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# Analysing Pre-Primary Students' Mathematics Performance Through the Use of Educational Construction Toys

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**Abstract:** This study analyses the impact of manipulative learning tools, specifically the Engino toy blocks, on the mathematical performance of pre-primary students, especially in understanding the sections of counting and addition. The research hypothesis states that students using Engino toy blocks will perform significantly better than those using traditional learning methods. An experimental design of randomly assigning the students was employed, involving 50 students divided equally into an experimental group (students who used Engino toys) and a control group (students who did not use Engino toys). Statistical analysis included mean comparison, standard deviation and independent t-test to analyse performance differences. Findings indicate that students in the experimental group performed better, showing a mean value increase of approximately 37% compared to the control group, and a p-value was also found to be less than the significance level of .05. The large effect size of 0.83 demonstrates a strong influence of using the toy blocks in their learning experience. These results highlight the effectiveness of Engino toy blocks in improving engagement and deeper understanding of the concepts in early mathematics education.

**Keywords:** *Applied mathematics, Engino, enhanced learning, innovative learning techniques, statistics.*

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## Introduction

### *Problem Statement*

Teaching mathematics, especially to pre-primary students, presents challenges, including low student engagement, insufficient teaching strategies and difficulties in understanding different mathematical concepts (Björklund, 2015; Cotton, 2016). The traditional teaching methods usually fail to enhance students' cognitive thinking and learning skills, leading to significant gaps in proficiency in mathematics (NG, 2006). Given the importance of foundational mathematical concepts and skills in early education, there is a need for innovative teaching strategies that promote active participation and a deeper understanding of the topics.

Hence, hands-on learning approaches, such as Engino toy blocks, have the potential to address these challenges by encouraging students to visualise and solve mathematics questions. Previous studies have shown the effectiveness of block-based learning tools in enhancing numeracy skills and logical thinking among students (Gejard & Melander, 2020; Kinzer et al., 2016; Pirrone et al., 2018). Moreover, it is essential to highlight the significance of cultivating fundamental mathematical principles during early education in order to establish a solid groundwork for future mathematical achievements (Montague-Smith et al., 2017). However, research analysing the impact of manipulative learning tools such as Engino toy blocks is very scarce. This study aims to fill this gap by examining whether incorporating Engino toy blocks into mathematics lessons improves student performance in counting and addition.

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*Research Question*

Does the use of hands-on learning approaches, such as Engino toy blocks in pre-primary mathematics education, enhance student performance in counting and addition compared to traditional teaching methods?

*Research Objectives*

This research focuses mainly on assessing the impact of manipulative learning tools like Engino toy blocks on pre-primary students' mathematics performance in counting and addition. It also aims to compare the learning outcomes of students using Engino toy blocks with those using traditional teaching methods and evaluate student engagement when learning these concepts using hands-on activities. This study also addressed the effectiveness of Engino toy blocks as a tool for improving problem-solving skills and teamwork in early childhood education.

*Background to Engino and its Toy Blocks*

Engino is a Cypriot company established in 2004 that manufactures a range of construction-based toy sets designed to enhance children's learning experiences. These sets allow the students to create complex models, promoting engagement in science, technology, engineering and mathematics (STEM) education (Antoniou et al., 2019). The unique design of these blocks enables multidirectional connectivity, facilitating hands-on learning of concepts for better understanding (Araújo et al., 2017).

*Figure 1. Notion of How Engino Blocks Work*

In recent years, hands-on learning tools have played a crucial role in the early education of students. Literature suggests that structured play with construction toys improves problem-solving skills, critical thinking and comprehension of mathematical concepts (Bennett & Weidner, 2014; Di Paola et al., 2020; Muñoz et al., 2020). However, while various hands-on learning structures have been examined, limited research exists on the specific impact of Engino toy blocks on mathematics education in pre-primary students.

*Hypothesis*

The following hypothesis testing was performed:

$H_0$ (Null hypothesis): There is no significant difference in student performance between students using hands-on tools like Engino toy blocks and those using traditional methods.

$H_1$ (Alternate hypothesis): There is a significant difference in student performance between students using hands-on tools like Engino toy blocks and those using traditional methods.

This research contributed to the growing body of knowledge on hands-on learning in early mathematics by analysing both qualitative and quantitative data. The results will help the teachers, and the policymakers understand the effectiveness of Engino toy blocks as a teaching tool, providing insights into their potential inclusion into the early childhood curriculum.

## Literature Review

Early childhood mathematics education is vital for developing foundational numeracy skills. However, the traditional methods fail to engage the students effectively when explaining the concepts (Björklund, 2015). Hands-on learning tools have gained more attention in recent years for their ability to improve mathematical understanding through interactive activities (Di Paola et al., 2020). Among these, block-based learning approaches have been shown to have a positive impact on students' spatial reasoning and problem-solving skills (Simoncini et al., 2020). This section critically examines existing studies on manipulative-based learning, summarises the key findings and highlights the research gap this study aims to address.

*Manipulative-Based Learning and Mathematics Performance*

Studies have consistently shown the effectiveness of manipulative-based learning in early mathematics education. Research by the author McDougal et al. (2023) found a strong correlation between block construction skills and mathematics performance, especially in areas such as spatial reasoning and cognitive thinking.

Similarly, Gilligan-Lee et al. (2023) showed that young children who engaged in structured block play exhibited higher arithmetic knowledge than those who did not. These results also align with Poon (2018), who highlighted the benefits of interactive learning tools for students from different socio-economic backgrounds.

While the above-mentioned literature confirms that block-based learning enhances early mathematical skills, they primarily focus on general construction toys. The effectiveness of Engino toy blocks designed specifically for structured educational purposes remains underexplored. Hence this study aims to bridge the gap by investigating whether Engino blocks can improve pre-primary students' learning outcomes in the topics of counting and addition.

*Engino Blocks and Their Impact on Mathematics Education*

Engino toy blocks differ from traditional construction toys due to their modular design, allowing for more complex and intricate model-building (Araújo et al., 2017). While prior literature has explored the role of Engino toys in engineering and robotics education, few studies have analysed their impact on early childhood mathematics learning (Almpani & Almisis, 2021).

Recent studies suggest that integrating structured, manipulative-based learning can enhance students' conceptual understanding. Kinzer et al. (2016) found that students who participated in guided block play showed better mathematical reasoning and problem-solving skills than those who relied solely on abstract instruction. However, limited research has assessed whether Engino toy blocks offer better benefits compared to other manipulatives.

*Research Gap and Rationale for This Study*

Despite the research on manipulative-based learning, the following gaps remain concerning Engino toy blocks:

1. There is limited focus on Engino blocks in mathematics education.
2. There is also a lack of comparative studies between Engino-based learning to traditional methods in pre-primary education.
3. The need for empirical evidence on the effectiveness as there is a lack of quantitative data analysis on specific learning gains with Engino blocks.

This research addressed these gaps by experimentally evaluating the effectiveness of Engino toy blocks in enhancing pre-primary students' performance in counting and addition. Through quantitative analysis of student outcomes and qualitative insights from teacher feedback, this research provides a data-driven assessment of Engino block's role in mathematics education.

## Methodology

*Research Approach*

This research employs a true experimental design with random assignment to analyse the impact of hands-on tools such as Engino toy blocks on pre-primary students and their student performance in mathematics. The study was conducted at the Engino Summer Academy where students were randomly assigned to either an experimental group (n = 25) using Engino toy blocks or a control group (n = 25) following traditional teaching methods.

To ensure comparability, the intervention focussed on the fundamental concepts, of counting and addition. The study lasted for four weeks, with both groups receiving instruction for the same duration and similar classroom conditions. The control group used traditional teaching techniques, including worksheets, verbal explanations and number exercises, whereas the experimental group incorporated Engino toy blocks for concept reinforcement.

A sample of 50 students was considered based on power analysis, ensuring an adequate sample to detect a moderate effect size (Cohen's d = 0.8) at a power level of 0.8 and $\alpha = .05$ significance level. Additionally, prior studies in manipulative-based learning in mathematics education have used similar sample sizes, validating this approach (McDougal et al., 2023).

Students were randomly assigned using a computer-generated randomisation method. Each participant was given a unique ID, and a random number generator was used to allocate them to either the experimental group or the control group. This also ensured the equal distribution of students with varied skill levels in both groups, minimising selection bias.

*Qualitative Analysis*

The questionnaires provided for the students (Refer Appendix A) and teachers (Refer Appendix B) will be analysed to provide a qualitative aspect of the research. The questionnaire provided for the students had 8 questions in total and the questionnaire given to the teachers had 13 questions in total. Data about each question of the questionnaire will be collated using Excel software and the responses by the teachers after using Engino models, are depicted initially using graphs. Matlab software was used to validate the results from Excel and to find the mean and standard deviation of the dataset.

To ensure validity, the questionnaires were reviewed by three independent mathematics educators. Cronbach's alpha was obtained to assess the internal consistency yielding $\alpha = 0.82$ for students and $\alpha = 0.86$ for teachers indicating high reliability.

Challenge cards were employed to analyse student's problem-solving abilities. Each student was given a set of mathematics-based tasks aligned with the curriculum for the topics, of counting and addition. These challenge cards were also reviewed by the independent educators and a pilot study was conducted with 10 students to ensure clarity and appropriateness for pre-primary learners. Correct answers will give them 2 points and incorrect answer gets them 0 points. The maximum possible score per student was 20 points.

*Quantitative Analysis*

Several statistical analysis were conducted to study the impact of manipulative learning tools like Engino toy blocks on student performance.

The subsequent procedure was executed to do the analysis.

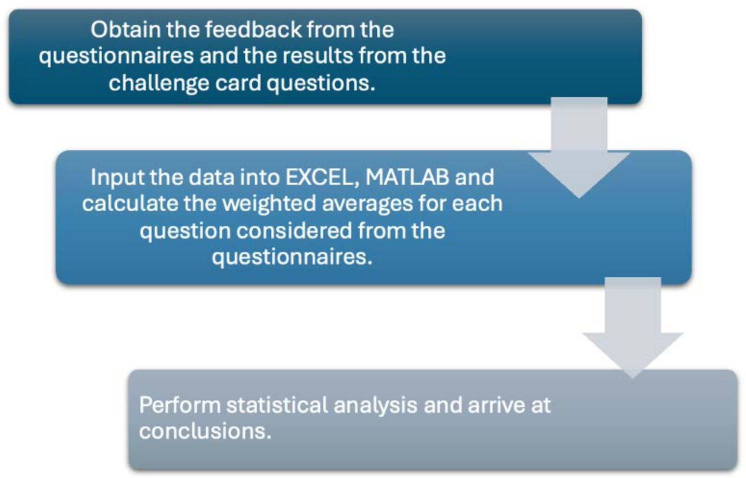


*Figure 2. Process Used for This Study*

Descriptive statistics, including mean, median and standard deviation, were found for both experimental and control groups. An independent t-test was performed to compare the mean scores of the two groups, assessing whether the observed differences were statistically significant. Before the t-test, the assumptions of normality and homogeneity of variance were checked using the Shapiro-Wilk test and Levene's test. The Shapiro-Wilk test was assigned to see whether the data followed a normal distribution, and the $p$-value found connected to this test was greater than .05, which confirms normality. Similarly, the $p$-value obtained from Levene's test was greater than .05, indicating that the assumption of equal variances between the groups was met.

It is acknowledged that there are many branches for Mathematics concepts, but again only the catalytic modules on counting and addition are considered so as to find evidence of the impact of Engino blocks on student performance. The same method, however, can be used and extended to other modules in different age groups, not only mathematics-related but also to any other field.

Effect size in statistics is the quantitative measure of the magnitude of an event (Coe, 2012; Sofroniou et al., 2020). This topic is typically associated with the application of hypothesis testing in the field of statistics. To measure the magnitude of the difference between the two groups, Cohen's d was calculated providing the difference between the two groups. Cohen's d values are interpreted as follows:

1. 0.2 or higher represents a smaller effect size
2. 0.5 or higher shows a medium effect size.
3. 0.8 or higher demonstrates a larger effect size.

This is also utilised by Hedge's and Olkin's equation, and it may be computed using Excel (Sofroniou & Poutos, 2016; Sofroniou & Premnath, 2023).

Typically, the absolute effect size is taken into account when assessing the statistical characteristics of the variables (Ialongo, 2016; Sofroniou & Premnath, 2024). This study also highlights the significance of effect magnitude. It is primarily utilised in any conversations about statistics (Sofroniou et al., 2020).

The statistically significant threshold was set at .05. If the t-test yields a *p*-value lower than this threshold, the null hypothesis would be rejected, and the alternate hypothesis would be accepted.

Missing data, which accounted for less than 5% of responses, were handled using multiple imputations to prevent data loss bias. This method ensured that the dataset remained statistically robust by estimating missing values based on observed data patterns.

## Results

*Qualitative Analysis*

Figures 2 and 3 show the results of each question considered from the students' and teachers' questionnaires respectively regarding the use of Engino toy blocks in mathematics education. They portray the questions affecting the use of Engino blocks for the modules considered. These visualisations highlight patterns in engagement, enjoyment and effectiveness of learning.

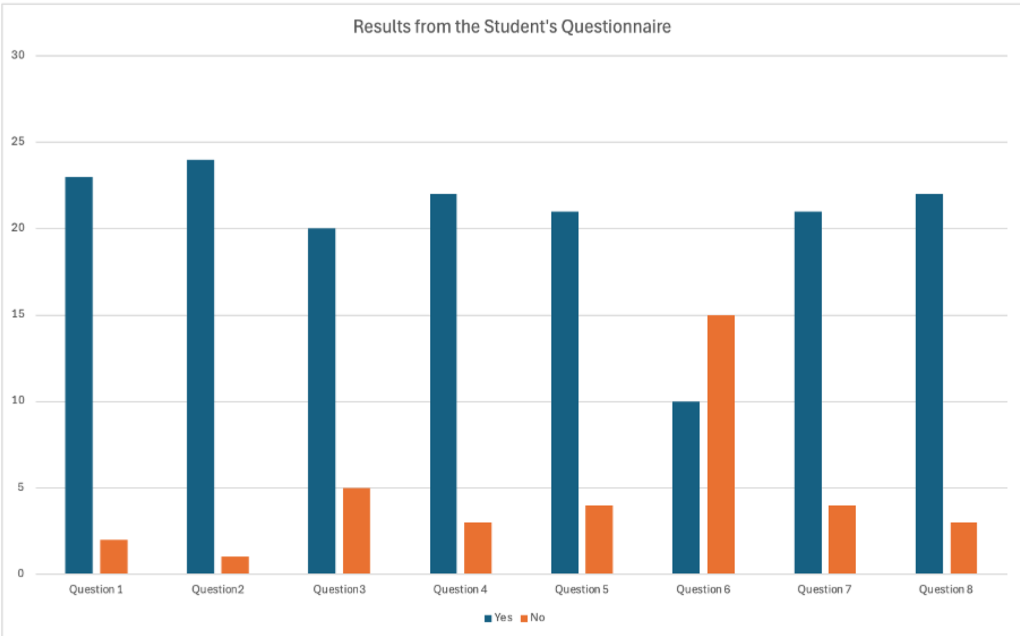


*Figure 3. Results from the Student's Questionnaire.*

Figure 3 shows the feedback from the students' questionnaire after they have used Engino toy blocks for their activities. Questions 1 (Did you enjoy using Engino blocks in class?) and Question 2 (Did you have fun building things using Engino blocks?) have the highest number of "Yes" responses, indicating they were likely the most positively received.

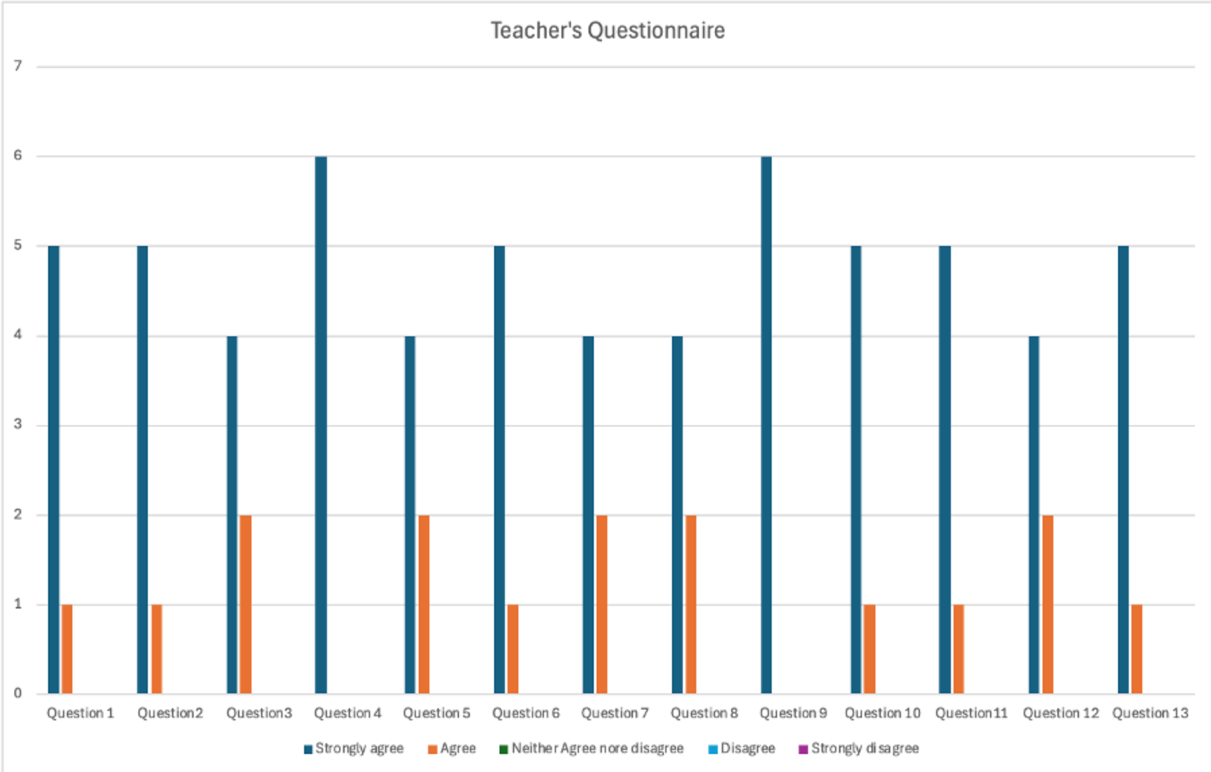


*Figure 4. Results from the Teacher's Questionnaire*

Figure 4 illustrates the data collected from the questionnaire administered to the teachers. The vast majority of replies to most questions fell into the "Strongly Agree" and "Agree" categories, indicating a remarkable level of agreement. The observed pattern indicates a robust and consistently positive agreement among the participants for all the questions.

Question 4 (Sufficiency of Engino materials) and Question 9 (Teaching objectives met) received only "Strongly Agree" responses, suggesting that teachers found Engino highly effective for lesson planning and curriculum alignment. However, open-ended responses revealed a need for additional 3D shape activities to allow students to construct more complex structures and take-home kits for further engagement so that they could practice outside the classroom. These suggestions will enhance the student's performance even more and help them understand complex concepts in detail.

*Table 1. Proportion of 'Yes', Absolute Differences and Standard Deviations for each Question*

| Question | Proportion of Yes | Absolute Difference | Standard Deviation |
|---|---|---|---|
| Question 1 | 0.92 | 0.04 | 0.2713 |
| Question 2 | 0.96 | 0.08 | 0.196 |
| Question 3 | 0.8 | 0.08 | 0.4 |
| Question 4 | 0.88 | 0 | 0.325 |
| Question 5 | 0.84 | 0.04 | 0.3666 |
| Question 6 | 0.4 | 0.48 | 0.4899 |
| Question 7 | 0.84 | 0.04 | 0.3666 |
| Question 8 | 0.88 | 0 | 0.325 |

Table 1 above shows the Proportions of 'Yes' (mean values), absolute values and the standard deviations from the questionnaire results conducted for the students.

Questions 1, 4, 5, and 7 have proportions close to Question 8, showing that students responded similarly to these questions compared to Question 8.

Question 2 has a slightly higher proportion of "Yes" responses, while Question 3 has a slightly lower proportion. However, the most significant difference is with Question 6, where the proportion of "Yes" responses is much lower than in Question 8.

Question 1 and 2 have high mean values than the others and they also have very low standard deviation values. Low standard deviation values show that the responses were consistent for these two questions compared to the other questions.

A qualitative thematic analysis from the feedback of the teachers revealed key themes regarding the use of Engino toy blocks in teaching mathematics.

1. It increased student engagement, with teachers stating that the students were more focused and actively involved in lessons when using Engino blocks. The hands-on activities captured student's interest and sustained their attention in the classroom.
2. It improved collaboration and teamwork within the group. Students worked well together, sharing ideas and enhancing their communication skills. The interactive nature of the activities encouraged cooperative learning.
3. A need for further support was identified. Some teachers requested additional resources for extended lesson plans and to integrate Engino blocks into the broader range of mathematical concepts.

*Quantitative Results*

The aim of this study was to investigate the effectiveness of using hands on tools such as Engino toy blocks for pre-primary students' mathematics education. The results from the challenge cards were analysed and each student was given a score out of 20 points. The arithmetic means, and standard deviations of the experimental and control groups were extracted for each based on the level of students' performance, as shown in Table 2.

*Table 2. Mean and Standard Deviation of Challenge Card Scores for Experimental and Control Groups*

| Group | Mean | Standard Deviation |
|---|---|---|
| Experimental (Using Engino) | 11.875 | 1.583 |
| Control (Without using Engino) | 8.655 | 3.587 |

Analysis of Table 2 reveals that the average score of the students in the experimental group, 11.875, is 3.22 points higher than the average score of the control group, 8.655. The small standard deviation value, 1.583, seen in the Experimental group indicates the high level of consistency in student performance, as the findings are tightly concentrated around the mean value.

The control group has a higher standard deviation of 3.587, suggesting that the scores of the participants in this group range more from the group's mean of 8.655. Contrasting with the experimental group, the participants in the control group exhibited less consistency, as seen from their heightened variability.

The $p$-value found was .04421 for the independent t-test which is less than the significance value of .05. Hence, we reject the null hypothesis and conclude that there is a significant difference in student performance between the Experimental Group (those who used Engino toy blocks) and the Control Group (those who did not use Engino toy blocks).

The effect size (Cohen's d = 0.83) shows a larger effect size, demonstrating that the differences observed between the two groups are statistically significant and practically meaningful. This shows that the Engino blocks have a strong educational impact, making them a valuable tool for enhancing early mathematics education. That is, students who used hands-on application tools like Engino blocks showed a significantly higher likelihood of grasping counting and addition concepts compared to those who relied on traditional methods. These results reinforce the importance of incorporating hands-on learning tools in mathematics education. Furthermore, the absolute value of the Pearson correlation coefficient was found to be .51, demonstrating a robust linear relationship between Engino block usage and mathematical performance, further validating the effectiveness of this approach in early childhood education.

By integrating both qualitative teacher feedback and quantitative test results a comprehensive impact of the Engino blocks can be seen. The statistically significant improvement in student performance (t-test results) aligns with teacher observations, highlighting increased teamwork and engagement. However, teacher feedback suggests providing additional training on Engino implementation and expanding the use of challenge cards to include word problems.

These findings highlight that while Engino blocks help in improving student performance, their integration into the curriculum should be continuously refined to maximise learning outcomes.

## Discussion

The research findings indicate that the use of manipulative tools like Engino blocks in teaching mathematics to pre-primary students has a notable and beneficial effect. The results demonstrate the enhancement in students' average performance when Engino toy blocks are integrated into their educational curriculum. Students in the experimental group outperformed those in the control group, having a higher average score. Cohen's d, and Pearson's correlation coefficients all validated the positive impact of the Engino toy blocks. These results align with prior research emphasising the importance of hands-on learning tools in early mathematics education (Simoncini et al., 2020).

The positive impact of Engino blocks can be attributed to factors like tactile and interactive nature. This enhanced students' engagement and motivation, making mathematics concepts more understandable. Teachers reviewed that the students in the experiment group were more focused and enthusiastic. Also, the structured use of Engino blocks may have provided a clearer learning progression to the learners, gradually building on their mathematical skills.

One possible factor influencing the results is prior mathematical ability, as some students may have stronger foundational skills, giving them an advantage in learning the topics. Although random assignment aimed to minimise pre-existing differences, it is possible that students with higher problem-solving skills naturally benefitted more from using Engino blocks.

Comparing these findings with previous studies, the results are consistent with the evidence supporting the effectiveness of hands-on learning tools in early mathematics education. Researchers found significant improvements in mathematical learning when structured block play is incorporated within the learning environment (Gilligan-Lee et al., 2023; McDougal et al., 2024). While primarily centred around other construction toys, these studies align with the outcomes observed using the Engino blocks. Similarly, Kinzer et al. (2016) also highlight that these blocks play a vital role in enhancing problem-solving skills when compared to traditional methods. This current study extends these results by focussing on Engino blocks, offering new insights into their potential educational benefits.

Several confounding variables like classroom dynamics may have also influenced the results of the study. Engino-based lessons encouraged collaborative activities, which may have led to improved teamwork. Additionally, individual differences in learning skills may have played a role as students benefit more from visual learning approaches. Also, home learning environments were not controlled meaning some students could have received additional support influencing their student performance.

While the results demonstrated statistical significance, it is vital to distinguish this from practical significance. With the large effect size, it can be shown as a meaningful impact in real-world applications within the education sector. This shows that Engino blocks did not only provide improvement in test scores but also had a substantial impact on students' ability to grasp concepts. Hence, it is crucial to understand the impact of incorporating such learning tools to improve student performance and understand the concepts in detail.

## Conclusion

This research studied the impact of manipulative tools such as Engino toy blocks on pre-primary students' mathematics performance, specifically in counting and addition, at the Engino Summer Academy. The findings suggest that students who used Engino blocks demonstrated higher performance compared to those taught using traditional methods. Statistical analyses, including mean comparisons, standard deviation, and hypothesis testing, indicated a statistically significant improvement in the experimental group. However, while these results provide strong evidence of the effectiveness of hands-on learning tools, they should be interpreted with caution, considering the study's sample size, duration, and contextual limitations.

The findings have practical implications for early childhood education, particularly in curriculum development. Incorporating Engino blocks or similar hands-on learning tools into pre-primary mathematics lessons could enhance student engagement and conceptual understanding. However, successful implementation would require adequate teacher training and structured lesson plans to maximise educational benefits. Additionally, feedback from teachers suggests that expanding Engino-based activities to include more 3D shape exercises and take-home kits could further improve learning outcomes.

Given the study's limitations, future research should expand the sample size and conduct longitudinal studies to examine the long-term retention of mathematical skills. Also, explore how Engino blocks impact other mathematical domains beyond counting and addition for other groups of students. Furthermore, integrating classroom observations and student interviews could provide deeper insights into how students engage with and benefit from these tools. These future directions would contribute to a more comprehensive understanding of the role of hands-on learning in early mathematics education and its potential for wider policy implementation.

## Recommendations

Further, to maximise the effectiveness of practical based learning like Engino toy blocks in early mathematics education, several practical steps can be taken in the future. Teacher training programs should be developed to help teachers with strategies for incorporating manipulatives into lesson plans and adapting them to diverse learning styles. Curriculum integration is important, ensuring that Engino-based activities extend beyond counting and addition to improve problem-solving and spatial reasoning. However, implementation challenges such as limited resources in disadvantaged schools and time constraints in structured curricula must be addressed through cost-effective alternatives and efficient lesson planning. Further research on Engino's impact in various educational settings, including low-income schools, would provide deeper insights into its long-term benefits. Lastly, collaboration with educators and policymakers can help promote hands-on learning initiatives and ensure broader adoption in early childhood education.

## Limitations

While this study provides deeper insight into the impact of hands-on tools like Engino toy blocks, there are some limitations that need to be considered. The sample size of 50 students, which might be statistically sufficient, is not enough to generalise the findings to larger populations. Hence a large number of students needed to be considered to have stronger results. The study was also conducted in four weeks, which may cause some difficulties in assessing the long-term effects of the Engino toy blocks. While teachers followed the same lesson plans, different teaching styles and classroom management could have contributed to differences in student performance. Hence these factors should be considered in future research to obtain and validate the findings of this study.

### Ethics Statements

The studies involving human participants were reviewed and approved by Engino-net Limited and the University of West London.

### Conflict of Interest

The authors declare no conflicts of interest

### Generative AI Statement

During the preparation of this work, the authors used Grammarly for language editing. After using this service, the authors reviewed and edited the content as needed. We, as the authors, take full responsibility for the content of our published work.

### Authorship Contribution Statement

Sofroniou, Premnath, Sisamos: Conceptualization, design, analysis, writing. All authors: Editing/reviewing, supervision. Sofroniou, Sisamos, Almpani, Sisamou: Revision manuscript.

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## Appendix

*Appendix A*

*Questionnaire for the students of the age group 5-6*

The feedback from this students' questionnaire will then be used to plot the graphs and also analyse the effects of all the question to the final Question 8 (Understanding the topic better with Engino). This will provide strong foundation to show the enhancement in the learning experience when using Engino models.

1. Did you enjoy using Engino blocks in class?

   Yes No ☐ ☐

2. Did you have fun building things using Engino blocks?

   Yes No ☐ ☐

3. Would you like to use Engino blocks again to learn new things?

   Yes No ☐ ☐

4. Was it easy to put together the Engino blocks?

   Yes No ☐ ☐

5. Did you like working with your friends in using Engino blocks?

   Yes No ☐ ☐

6. Did you need help from the teacher to build the models?

   Yes No ☐ ☐

7. Did you feel proud of what you built using Engino blocks?

   Yes No ☐ ☐

8. Did Engino blocks help you understand the topics better?

   Yes No ☐ ☐

*Appendix B*

*Questionnaire for the Teachers (Age group 5-6)*

Please evaluate the following statements according to your personal interaction with Engino blocks in your classroom. Utilise the following scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree. Please tick the preference.

Data about each question of the questionnaire will be collated using excel software and the responses by the teachers after using Engino models, are depicted initially using graphs. Using excel software the relationship between the questions relative to that of Questions 12 (satisfaction) and 13 (enhancement) is presented in bar charts and tables. These visibly show which questions have a relation between each question and the satisfaction. Furthermore, hypothesis testing is performed to analyse whether there incorporating Engino has a significant effect on the enhancement of the students.

1. The students were more engaged when using Engino blocks in the classroom.
   - Strongly Agree
   - Agree
   - Neither Agree nor Disagree
   - Disagree
   - Strongly Disagree
2. Students showed more interest and enthusiasm when using Engino blocks.
   - Strongly Agree
   - Agree
   - Neither Agree nor Disagree
   - Disagree
   - Strongly Disagree
3. It was easy to incorporate Engino models into the lessons.
   - Strongly Agree
   - Agree
   - Neither Agree nor Disagree
   - Disagree
   - Strongly Disagree
4. The materials and instructions provided with the Engino blocks was sufficient.
   - Strongly Agree
   - Agree
   - Neither Agree nor Disagree
   - Disagree
   - Strongly Disagree
5. Students understood the topics better with Engino models.
   - Strongly Agree
   - Agree
   - Neither Agree nor Disagree
   - Disagree
   - Strongly Disagree

6. Students worked to well as a team when building Engino models.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
7. Using Engino models encouraged students to improve collaboration.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
8. Students were able to communicate their ideas effectively in the classroom when using Engino models.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
9. The use of Engino was beneficial for the teaching objectives.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
10. I received positive feedback from the students after using Engino in class.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
11. I would like to use Engino in the future lessons.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree

12. I am strongly satisfied with the quality of the lessons plan incorporating Engino.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
13. The incorporation of Engino models in lessons enhanced student learning experience.
    - o Strongly Agree
    - o Agree
    - o Neither Agree nor Disagree
    - o Disagree
    - o Strongly Disagree
14. Please specify of any suggestions for improvements with the lesson plans with Engino.

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