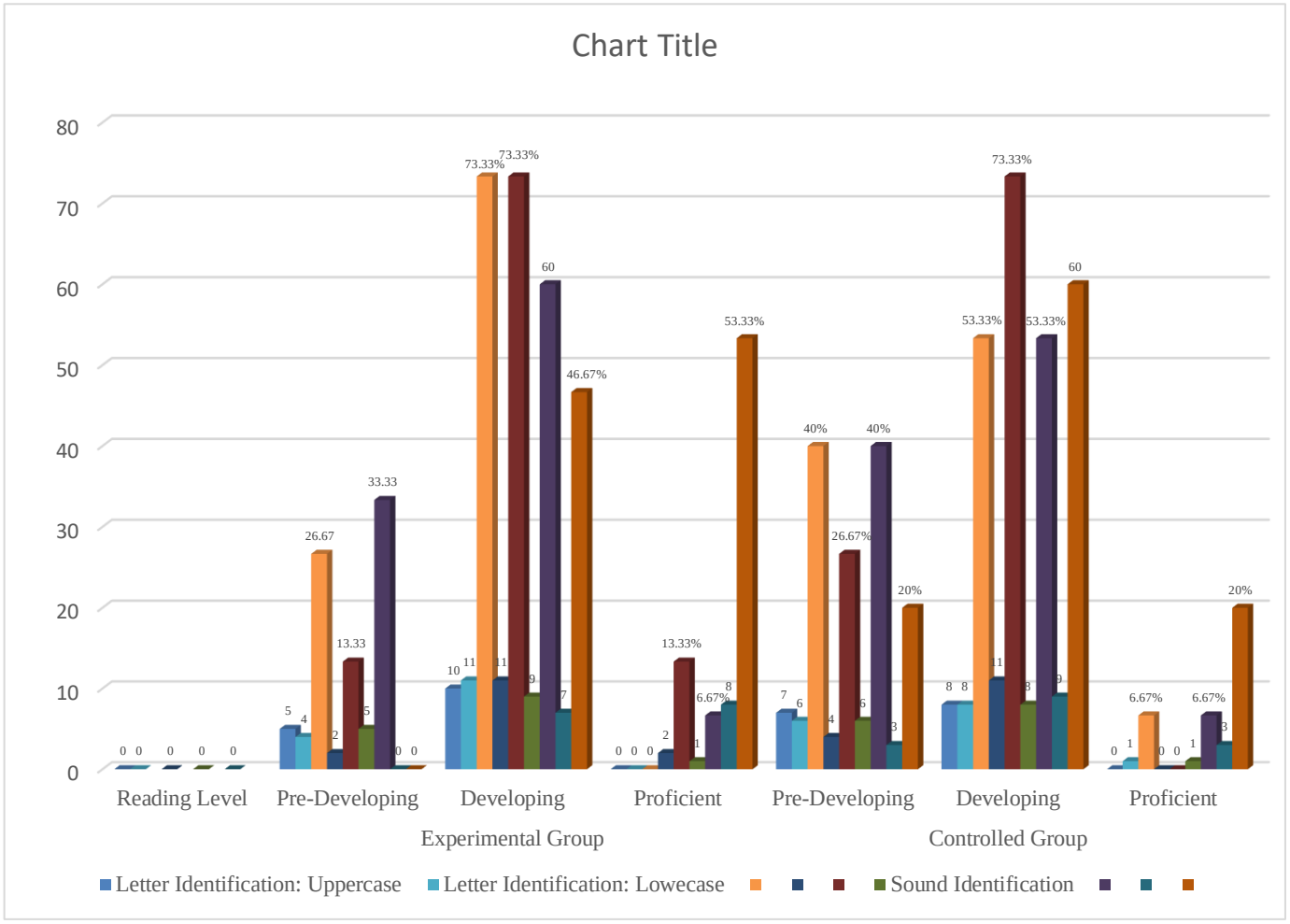


Figure 1: Level of Pre-Literacy Skills Among Kindergarten Learners in Letter Identification: Uppercase and Lowercase, Sound Identification

The figures showed that kindergarten learners in the experimental group who used Eduball demonstrated greater improvement in uppercase, lowercase, and sound identification compared to those in the control group who received traditional instruction. Initially, both groups had a majority of learners at the developing level and a significant number still pre-developing across all three areas. However, after the intervention, the experimental group showed a marked reduction in pre-developing learners and noticeable increases in those reaching proficiency. Specifically, in uppercase letter identification, none remained pre-developing, and 20% became proficient. The result aligned with the findings of Justice et al. (2016), who noted that children typically recognize uppercase letters earlier than lowercase ones, due to their uniformity and prominence in everyday contexts. In lowercase letters, 13.33% reached proficiency, Kühn and Saine (2021), who found that systematic and playful instruction methods significantly improved young children's ability to recognize and name lowercase letters, especially when integrated with movement and tactile activities. Their study emphasized that lowercase letters require more deliberate teaching strategies due to their complexity and children's limited exposure to them in everyday settings.

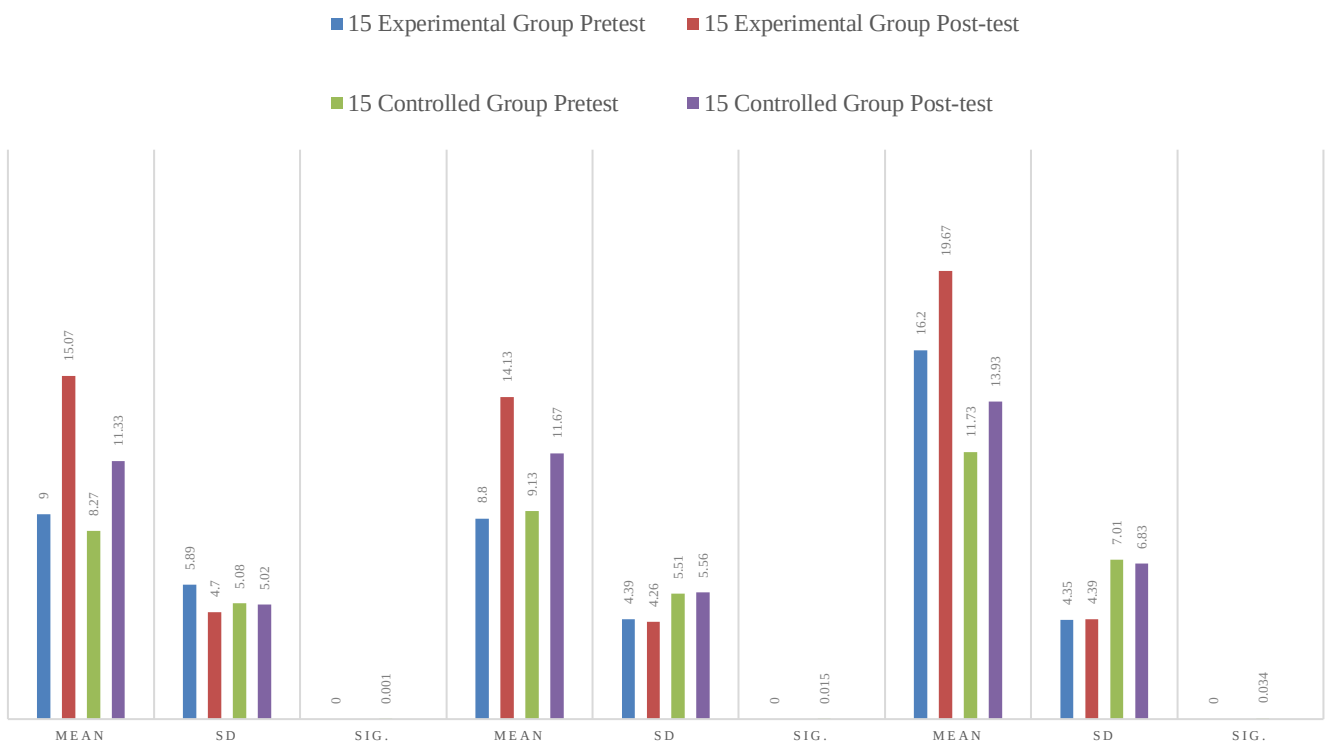
and in sound identifications notably more challenging skill over half (53.33%) advanced to the proficient level. These findings aligned with Lonigan et al. (2015), who emphasized that young learners made the greatest gains in phonological awareness when provided with systematic and explicit instruction in sound-letter relationships. Furthermore, Al Otaiba et al. (2019) demonstrated that integrating multisensory strategies into phonemic awareness instruction significantly improved early reading skills. Additionally, Martinez and Bingham (2023) highlighted the benefits of incorporating physical movement into early literacy learning,

finding that kinesthetic activities enhanced engagement and retention of phonological concepts among young children.

In contrast, the control group, which followed the traditional method, showed only modest gains. Although there was a decrease in the number of pre-developing learners across all skill areas, no students in the control group reached the proficient level in either uppercase or lowercase letter identification, and only a small number (20%) achieved proficiency in sound identification. These outcomes suggest that while traditional instruction had some impact, it was not as effective as the multisensory approach implemented through Eduball. The consistent underperformance in the control group highlights the need for more engaging and integrative teaching strategies in early literacy development.

These results highlight the effectiveness of the Eduball intervention in enhancing pre-literacy skills among young learners. These findings are supported by Mitak et al. (2022), who found that using a multisensory approach integrating visual, auditory, tactile, and kinesthetic activities significantly improved students' reading speed, letter recognition, engagement, motivation, and confidence. Similarly, Lumor et al. (2025) confirmed that engaging multiple senses enhanced letter formation scores, reinforcing the effectiveness of multisensory strategies in improving letter recognition and learning retention.

Figure 2: Difference of Pre-test and Post test of Pre- Literacy Skills among Kindergarten Learners in Letter Identification: Uppercase and Lowercase and Sound Identification



Difference of Pretest and Post-test Scores of Kindergarten Learners

The figures above illustrate the differences in the pre-test and post-test scores of kindergarten learners. It is evident that both the experimental and control groups showed improvement from the pre-test to the post-test in terms of uppercase and lowercase letter identification as well as sound identification. This indicates that both the Eduball-based intervention and the traditional teaching methods had a positive impact on the learners' pre-literacy skills. However, a closer look at the data reveals that the experimental group those who were taught using Eduball demonstrated significantly greater gains compared to control group who used traditional method. This suggests that the Eduball approach was more effective in enhancing pre-literacy skills. One possible reason for this is the active and engaging nature of Eduball as a learning tool. Through the integration of movement, play, and academic content, Eduball created an interactive and enjoyable learning environment.

The learners in the experimental group were more physically and mentally engaged during instruction, which may have contributed to better attention, retention, and motivation. This level of engagement likely facilitated deeper learning and stronger skill acquisition, particularly in recognizing letters and associating them with their corresponding sounds.

In uppercase letter identification, learners in the experimental group demonstrated a greater improvement, increasing from a mean of 9.00 to 15.07, compared to the control group's increase from 8.27 to 11.33. The standard deviation in the experimental group decreased after the intervention, suggesting more consistent performance. The p-value of 0.001 for the experimental group strongly supports the conclusion that Eduball significantly contributed to improved outcomes. The superior performance is attributed to the kinesthetic and multisensory nature of Eduball, which fosters active learning and stronger memory retention. This aligns with Vinter et al. (2023) and Treiman et al. (2017), who noted that movement-based familiarity, especially with letters found in children's names, enhances letter recognition.

Similarly, the experimental group showed marked progress in lowercase letter identification, with their mean score rising from 8.80 to 14.13, whereas the control group's mean rose only from 9.13 to 11.67. The p-value for the experimental group was 0.000, again affirming a significant impact of the intervention. The interactive Eduball activities appear especially effective in teaching lowercase letters, which are often more challenging due to their variability and less frequent exposure. This finding is backed by Johnson (2016), who emphasized the need for direct and differentiated instruction for lowercase letters, as children do not automatically transfer their uppercase knowledge to lowercase forms. Eduball seems to meet this need effectively through its playful and physically engaging format. In terms of sound identification, the experimental group again showed a more substantial improvement from 16.20 to 19.67 compared to the control group's progress from 11.73 to 13.93. The p-value of 0.000 for the experimental group confirms a highly significant improvement, while the control group's p-value of 0.034 also indicates progress, albeit less pronounced. The results suggest that Eduball's combination of physical movement and repetition strengthens phonemic awareness more effectively than static methods. Supporting this, Dodd et al. (2017) and Evans et al. (2018) argue that multisensory instruction aids in recognizing sounds, particularly in learners with lower phonological memory or from low-SES backgrounds.

CONCLUSION

This study conclude that Eduball is a significantly more effective instructional tool for enhancing pre-literacy skills among kindergarten learners compared to traditional teaching methods. Both the experimental and control groups began the intervention with similarly low pretest scores, indicating a comparable baseline in their pre-literacy development. However, after the intervention, the experimental group who participated in Eduball activities demonstrated significantly higher post-test scores in all assessed areas: uppercase letter recognition, lowercase letter recognition, and letter sound identification. A notable number of learners in the Eduball group achieved a "Proficient" rating, reflecting marked improvements in their literacy abilities. In contrast, the control group, which continued with standard instruction, showed only modest gains, with very few reaching the proficiency level. The experimental group's larger mean score increases underscore the value of integrating movement-based, interactive learning tools like Eduball in early childhood education, especially in fostering substantial growth in foundational literacy skills.

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