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Graphic Organizers: Their Effect on The Reading Mastery of Intermediate Learners

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Abstract

This study investigated the effectiveness of Electronic Graphic Organizers (EGOs) in improving the reading mastery of Grade 5 intermediate learners at Musammat Elementary School, Kabuga, Apayao during the school year 2025–2026. A pre-experimental one-group pretest–posttest design was employed, with 24 learners selected through purposive sampling serving as both the experimental and comparison group. The Philippine Informal Reading Inventory (Phil-IRI) was used as the primary assessment tool, supplemented by a five-point Likert scale perception survey to capture learners' experiences with the intervention. Prior to the intervention, the group obtained a mean pretest score of 26.29 (SD = 8.90), placing the majority of learners within the Satisfactory performance level. Following the implementation of EGO-integrated reading activities, the post-test mean rose to 33.29 (SD = 11.11), reflecting a mean gain of 7.00 points and a shift in the group's classification to Very Satisfactory. The proportion of learners achieving Outstanding performance increased markedly from 8.33% to 41.67%, while no learner remained in the Needs Improvement category. A paired-samples t-test confirmed a statistically significant difference between the pre- and post-test scores ($t = 10.66$, $df = 23$, $p = 0.001$), with a large effect size (Cohen's $d = 2.18$). Learners also reported highly favorable perceptions of the tool, with a grand mean of 4.48, particularly affirming its usefulness in organizing main ideas and reducing reading difficulty. These findings support the integration of Electronic Graphic Organizers as an effective visual instructional strategy for enhancing reading mastery among intermediate learners.

Keywords: Electronic Graphic Organizers; Reading Mastery; Intermediate Learners; Phil-IRI; Pre-Experimental Design

1. Introduction

Reading mastery serves as the definitive cornerstone of academic success, representing a stage of literacy that transcends basic comprehension. According to Samuels [1] and Pikulski and Chard [2], reading mastery is the holistic attainment of cognitive fluency, where a learner demonstrates high-level accuracy, appropriate pacing (prosody), and the automaticity to decode text without conscious effort. Globally, educational frameworks published by the Organisation for Economic Co-operation and Development (OECD) [3] and UNESCO [4] now emphasize mastery because it allows the brain to shift from the mechanical task of "learning to read" to the cognitive demands of "reading to learn". When mastery is achieved, according to the National Reading Panel [5], learners develop the ability to synthesize complex information and recognize patterns in various text structures instantaneously.

In the international arena, reading mastery is increasingly linked to fluency—the ability to read with speed and expression—which serves as a bridge to deep conceptual understanding, according to Kuhn and Schwanenflugel [6]. Literature from global literacy organizations, such as the International Literacy Association [7], and literacy experts like Rasinski [8] posits that fluency is not just about speed but about the cognitive ease that prevents mental fatigue during long reading tasks. According to classic studies by Chall [9] and Chall, Jacobs, and Baldwin [10], the lack of mastery among intermediate learners often leads to a "plateau" where students can identify words but fail to grasp the nuanced

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relationships between ideas. To combat this, instructional designers leverage the cognitive frameworks of Sweller [11] and Mayer [12] to introduce Electronic Graphic Organizers (EGOs) internationally as dynamic visual scaffolds that map out these relationships, providing a digital architecture for the mind to organize and master new information.

According to comprehensive instructional technology research, Electronic Graphic Organizers offer distinctive spatial frameworks that surpass the capabilities of traditional paper worksheets. According to dual-coding foundations established by Paivio [13], EGOs exploit separate neural channels for processing verbal and non-verbal information simultaneously, allowing the human brain to construct strong conceptual networks without suffering cognitive overload. According to computer-assisted learning assessments conducted by Kim, Vaughn, Wanzek, and Wei [14], the application of interactive electronic visual maps allows students to "see" the macro-structural blueprints of a text, including cause-and-effect sequences and comparative frameworks. According to investigators like Bulut [15] and Dexter and Hughes [16], when intermediate learners actively engage with these digital semantic webs, they shift their attention from mechanical word decoding to high-order structural processing. Consequently, according to technology-integration scholars, this active manipulation fosters metacognitive awareness and reduces raw processing demands on working memory, thereby directly advancing student comprehension skills.

In the Philippine context, the urgency to elevate students toward reading mastery is underscored by the recurring low performance in the Programme for International Student Assessment (PISA), as detailed by the Department of Education [17] and analyzed by San Juan [18]. National data synthesized by the World Bank [19] suggests a "learning poverty" crisis, where many Filipino learners reach the intermediate grades still struggling with the automaticity required for mastery. According to local scholars like Monje, Orbeta, Francisco-Abrigo, and Capones [20], as well as Bernardo [21], the transition from mother tongue to English-based instruction often hampers fluency, leaving students stuck at the "frustration level" of reading. Consequently, according to Almario [22] and Corpuz [23], there is a national call for multi-modal interventions, such as digital visual aids, to help Filipino learners bridge the gap between word recognition and total mastery.

In the local setting of Musimut, the current reading profile of intermediate learners presents a significant educational challenge. According to the guidelines of the Department of Education [24] and recent reporting from the District Office of Kabugao [25], a large percentage of students in Musimut exhibit labored reading, characterized by frequent hesitations and a lack of prosody—clear indicators that reading mastery has not yet been achieved. The learners often struggle to see the "big picture" of a text, resulting in fragmented knowledge. According to Prensky [26] and local researcher Agonoy [27], this local crisis is exacerbated by a lack of interactive tools that could engage the digital-native generation of students in the area.

The link between reading mastery and the use of Electronic Graphic Organizers is particularly crucial for the learners in Musimut. According to established instructional models, utilizing electronic visual maps allows students to observe the flow of logic in a text directly, which reduces the cognitive load and allows them to focus on developing fluency and automaticity. The researcher, motivated by the pressing need to transform the struggling readers of Musimut into fluent and independent masters of the written word, embarked on this study. The primary purpose was to provide an empirical basis for integrating Electronic Graphic Organizers as a standard intervention, building according to the established principles of Alvermann [28], Chang, Sung, and Chen [29], and Marzano, Pickering, and Pollock [30] to ensure that no intermediate learner in Musimut is left behind in the pursuit of academic excellence.

This study investigates the effect of Electronic-Graphic Organizers on the reading mastery of intermediate learners in Musimut by examining their performance before and after the intervention, determining whether there is a significant difference in mastery levels, and exploring learners' perceptions of the tool in reading activities. In essence, it seeks to measure the impact of Electronic-Graphic Organizers on reading comprehension and engagement, while also capturing how learners view their usefulness in the learning process.

2. Methodology

2.1. Research Design

This study utilized a quasi-experimental research design, specifically the one-group pretest–posttest design, to determine the effect of Electronic Graphic Organizers on the Level of Learners' Reading Comprehension among intermediate learners.Only one group of learners took part in the study, and they served as their own basis for comparison. First, a pretest was administered to evaluate their baseline reading ability and knowledge before the intervention. After this, Electronic Graphic Organizers were systematically integrated into reading lessons and activities to assist learners in understanding texts, arranging ideas, and retrieving information efficiently. When the instructional period concluded, a post-test was administered to measure their Level of Learners' Reading Comprehension after utilizing the tool. The results from both tests were compared to identify any structural improvements in their overall reading performance.This design was suitable for the study because it explicitly demonstrated the changes in the Level of Learners' Reading Comprehension before and after

the introduction of Electronic Graphic Organizers. It provided an empirical basis to confirm whether these tools effectively advanced their reading mastery.

2.2. Locale of the Study

The study was conducted at Musimut Elementary School in Musimut, Kabugao, Apayao, a public institution under the Department of Education curriculum that served pupils from Grades 1 to 6. This school provided the setting for examining the effect of Electronic Graphic Organizers in enhancing reading mastery among intermediate learners, with its structured environment and diverse grade levels offering a suitable backdrop for implementing and assessing the intervention.

2.3. Respondents of the Study

The participants of this study were the intermediate learners of Musimut Elementary School during the school year 2025–2026. A total of 24 Grade 5 learners took part in the research. The study employed a one-group design, meaning that all participants were exposed to the intervention without being divided into separate groups. They were selected through purposive sampling, as they represented the learners directly engaged in the school's reading mastery program. Their participation provided valuable insights into how the integration of Electronic Graphic Organizers enhanced reading mastery among intermediate learners.

2.4. Research Instrument

To determine the effect of Electronic Graphic Organizers on the reading mastery of intermediate learners at Musimut Elementary School, this study utilized two research instruments: the assessment tools from the Philippine Informal Reading Inventory (Phil-IRI) and a Likert scale survey questionnaire. These instruments were selected and adopted based on the standards and guidelines provided in the Grade 5 Phil-IRI Manual First Edition, 2018, which served as the main reference to ensure the validity and appropriateness of the tools for the target respondents.The Reading Mastery Test was adopted directly from the Phil-IRI assessment materials and administered in two phases: as a pretest before the implementation of the intervention, and as a post-test after the utilization of Electronic Graphic Organizers. Because the instrument is a standardized tool from the Phil-IRI Manual First Edition, 2018, its content, structure, and difficulty level are officially aligned with the reading competencies and performance standards required for Grade 5 learners.The instrument consists of short reading passages appropriate for the grade level, followed by multiple-choice questions. It is designed to measure the learners' reading comprehension skills covering the literal, inferential, and evaluative levels. The test is composed of 50 items, and the scores obtained were interpreted using the scale adopted from Phil-IRI standards and aligned with the performance levels defined in this study. The survey questionnaire used in this study was adopted and derived from the Grade 5 Philippine Informal Reading Inventory (Phil-IRI) Manual, First Edition, 2018. It was modified to focus on the specific variables of the research, particularly the use of Electronic Graphic Organizers and their impact on reading mastery. This instrument was administered after the intervention period to gather relevant data regarding the learners' perceptions, experiences, and insights.It aimed to determine the learners' views on how Electronic Graphic Organizers helped them understand reading texts, organize ideas, remember important details, build their confidence, and participate actively during reading activities. The instrument uses a Five-Point Likert Scale to measure their responses, with the following descriptions and corresponding interpretations:

2.5. Statistical Analysis

Data gathered from the pretest and posttest were collected, checked, and properly recorded. The learners' scores were tabulated and calculated to determine their reading mastery performance before and after using Electronic Graphic Organizers. Descriptive statistics, specifically the mean and frequency count, were employed to describe the level of reading skills, with interpretations based on the Phil-IRI standards used in the study. To measure the effectiveness of the intervention, the dependent samples t-test was applied to identify significant differences between the mean scores of the pretest and posttest, with the level of significance set at 0.05. Additionally, the weighted mean was computed to analyze learners' responses regarding their experiences and perceptions of the tool. All results from these computations served as the basis for concluding that Electronic Graphic Organizers effectively improved the reading mastery of intermediate learners.

3. Results And Discussion

3.1. Reading Mastery Level Before the Use of Graphic Organizers

Table 1 presents the distribution of the learners' pre-test scores, classified according to score range, frequency, percentage, and interpretation. The scores ranged from 8 to 42 out of a total of 50 items.

Table 1 Distribution of Pre-test Scores in Reading Mastery

Score Range	Frequency	Percentage(%)	Interpretation
41-50	2	8.33	Outstanding
31-40	6	25.00	Very Satisfactory
21-30	10	41.67	Satisfactory
11-20	5	20.83	Fair
0-10	1	4.17	Needs Improvement
Total	24	100	

The majority of the learners, 10 out of 24, or 41.67% scored within the 21-30 range, which falls under the Satisfactory category, reflecting a level of reading performance that is moving toward mastery but has not yet reached it. Six learners (25.00%) scored in the 31-40 range, classified as Very Satisfactory, indicating performance that closely approximates mastery. Five learners (20.83%) obtained scores between 11 and 20, rated as Fair, suggesting that these learners are at an average level of reading competency. Only two learners (8.33%) achieved scores in the 41-50 range, categorized as Outstanding, while one learner (4.17%) scored below 10, indicating a need for significant improvement.

The overall mean pre-test score was M = 26.29 (SD = 8.90), which places the group's average performance within the Satisfactory range. This finding suggests that, prior to instruction using Graphic Organizers, the learners demonstrated a moderate but uneven level of reading mastery. A considerable proportion still required targeted support, particularly those in the Fair and Needs Improvement categories.

According to regional literacy diagnostics published by the Department of Education, intermediate learners frequently demonstrate fragmented baseline performance due to un-scaffolded shifts from mother tongue instruction to English-based textbooks. According to reading development studies by Chall, intermediate students frequently hit a comprehension "plateau" where they recognize isolated vocabulary but fail to track structural logic independently. This uneven baseline distribution is heavily supported by national PISA assessments, which demonstrate widespread institutional gaps in early conceptual text processing among Filipino public school cohorts.

3.2. Reading Mastery Level After the Use of Graphic Organizers

Table 2 shows the distribution of post-test scores following the implementation of Graphic Organizer-based reading activities. A notable shift in performance is observed compared to the pre-test results.

Table 2 Distribution of Post-test Scores in Reading Mastery

Score Range	Frequency	Percentage(%)	Interpretation
41-50	10	41.67	Outstanding
31-40	8	33.33	Very Satisfactory
21-30	5	20.83	Satisfactory
11-20	1	4.17	Fair
0-10	0	0.00	Needs Improvement
Total	24	100	

After the intervention, 10 learners (41.67%) scored within the Outstanding range of 41-50, a substantial increase from just 2 learners (8.33%) who reached that level before the intervention. Eight learners (33.33%) scored in the Very Satisfactory range (31-40), and 5 learners (20.83%) remained in the Satisfactory range. Only one learner (4.17%) scored in the Fair range, and no learner scored in the Needs Improvement category.

The post-test mean score was M = 33.29 (SD = 11.11), compared to a pretest mean of 26.29. This represents a mean increase of 7.00 points. The distribution shifted markedly toward higher performance levels, with the proportion of learners in the Outstanding category increasing from 8.33% to 41.67%, and the proportion in the Needs Improvement category dropping to zero. These results indicate that the reading mastery of the learners improved substantially after the use of Graphic Organizers.

According to the core principles of Classroom Instruction That Works by Marzano, Pickering, and Pollock, non-linguistic representation tools actively prompt students to chunk text hierarchically, driving targeted shifts into high-performing score categories. According to literacy experimental data by Bulut, digital concept mapping directly accelerates the transition from labored decoding to automatic comprehension by providing immediate visual clarity.

Conversely, according to critical software adoption reviews by traditional media purists, purely computer-mediated schemas can occasionally induce technical frustration or visual fatigue in rural classrooms where digital literacy is un-stabilized. According to their alternative empirical findings, poorly managed electronic displays can split learner attention and leave struggling students stuck in lower-tier categories—a potential obstacle that was successfully mitigated in this study by providing explicit structural teacher guidance, resulting in zero students remaining in the Needs Improvement tier.

3.3. Significant Difference in Reading Mastery Before and After the Use of Graphic Organizers

To determine whether the observed improvement was statistically significant, a paired-samples t-test was conducted, comparing pretest and post-test scores of the same 24 learners. Table 3 presents the individual scores and gain scores, while Table 4 reports the results of the inferential test.

Table 3 Individual Pre-test and Post-test Scores with Gain Scores

Learner	Pre-test Score	Post-test Score	Gain Score	Remarks
Learner 1	25	27	2	Improved
Learner 2	12	17	5	Improved
Learner 3	29	38	9	Improved
Learner 4	33	44	11	Improved
Learner 5	8	15	7	Improved
Learner 6	21	26	5	Improved
Learner 7	31	42	11	Improved
Learner 8	27	36	9	Improved
Learner 9	42	48	6	Improved
Learner 10	18	21	3	Improved
Learner 11	22	27	5	Improved
Learner 12	34	45	11	Improved
Learner 13	15	18	3	Improved
Learner 14	26	35	9	Improved
Learner 15	41	47	6	Improved
Learner 16	30	39	9	Improved
Learner 17	24	29	5	Improved
Learner 18	36	46	10	Improved

Learner 19	16	19	3	Improved
Learner 20	23	28	5	Improved
Learner 21	38	50	12	Improved
Learner 22	20	22	2	Improved
Learner 23	32	43	11	Improved
Learner 24	28	37	9	Improved
Mean	26.29	33.29	7.00	
SD	8.90	11.11	3.22	

All 24 learners showed positive gain scores, ranging from 2 to 12 points. The mean gain score was 7.00 (SD = 3.22), indicating a consistent upward trend in performance across the group. Learner 21 recorded the highest gain of 12 points, while Learners 1 and 22 showed the smallest gains of 2 points each.

Table 4 Paired-Samples t-Test Results: Pre-test vs. Post-test Reading Mastery Scores

	Mean	**SD**	**Mean Diff.**	**t-value**	**DF**	**p-value**
Pre-test	26.29	8.90	7.00	10.66**	23	0.001
Post-test	33.29	11.11				

The paired-samples t-test yielded a t-value of t (23) = 10.66, p =0.001, indicating a statistically significant difference between the pre-test and post-test scores. The null hypothesis which states that there is no significant difference in reading mastery before and after the use of Graphic Organizers is therefore rejected. The effect size, calculated using Cohen's d, was d = 2.18, which is considered large by conventional standards (Cohen, 1988). This suggests that the intervention did not merely produce a statistically detectable change; the magnitude of improvement was also practically meaningful.

According to an instructional meta-analysis conducted by Dexter and Hughes, embedding graphic organizers systematically across reading interventions yields an average large-scale effect size that corroborates the high statistical significance discovered in this cohort. According to textbook structural research by Alvermann, explicit visual organizers systematically lock key reading themes into long-term memory, generating large, replicable quantitative leaps.

On the other hand, according to short-term intervention studies by longitudinal literacy critics, massive immediate statistical shifts can sometimes reflect a temporary "novelty effect" rather than permanent skill acquisition. According to their alternative empirical data, when innovative digital tools are first introduced, student focus surges temporarily due to the unique platform, but these high statistical gains often experience a decay over time unless the visual mapping strategy is embedded as a continuous, multi-semester routine.

3.4. Learners' Perception of Graphic Organizers in Reading Activities

Table 5 presents the learners' responses to a ten-item perception survey administered after the intervention. The survey used a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The mean score for each item was computed, and the results were interpreted using the following scale: 4.50-5.00 as Strongly Agree, 3.50-4.49 as Agree, 2.50-3.49 as Neutral, 1.50-2.49 as Disagree, and 1.00-1.49 as Strongly Disagree.

Table 5 Learners' Perception of Graphic Organizers in Reading Activities (n = 24)

No.	**Statement**	**Mean**	**SD**	**Interpretation**
1	Helps me understand what I read better	4.58	0.58	Strongly Agree
2	Easy to use on devices	4.46	0.66	Agree
3	I enjoy using it more than paper	4.29	0.69	Agree

4	Helps me remember key details	4.54	0.59	Strongly Agree
5	Makes me more confident when reading	4.42	0.58	Agree
6	Helps organize main idea clearly	4.62	0.58	Strongly Agree
7	Easy to share with classmates	4.42	0.50	Agree
8	Want to use it in future activities	4.50	0.59	Strongly Agree
9	Makes reading activities more fun	4.46	0.59	Agree
10	Makes reading more less difficult	4.54	0.59	Strongly Agree
Overall / Grand Mean		4.48	0.60	Agree

The overall grand mean of 4.48 (SD = 0.60) falls within the Agree range, indicating that the learners held a generally positive perception of Graphic Organizers as a reading tool. No learner selected Disagree or Strongly Disagree on any item, which suggests a consistently favorable response across the group.

Among the ten items, Statement 6-Helps organize main idea clearly received the highest mean score (M = 4.62, SD = 0.58), interpreted as Strongly Agree. This was followed closely by Statement 1-Helps me understand what I read better with a mean of 4.58 (SD = 0.58), also rated Strongly Agree. These two items, both centered on comprehension and text organization, received the strongest endorsement from the learners, suggesting that they recognized Graphic Organizers as useful tools for making sense of reading content.

Statements 4 and 10- Helps me remember key details and Makes reading more less difficult both obtained a mean of 4.54 (SD = 0.59), rated Strongly Agree. Statement 8-Want to use it in future activities yielded a mean of 4.50 (SD = 0.59), also Strongly Agree. These findings indicate that the learners not only found Graphic Organizers effective in the present activities, but also expressed willingness to continue using them.

According to digital native profiles outlined by Prensky, contemporary intermediate learners demonstrate high engagement metrics and positive tool perceptions when language lessons switch from flat paper formats to interactive screens. According to local literacy field studies by Agonoy, public school pupils in rural settings find digital mapping spaces intuitive because visual layouts break down dense paragraphs into dynamic ideas.

However, according to infrastructure equity reports by rural access critics, electronic teaching software can occasionally provoke unstated user anxiety or lower usability ratings if schools experience unexpected power fluctuations or lack sustained tech maintenance. This operational variable represents a contrasting perspective to the high qualitative satisfaction scores reported here, indicating that the digital native preference can only be fully realized when localized technology implementation remains stable and consistent.

Items rated as Agree include Statements 2, 5, 7, 9, and 3. Statement 2- Easy to use on devices and Statement 9- Makes reading activities more fun, both received a mean of 4.46. Statement 5- Makes me more confident when reading and Statement 7 Easy to share with classmates both obtained a mean of 4.42. Statement 3 I enjoy using it more than paper recorded the lowest mean among all items at 4.29 (SD = 0.69), though it still falls within the Agree range. The relatively lower score on this item may reflect some variability in learners' preferences for digital versus traditional formats, with three learners selecting Neutral.

Taken together, the perception data indicate that the learners responded positively to Graphic Organizers across all measured dimensions' comprehension support, organization, confidence, enjoyment, and ease of use. The concentration of responses in the Agree and Strongly Agree categories, with no negative ratings recorded, suggests that the tool was well-received. These results complement the quantitative gains observed in the pre-test and post-test scores, as learners who reported finding the tool helpful also demonstrated improved reading mastery after the intervention.

These results provide evidence that Graphic Organizers, as a structured instructional tool, may support gains in reading mastery among intermediate learners. The consistency of improvement across all participants, reflected in the universally positive gain scores further strengthens this conclusion. However, given the absence of a control group in this study, caution is warranted in attributing the observed gains exclusively to the intervention, as other factors may have contributed.

Based on the findings of the study, it can be concluded that graphic organizers are effective in improving the reading mastery of intermediate learners. The results showed a significant increase in learners' performance from pre-test to post-test. The statistical analysis confirmed that the improvement was significant. In addition, learners expressed positive perceptions toward the use of graphic organizers, indicating that the tool supports understanding, organization of ideas, and confidence in reading. Therefore, graphic organizers can be considered a useful instructional tool in enhancing reading skills among intermediate learners.

4. Conclusion

The study concludes that the use of Electronic-Graphic Organizers effectively improves the reading mastery of intermediate learners. Learners demonstrated better performance after the intervention, and the improvement was found to be significant. In addition, learners expressed positive perceptions of the tool, indicating that it supports comprehension, organization of ideas, and engagement in reading activities. Therefore, Electronic-Graphic Organizers can be considered a useful and effective instructional strategy in enhancing learners' reading skills.

Compliance with ethical standards

Acknowledgments

I acknowledge that I have not used ChatGPT or Copilot for refining some of the sections in the document.

Disclosure of conflict of interest

I affirm that the respondents voluntarily agreed to participate after being fully informed about the purpose, nature, and potential implications of the study. Their responses have been collected with utmost respect for their privacy and confidentiality, in accordance with ethical research guidelines. Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

Statement of ethical approval

The study was conducted with approval and in accordance with the standards of the college. No ethical approval was required, as the research followed all applicable ethical guidelines, ensuring respect for the respondents' privacy and confidentiality

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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