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Non-Technological Teaching Aid: Effectiveness in Developing Young Learners' Grammatical Accuracy

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Abstract

With the rapid development of educational technology in the teaching and learning of English, many instructors are beginning to integrate various technology related activities in their lesson. However, many of the recent studies states inaccessibility to technological infrastructure had hindered the implementation of said activities in the classroom. This study hence investigates the effectiveness of an interventional teaching aid that does not need technology on improving young learners' grammar accuracy in terms of using preposition accurately and forming simple sentences using preposition. Sixty (n=60) year 4 learners of a primary school were enrolled in the quasi-experimental research where the Experimental Group (EG) were involved with the interventional teaching aid called Dice and Paste (DAP) activity. The results indicated that among the two groups, the EG who received instructions based on DAP activity improved the most in post-test for both preposition test (section A) and also simple sentence formation using preposition (section B). This researcher recommends ESL language instructors, other subject instructors, program coordinators, and other stakeholders to adopt DAP especially in an environment where technological infrastructures were lacking.

Keywords: English as a second language, Teaching aid, Intervention, Grammatical accuracy,

Prepositions

1. Introduction

1.1 The Need for Non-Technological Teaching Aids in Teaching Grammar

In recent years, the landscape of language learning has transformed significantly. Technological advancements have brought about a revolution in teaching methods, moving away from passive information delivery to interactive, student-centered learning (Hung, Chu & Chang, 2019). Teaching aids now play a crucial role in facilitating this shift by capturing student attention and bridging the gap between classroom instruction and real-world applications (Fenn & McGlynn, 2019). Despite the benefits of technology-based aids, accessibility remains a concern, which underscore disparities in technology access among students from different socioeconomic backgrounds (Malaysian Ministry of Education, 2013). Many studies (Khatoony & Nezhadmehr, 2020; Apdy & Asrifan, 2019) highlight issues such as restricted access to technology, unreliable internet connections, and the challenge for teachers in developing online materials, particularly in regions like Malaysia where Yeo et al. (2018) note a lack of technological infrastructure. Furthermore, research by Van Dijk et al. (2016) and Granata (2019) raises concerns that an increased reliance on technology may lead to a decline in traditional grammar learning methods. Despite these findings, there is a gap in exploring alternative non-technological teaching aids. This study addresses this gap by examining the Dice and Paste (DAP) activity's effectiveness in fostering grammar proficiency without the need for technology, thus contributing a novel solution to the literature.

Moreover, a major concern in the use of technology in education is its potential negative impact on grammar acquisition. Research by Van Dijk et al. (2016) and Granata (2019) suggests that increased exposure to technology, particularly in primary education, could lead to a decline in traditional learning methods such as reading, prompting questions about whether technology might hinder rather than facilitate the development of strong grammar skills. Futhermore, Machanick (2014) highlights how technology could create a barrier between teachers and students. Over-reliance on digital tools may reduce learner self-efficacy and impair the effective communication of fundamental grammatical concepts. While Machanick's work emphasizes the benefits of engaging, technology-free lessons, it does not explore specific alternative teaching methods. This research gap presents an opportunity to investigate the effectiveness of innovative, low-tech teaching aids like the Directed Activities Related to Texts (DAP) in fostering active learner participation and grammar proficiency.

Given these realities, there is a growing need to explore alternative, non-technological teaching aids suitable for the Malaysian classroom context. Traditional grammar instruction often relies on rote memorization and drills, which can be monotonous and may not empower learners to construct grammatically correct sentences independently. Researchers advocate for alternative approaches to boost learner confidence and proficiency in grammar.

Previous research suggests the effectiveness of creative, low-tech methods. Chambers and Yunus (2017) studied the "Wheel of Grammar" (WOG), a non-technological tool, and found it successful in enhancing learners' skills in constructing sentences, particularly in

subject-verb agreement, tense usage, and the application of the verb "to be." DAP follows this principle by incorporating randomized grammatical elements akin to WOG, offering varied practice scenarios that sustain learner engagement.

Last but not least, young learners encounter substantial challenges in mastering prepositions of place, which are critical for spatial reasoning and language development (Geeraerts, 2010; Schick, 2013). Despite their seemingly straightforward nature, prepositions require nuanced understanding of contextual comprehension and distinctions between stationary and moving situations (Bowerman & Choi, 1993). This cognitive complexity poses challenges for young learners, affecting their ability to produce correct prepositions (Fernandes et al., 2022) and comprehend spatial instructions (Carlson & Ferreira, 2017).

Building on this groundwork, the current study aims to investigate whether similar positive outcomes can be achieved through innovative, non-technological teaching aids designed to enhance grammar accuracy among young learners in Malaysia.

1.2 The Use of Teaching Aids in the Teaching of English as a Second Language

Teaching and learning in classrooms are incomplete without the use of teaching aids. Modern educational institutions widely employ these aids due to their numerous benefits and educational value. They help learners comprehend lessons with ease, enhance motivation, save time, and improve learning abilities. When integrated strategically, these aids significantly enhance instructional effectiveness. However, despite their popularity and advantages over traditional methods, Malaysian educational institutions face challenges such as affordability and accessibility issues with modern teaching aids, particularly in rural areas (Munje, 2022).

Moreover, the use of technology-based teaching aids requires teachers to possess the necessary skills and resources, which can be hindered by environmental conditions, infrastructure requirements, and financial constraints. Alternative teaching aids that are cost-effective and independent of technological infrastructure are thus crucial (Scott, 2015).

Game-Based Learning (GBL) has emerged as a notable instructional strategy that uses games to engage learners in the learning process (Noroozi et al., 2020; Tang et al., 2009). It leverages interactive and engaging virtual environments to facilitate active learning and enhance educational outcomes (Castillo-Cuesta, 2020; Ge & Ifenthaler, 2018). Games in education have been shown to empower learners, enhance autonomy, and effectively reinforce content knowledge (Kulpa, 2017; Asiri, 2019).

In the realm of ESL (English as a Second Language) instruction, games play a crucial role in enhancing learner motivation and engagement (Cam & Tran, 2017). They provide opportunities to practice grammar and vocabulary in meaningful contexts, thereby fostering deeper understanding and dynamic learning environments (Cárdenas-Moncada et al., 2020; Tsai et al., 2017).

Effective grammar instruction remains challenging in ESL education, yet it is fundamental for language acquisition (Rahman et al., 2019). Incorporating games into grammar instruction

has been found to reduce learner anxiety, provide enjoyable learning experiences, and positively impact language acquisition (Ali, 2020; Fokides & Zampouli, 2017).

For instance, Fokides and Zampouli (2017) demonstrated the effectiveness of contextual game-based learning in improving ESL learners' grammar accuracy compared to traditional methods. Anderson et al. (2008) also explored the use of games like 'America's Army' to enhance learning outcomes through interactive and immersive experiences.

In light of these findings, the alternative hypothesis (H_1) for this study proposes that young learners who engage with the "Dice and Paste" game will exhibit significantly greater improvements in grammar accuracy compared to those who receive traditional grammar instruction.

1.3 Research Objectives

The aims of this research are:

1. To examine how the DAP language game influences learners' performance in a grammar assessment, focusing on prepositions.
2. To explore the impact of the DAP language game on learners' performance in a grammar assessment, specifically in constructing simple sentences that incorporate prepositions.

2. Method

To address the research questions, a quasi-experimental research design was employed. A quasi-experiment is chosen because randomly assigning participants to an experimental group receiving the DAP intervention and a control group without the intervention may not be ethical or feasible in this educational setting (Shadish et al., 2002). Therefore, a quasi-experimental non-equivalent group design was selected for implementation. This study took place in a public primary school with a total of 307 year 4 learners. Data for this quasi-experiment was collected from 60 year 4 learners who were enrolled in March 2024. Two intact classes were divided into an experimental group (EG) and a control group (CG), each consisting of 30 learners with diverse genders and levels of proficiency. One of the main criteria set by the researchers was that participants must have completed the Year 3 UASA exam. Exam results were used to identify learners with high and low proficiency. This focus was chosen to investigate the effectiveness of the DAP activity across both high and low proficiency learners.

2.1 Pre-test and Post-test

The pre-test consists of 10 preposition items in Section A and 5 simple sentence formation items in Section B. The post-test mirrors the format of the pre-test, comprising 15 different items in total. The test was meticulously developed by adhering to the year 4 English curriculum in Malaysia, ensuring relevance and suitability for year 4 learners. A key criterion during question development was alignment with the content of the year 4 English textbook used across Malaysian primary schools. Additionally, the test items underwent evaluation and

approval by two validators: a highly experienced year 4 English teacher in the research setting and a senior university lecturer with extensive expertise in teacher training and instructional material development. Out of the 15 questions, 10 are fill-in-the-blank (FIB) questions, while the remaining 5 are subjective questions. Section A of the test addresses research question 1, assessing participants' proficiency in prepositions, while Section B focuses on research question 2, evaluating participants' ability to construct sentences using prepositions.

2.2 Control Group and Experimental Group

During the course of the treatments, two groups were instructed using the same textbook but with different instructional methods. Both groups were simultaneously tasked with answering and responding to preposition questions throughout the intervention. The control group (CG) exclusively received traditional teaching, emphasizing explicit instruction of grammatical rules, patterns, and language structures (Ericsson & Hasling, 2002). This method breaks down language into its components, focusing on aspects like identifying parts of speech such as nouns, verbs, and adjectives, with a specific focus in this study on prepositions, and analyzing sentence structure, including subject-verb agreement with prepositions based on visual cues.

Teaching aids are resources that facilitate knowledge delivery (Joseph, 2015). In this study, the Directed Activities Related to Texts (DAP), a form of teaching aid, transforms instruction into an active learning activity aimed at enhancing young learners' grammar accuracy. DAP consists of two main components: a large dice with six sections and a mah-jong paper divided into nine sections, providing 54 possible combinations per dice throw.

In this study's context, each side of the dice features different prepositions, while each section of the mahjong paper contains various subjects or objects, either written or depicted in pictures. During gameplay, learners roll the dice onto the mah-jong paper to determine two keywords—one from the dice and one from the paper—and then construct a simple sentence using these two words. According to the conceptual framework, repeated dice throws and sentence formation promote pattern practice and engage learners in a state of focused immersion during the DAP activity.

2.3 Validity and Reliability of the Instrument

Validity is critical in pre-tests and post-tests to ensure accurate assessment of participants' knowledge or skills related to specific prepositions. Content validity ensures that test items effectively and fairly represent the targeted content area—in this case, prepositions (Polit & Beck, 2017). To achieve this, the researcher closely aligned with the year 4 English curriculum in Malaysia and consulted two subject experts in test development.

In pre-test and post-test designs, a reliable test produces consistent ratings for participants, assuming their knowledge remains stable between test administrations. To enhance validity and reliability, pilot testing was conducted. Thirty participants were selected for the pilot test, where they initially answered test questions. After a week without additional learning input on prepositions, they retook the same test. The correlation coefficient from the test-retest

method indicated score stability.

Koo and Li (2016) suggested that an inter-rater agreement measure like kappa or ICC should ideally exceed 0.90 for excellent reliability. With intraclass correlation measures ranging from 0.924 to 0.961, it can be concluded that the instrument yielded consistent results for participants who took the tests without additional teaching and learning interventions on the topic.

This approach ensures that test items in each pre-test and post-test consistently measure the same construct. Potential threats to internal validity were carefully controlled and monitored in the pilot study conducted prior to the main research.

2.4 Data Analysis

After gathering the data, the initial step was to perform Exploratory Data Analysis (EDA) to check for normal distribution in the datasets. Following this normality test, the data underwent confirmatory analysis. To address research questions 1 and 2, the pre- and post-test scores were analyzed using Statistical Package for the Social Sciences (SPSS) Version 26. The data were input into SPSS to obtain descriptive statistics, which include measures of central tendency (mean, median, mode) and variability (range, variance, standard deviation), as outlined by Field (2013). These descriptive statistics help in understanding the average scores and the dispersion of the data in both pre-test and post-test groups. This analysis enables comparison between the groups to determine if the intervention caused any significant changes in scores or their consistency. Subsequently, a paired sample t-test was conducted to compare the means of the paired data points from the same individuals before and after the intervention. This test evaluates whether the differences between pre-test and post-test scores are statistically significant, thus indicating if the changes were likely due to the intervention rather than random variation (Field, 2013).

In summary, the use of pre-test and post-test assessments in this study aimed to evaluate two objectives: the improvement in participants' accuracy in using prepositions and their ability to write simple sentences with prepositions using the DAP intervention. This approach directly measures the impact of the intervention on the dependent variable, as described by Gall et al. (1996), and allows the researcher to determine if the intervention had the desired effect on the participants.

3. Findings

The findings section illustrates the demographic information, as well as the findings from the inferential statistics conducted.

3.1 Demographic Information

Tables 1 and 2 provide demographic details about the sample used in the quasi-experiment, focusing on the distribution and characteristics related to gender and proficiency, as determined by their year 3 UASA scores within each treatment group. Participants were categorized as high proficiency if they scored 70 or above on the previous year's UASA English exam, and low proficiency if they scored 70 or below. The study sample includes 60

year 4 students from two classes, with each class having an equal number of students.

Table 1. Backgrounds of the participants according to group and gender

Group	Male	Female	Total
CG	13	17	30
EG	10	20	30
Total	23	37	60

Table 2. Frequency distribution of participants' proficiency level

Proficiency	CG	EG	Total
High	10	10	30
Low	20	20	30
Total	30	30	60

3.2 Findings of Students' Preposition Accuracy

Each treatment group had an equal number of participants (N=30), and there were no dropouts from the quasi-experiment. In the pre-test, the mean scores for both groups were very similar (Mean (CG) = 6.73; Mean (EG) = 6.67). Additionally, the EG group had the smallest standard deviation (SD = 1.971), indicating that the scores were more closely clustered around the mean. The difference in standard deviation between the two groups was normally distributed.

In the post-test, both groups showed improvement in their mean scores compared to the pre-test, with EG achieving the highest mean score (Mean = 8.37, SD = 1.066).

Overall, the mean scores for learners' preposition performance varied throughout the quasi-experiment. Initially, the mean scores of the two groups were similar. After the intervention, both groups improved, but EG demonstrated the greatest increase in mean scores, surpassing CG.

3.3 Findings of Students' Skills in Sentence Formation Using Prepositions

Each treatment group had an equal number of participants (N=30), with no dropouts during the quasi-experiment. In the pre-test, the mean scores for both groups were quite similar (Mean (CG) = 2.83; Mean (EG) = 2.63). The CG group had the smallest standard deviation (SD = 1.234), indicating that the scores for sentence formation using prepositions were more closely clustered around the mean. The difference in standard deviation between the two

groups followed a normal distribution.

In the post-test, both groups showed improvements in their mean scores compared to the pre-test. Notably, the EG group achieved the highest mean score (Mean = 4.23, SD = 0.858).

In summary, the mean scores for sentence formation using prepositions varied between the two groups throughout the quasi-experiment. Initially, the mean scores were similar, but both groups improved after the intervention. Among the groups, EG showed the most significant increase in mean scores in the post-test.

3.4 Findings of Paired Samples t-test

Based on the SPSS analysis of the datasets from Section A, the experimental group had a t value of -7.369 with 29 degrees of freedom and a p-value of 0.000, indicating a significant difference from the control group, which had a p-value of 0.081. When comparing the mean values, the control group had a mean of -0.700, while the experimental group had a mean of -1.700. This shows that, although both groups improved in the post-test, the experimental group demonstrated a significantly greater improvement.

Similarly, for the datasets from Section B, the SPSS results showed a t value of -9.049 with 29 degrees of freedom and a p-value of 0.000 for the experimental group, indicating a significant difference from the control group, which had a p-value of 0.067. The control group had a mean of -0.300, while the experimental group had a mean of -1.600, demonstrating that while both groups improved in the post-test, the experimental group experienced a significantly greater improvement.

4. Discussion

A significant difference was observed in the post-test results (p=.000) of the EG compared to the CG in terms of accurate use of prepositions. These findings align with several previous studies that utilized intervention-based teaching aids to enhance grammar skills. For instance, Wichadee & Pattanapichet (2018) conducted quasi-experimental research to assess the impact of gamification on English grammar instruction in a private secondary school in Mombasa County. In their study, one class received traditional grammar teaching while the other was taught using gamified methods. The experimental group showed significantly better results than the control group (p=.000). This similarity in outcomes may be attributed to the comparable participant groups. In contrast, Mateo-Gallego & Ruiz (2018) conducted a study in Spain on the effectiveness of an interactive game for improving Spanish language skills. Their findings were inconsistent with the results of Wichadee & Pattanapichet, showing no significant difference between the experimental and control groups. This discrepancy might be due to the advanced ICT resources available in Spanish schools, which could reduce the impact of teaching aids that do not integrate technology. Consequently, learners in Spain may not have benefited significantly from instructional methods that lack technological components.

In terms of sentence formation using prepositions, a significant difference was observed in the post-test results (p=.000) of the EG compared to the CG. These findings are consistent

with several previous studies that used intervention-based teaching aids to enhance sentence formation. For example, Dumancic & Radic-Gjuric (2017) explored the use of gamification elements such as points, badges, and competition in teaching vocabulary and grammar to young learners. Their study found that gamification elements, through repetitive game-based activities, helped learners with word order, leading to significantly higher scores in the experimental group compared to the control group. Similarly, Kim (2015) investigated the impact of gamification principles—such as clear goals, challenges, and rewards—on learner motivation and achievement in English as a Foreign Language (EFL) learning. Although this study was not focused solely on sentence formation, it indicated that game-like elements could enhance learner engagement and potentially improve sentence construction skills. This is in line with the current study, which suggests that the intervention likely increased learner motivation and improved performance in sentence formation tasks.

Overall, these studies support the idea that integrating engaging and interactive elements into language instruction can significantly benefit learners. The current research reinforces this by showing the effectiveness of the specific intervention-based teaching aids used to improve sentence formation skills

5. Conclusion

While the findings of this study demonstrate the effectiveness of the DAP activity in improving grammar accuracy, there are some limitations that should be noted. The sample was limited to one school, and the quasi-experimental design lacked full randomization, which may affect the generalizability of the results. Additionally, the study focuses on a specific age group, and it is unclear how the intervention might perform with other age groups or in different educational settings. Future research should explore DAP's effectiveness across a broader range of participants and investigate its impact on other areas of language learning, such as vocabulary acquisition. In many areas where access to technological resources is limited, technology-based instructional methods are often impractical. DAP provides a low-tech yet effective alternative for improving grammar learning. This is particularly relevant given previous research indicating that insufficient resources often lead educators to rely on traditional, less engaging methods such as rote memorization and teacher-centered instruction (Darling-Hammond et al., 2020).

One of DAP's notable strengths is its ability to turn repetitive practice into an engaging game. Traditional grammar drills can be monotonous and result in disengagement, whereas DAP introduces elements of chance (e.g., dice rolls) and challenge (e.g., sentence construction) to make learning more enjoyable. This gamified approach can boost learner motivation and enhance knowledge retention (Ryan & Deci, 2017). However, it is important for instructors to be aware of potential challenges, such as managing classroom excitement and maintaining discipline. Instructors using DAP should have strategies in place to ensure a positive learning environment while optimizing the educational benefits of the activity.

In conclusion, the DAP teaching aid offers a promising method for improving grammar instruction, particularly in environments with limited resources. Its low-tech nature, versatility across subjects, and engaging, gamified approach provides a unique combination

that can enhance learner outcomes. Further research into DAP's effectiveness across different subjects and classroom settings could further establish its value as an educational tool.

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