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Boosting Students' ICT Proficiency through Edu-Graphics: An Enhanced Approach in Productivity Software Instruction

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Abstract. In the digital age, proficiency in productivity software is vital for students' academic and professional success. This study evaluated the effectiveness of the Edu-Graphics approach—a multimedia instructional strategy that integrates graphic design and cognitive principles—in improving ICT proficiency among Grade 8 students at New Pangasinan National High School. A proper experimental design was used, involving a control group that received traditional instruction and an experimental group that used a validated Edu-Graphics module. The module was assessed for Content, Relevance, Instructional Quality, and Presentation. Pre-test results confirmed that both groups were at a novice proficiency level, with no statistically significant differences: p-values were 0.13 for Word Processing, 0.21 for Presentation Software, 1.00 for Spreadsheet Software, and 0.16 for the Total Score. Post-test results revealed a significant improvement in the experimental group, which reached a competent level across all software categories. The experimental group achieved a total mean score of 3.25 (SD = 0.69), significantly higher than the control group's 1.84 (SD = 0.39), with p-values < 0.00001 in all areas. Furthermore, the experimental group recorded a mean gain score of 2.10 (SD = 0.68), compared to the control group's 0.76 (SD = 0.36). T-values ranged from 9.60 to 10.77, confirming statistically significant improvement ($p < 0.00001$) in Word Processing, Presentation, and Spreadsheet Software skills. These findings affirm the effectiveness of the Edu-Graphics approach in enhancing students' digital proficiency. By offering visually enriched, learner-centered, and self-paced instruction, the strategy supports varied learning styles and increases engagement. Edu-Graphics demonstrates strong potential as a scalable tool for integrating technology-driven instruction into the basic education curriculum.

Keywords: Digital literacy; Edu-Graphics; ICT education; Instructional intervention; Productivity software.

1.0 Introduction

In today's digital age, proficiency in Information and Communication Technology (ICT) is essential for success in education, professional careers, and society. The rapid evolution of technology has significantly reshaped learning, work, and communication, underscoring the need for strong ICT skills to thrive in the modern world (Malik, 2018). Within Technical and Livelihood Education (TLE), equipping students with proficiency in productivity software is crucial for preparing them for higher education and careers in engineering, healthcare, information technology, and business (Li, 2022). However, many New Pangasinan National High School (NPNHS) students face challenges in mastering these competencies.

Conventional instructional methods in TLE often rely on didactic teaching approaches and static learning materials (Mayer, 2017), which may not effectively engage students or cater to diverse learning styles. Additionally, Barcelona et al. (2023) highlight the difficulty teachers face in preparing instructional materials that align with modern pedagogical methods, hindering the integration of effective teaching practices.

Recent studies support the need to modernize teaching strategies. Magadza et al. (2024) and Kilag et al. (2024) emphasize the importance of creating engaging, motivating learning environments that foster student success. These studies advocate for innovative methods, yet they lack concrete, practical applications or specific models for addressing ICT teaching gaps in diverse educational settings. This gap underscores the need for adaptable, scalable instructional interventions to meet students' needs.

In response to these challenges, educators have explored innovative instructional strategies, such as graphic-design materials incorporating visual aids, infographics, and multimedia elements. Research shows that these approaches can significantly enhance students' comprehension and retention of complex concepts by presenting information in visually engaging and digestible formats (Turčáni et al., 2024). The Edu-Graphics approach leverages these elements, integrating graphic design principles, cognitive psychology, and instructional technology to create learner-centered, interactive materials to improve productivity software skills.

At NPNHS, students often struggle to connect theoretical knowledge with practical application, and conventional methods do not adequately prepare them for real-world scenarios. Edu-Graphics offers a potential solution by creating an immersive, engaging learning environment that fosters active student participation. This method integrates graphics, simulations, and collaborative tasks, which support a variety of learning styles and provide a personalized, hands-on educational experience.

This study aims to evaluate the effectiveness of Edu-Graphics as an instructional intervention to enhance productivity software skills. The study will use an actual experimental research design to assess the intervention's usability, accessibility, and pedagogical impact. The findings will contribute to the growing body of research on multimedia-enhanced teaching strategies and provide evidence for using such interventions in preparing students for technology-driven careers.

2.0 Methodology

2.1 Research Design

This study employed an actual experimental research design, which is widely recognized for its ability to establish causal relationships and yield quantitative data suitable for inferential analysis (Shaughnessy et al., 2009). This design enabled the researcher to manipulate the independent variable—using Edu-Graphics—while controlling for external variables, to assess its effect on student engagement and proficiency in productivity tools. The study involved two groups: a control group that received standard TLE teaching practices and an experimental group that utilized the Edu-Graphics module developed and validated by subject-matter experts. Both groups were administered a pre-test to establish baseline performance. The experimental group then underwent the intervention (using the Edu-Graphics module), and both groups took a post-test to measure any changes in their proficiency and engagement levels.

2.2 Research Locale

The study was conducted at New Pangasinan National High School (NPNHS) in Isulan, Sultan Kudarat, a public secondary school known for its diverse student population. NPNHS was selected due to its suitability for the study, willingness to participate, and the unique context of its rural location. This setting provided valuable insight into the effectiveness of Edu-Graphics in enhancing ICT proficiency in rural schools, where challenges such as limited resources, unreliable internet connectivity, and teacher retention are prevalent (Volmer, 2023; Tutor Doctor, 2017). Printed modules, offline activities, and scheduled ICT lab sessions were used to mitigate these challenges during the study and ensure that all students could engage with the content regardless of technological limitations.

2.3 Research Participants

The participants were 76 Grade 8 students from NPNHS, enrolled in the Learning Information System (LIS) of DepEd for the 2024–2025 school year. Using stratified random sampling, students were assigned to the control

or experimental group, with 38 students. Stratified random sampling was used to ensure balanced representation in both groups based on gender, socioeconomic background, and other relevant factors. Group assignments were conducted through randomization software to ensure fairness and reliability. The selection of Grade 8 students was based on their developmental stage, where students are transitioning from concrete to abstract thinking, making them ideal candidates for evaluating the impact of Edu-Graphics. Participation in the study was voluntary, with informed consent from parents or guardians.

2.4 Research Instrument

This study used two validated instruments as primary data sources. The first, adapted from Herrera (2011), cited by Sucion (2021), assessed the instructional material's Content, Relevance, instructional quality, and Presentation using a 5-point Likert scale. The second, adapted from Magallanes et al. (2024), evaluated students' productivity software skills in word processing, spreadsheets, and application software. All instruments underwent expert validation and reliability testing, including review by DepEd's quality assurance team. A pilot test was conducted to ensure clarity and alignment with the study's objectives. The overall Cronbach's alpha of 0.94 confirmed excellent reliability. Respondents participated voluntarily, following ethical research guidelines.

2.5 Data Gathering Procedure

This study followed standardized procedures for data collection. First, the researcher secured approval from the Dean of the Graduate School and permission from the Schools Division Superintendent of Sultan Kudarat and the School Principal of New Pangasinan National High School. Next, the validated instructional material and research instruments were introduced. A pilot test was conducted to ensure reliability. Then, a pre-test was administered to determine baseline ICT proficiency levels of Grade 8 students. The experimental group received the Edu-Graphics intervention during their regular TLE classes in the fourth quarter (January–March 2025), while the control group followed standard instruction. After the intervention, a post-test was conducted. Raw scores were collected, tabulated, and analyzed using mean, standard deviation, and t-test. All data were handled confidentially and used solely for academic purposes.

2.6 Ethical Considerations

This study strictly adhered to established ethical guidelines. Participation of Grade 8 students from New Pangasinan National High School was entirely voluntary, with informed consent obtained from both the students and their parents or guardians. Participants had the right to withdraw from the study at any point without consequence. All necessary measures were taken to minimize potential risks and ensure the respondents' physical, psychological, and emotional safety. The dignity and well-being of student participants were respected throughout the research process. Data collected from pre-tests, post-tests, or surveys was treated with complete confidentiality and used solely for academic purposes. The study upheld the principles of honesty, integrity, and transparency to prevent research misconduct or plagiarism.

3.0 Results and Discussion

3.1 Acceptability of the Edu-Graphics

In terms of Content

Table 1 revealed that the panel of experts rated the Edu-Graphics instructional material as excellent, with an overall mean score of 4.53, indicating over 91% acceptability in terms of Content. This high level of approval affirms the instructional material's quality, appropriateness, and pedagogical soundness.

This result reflects the effectiveness of Edu-Graphics in meeting instructional standards, which is further supported by its key features: clearly defined objectives, well-structured activities, and instructional practices that foster metacognitive development and learner engagement. The material is logically sequenced, provides clear instructions, and includes diverse learning tasks that align well with typical class durations. These elements contribute to improved learning efficiency, knowledge retention, and the practical application of skills. Edu-Graphics also promotes individualized and exploratory learning, allowing students to move independently through guided discovery. This student-centered approach aligns with contemporary educational frameworks emphasizing autonomy and critical thinking.

Table 1. *Level of Acceptability of the Edu-Graphics in terms of Content*

	Indicators	Mean	SD	Verbal Description
1.	The Edu-Graphics module and accompanying questionnaire align with the goals of the Education Curriculum.	4.67	0.58	Excellent
2.	The objectives of the Edu-Graphics module are clearly defined and well-stated.	4.33	0.58	Excellent
3.	The Edu-Graphics module and questionnaire contain appropriate assessment tools for learners.	4.67	0.58	Excellent
4.	The instructions provided in the Edu-Graphics module are clear and easy to understand.	4.67	0.58	Excellent
5.	The exercises and tasks are adequate for each class session.	4.67	0.58	Excellent
6.	The lessons in the Edu-Graphics module are realistic and logically sequenced.	4.67	0.58	Excellent
7.	The Content encourages further enhancement and deeper learning.	4.67	0.58	Excellent
8.	The Edu-Graphics module demonstrates effective instructional practices.	4.33	0.58	Excellent
9.	The Edu-Graphics module allows for individualized and experiential learning opportunities.	4.33	0.58	Excellent
10.	The sequence of activities in the Edu-Graphics module is suitable for the target audience.	4.33	0.58	Excellent
	Overall	**4.53**	**0.58**	**Excellent**

The positive evaluation results align with Robillos (2023), who emphasized that metacognitive-based digital graphic organizers improve learners' ability to regulate their thinking and enhance presentation skills. Similarly, Batinga et al. (2020) found that graphic organizers significantly improve comprehension and metacognitive strategy use, further validating the cognitive benefits of Edu-Graphics. When viewed alongside the current findings, these studies reinforce the notion that visually structured instructional materials are effective and transformative in ICT education contexts. By integrating these findings, this study contributes new evidence that supports the broader application of Edu-Graphics as a high-quality instructional tool, particularly in enhancing the cognitive, affective, and metacognitive dimensions of learning in productivity software instruction.

In terms of Relevance

Table 2 shows that the panel of experts rated the Relevance of Edu-Graphics as highly acceptable (M = 4.63, SD = 0.29), reflecting over 91% acceptability. This result confirms the material's alignment with educational objectives and learner needs.

Table 2. *Level of Acceptability of the Edu-Graphics in terms of Relevance*

	Indicators	Mean	SD	Verbal Description
1.	The activities in the Edu-Graphics module are appropriate and relevant to students' experiences and needs.	4.00	0.00	Very Satisfactory
2.	The Edu-Graphics module and questionnaire meet the minimum requirements set for the course.	4.67	0.58	Excellent
3.	The Edu-Graphics module and questionnaire provide teachers and students opportunities to develop ICT proficiency in productivity software.	4.67	0.58	Excellent
4.	The Edu-Graphics module and questionnaire are effective in enhancing ICT proficiency in productivity software skills related to course concepts.	5.00	0.00	Excellent
5.	The Edu-Graphics module package is suitable for developing practical ICT skills.	5.00	0.00	Excellent
6.	The Edu-Graphics module demonstrates effectiveness through pre-test and post-test results.	4.00	0.00	Very Satisfactory
7.	The learning tasks align with the expected Content and ICT skills to be developed among students.	5.00	0.00	Excellent
8.	The Edu-Graphics module materials are suitable for individual use.	4.67	0.58	Excellent
9.	The Edu-Graphics module aligns with current trends and student interests in technology.	4.67	0.58	Excellent
10.	The Content encourages further research and exploration in ICT proficiency.	4.67	0.58	Excellent
	Overall	**4.63**	**0.29**	**Excellent**

The high rating underscores Edu-Graphics' ability to connect instructional Content with real-life applications, boosting motivation, engagement, and learning effectiveness. This aligns with Stamov Roßnagel et al. (2020), who found that relevant instruction enhances motivation and reduces cognitive load. Similarly, Robillos (2023)

emphasized that Content tied to students' prior knowledge and career goals increases perceived learning value. Overall, the findings affirm that Edu-Graphics integrates meaningful, relevant Content that supports student engagement and academic growth.

In terms of Instructional Quality

Table 3 shows that Edu-Graphics received a high instructional quality rating (M = 4.53, SD = 0.46), meeting the 91–100% standard. This result indicates its effectiveness as a teaching tool. Instructions, visual design, and feedback mechanisms promote active learning and better comprehension. This supports Fouda (2019), who noted that graphic elements improve engagement and retention, and Majumdar (2015), who emphasized that ICT tools in TLE enhance practical skills. Overall, the results affirm Edu-Graphics' strength in developing digital competencies and improving software proficiency.

Table 3. *Level of Acceptability of the Edu-Graphics in terms of Instructional Quality*

	Indicators	Mean	SD	Verbal Description
1.	The Edu-Graphics module and questionnaire contain clear and easily understandable directions for users.	4.33	0.58	Excellent
2.	The Edu-Graphics module and questionnaire provide non-threatening, positive feedback.	4.67	0.58	Excellent
3.	The Edu-Graphics module and questionnaire include a variety of exercises to encourage active learning.	5.00	0.00	Excellent
4.	The instructional techniques in the Edu-Graphics module and questionnaire are appropriate.	4.33	0.58	Excellent
5.	The Edu-Graphics module and questionnaire demonstrate strong Relevance to users' experiences.	4.67	0.58	Excellent
6.	The Edu-Graphics module and questionnaire facilitate easy integration into the course.	4.67	0.58	Excellent
7.	The Edu-Graphics module and questionnaire stimulate interest and curiosity among teachers and students.	4.67	0.58	Excellent
8.	The Edu-Graphics module and questionnaire show evidence of effectiveness.	4.00	0.00	Very Satisfactory
9.	The concepts in the Edu-Graphics module and questionnaire are presented in simplified form.	4.33	0.58	Excellent
10.	The Edu-Graphics module and questionnaire are interactive and easy to navigate.	4.67	0.58	Excellent
	Overall	**4.53**	**0.46**	**Excellent**

In terms of Presentation

Table 4 shows that the Presentation of Edu-Graphics was rated highly acceptable (M = 4.47, SD = 0.52), indicating over 91% acceptability. This result reflects the module's effectiveness in delivering Content clearly and engagingly. Its organized layout, visual consistency, and user-friendly design enhance comprehension and support active participation. This result aligns with Lloyd (2024), who noted that purposeful graphics improve engagement and clarify Content. Edu-Graphics' clean structure and visuals reinforce its value as an effective instructional tool.

Table 4. *Level of Acceptability of the Edu-Graphics in terms of Presentation*

	Indicators	Mean	SD	Verbal Description
1.	The Edu-Graphics module and questionnaire are presented with clarity, focus, and proper organization.	4.33	0.58	Excellent
2.	The Edu-Graphics module and questionnaire are easy to navigate.	4.33	0.58	Excellent
3.	The layout of the Edu-Graphics module and questionnaire is well-organized and free from distracting elements.	4.67	0.58	Excellent
4.	Information is presented in ways familiar to students.	4.00	0.00	Very Satisfactory
5.	All references are visually and functionally consistent throughout the module.	4.33	0.58	Excellent
6.	The visual quality of text, images, and illustrations is high.	4.67	0.58	Excellent
7.	The Edu-Graphics module and questionnaire use items that are instructionally sensitive and educationally valuable.	4.67	0.58	Excellent
8.	The cover page aligns with the module's title.	4.33	1.15	Excellent
9.	The Edu-Graphics module and questionnaire are well-designed.	4.33	0.58	Excellent
10.	The EDU-GRAPHICS module and questionnaire are presented effectively and are user-friendly.	5.00	0.00	Excellent
	Overall	**4.47**	**0.52**	**Excellent**

Summary of the Acceptability of the Edu-Graphics

Table 5 summarizes grand mean ratings on the Content, Relevance, instructional quality, and Presentation of Edu-Graphics. The module received a high overall acceptability mean of 4.54 (SD = 0.46), with strong ratings across Content (4.53), Relevance (4.63), instructional quality (4.53), and Presentation (4.47). These results affirm its effectiveness for Grade 8 students, supporting learning through visual strategies and interactive elements. Edu-Graphics simplifies complex concepts with multimedia Content and hands-on tasks that foster practical ICT skills. It also accommodates diverse learning styles and promotes reflective learning, helping students build adaptability and problem-solving skills. While the module effectively improved basic digital competencies, more emphasis is needed on advanced tasks such as spreadsheet functions and automation tools. These findings align with Idris and Abubakar (2023), who highlighted the benefits of interactive multimedia in enhancing computer learning outcomes, confirming the need for continuous instructional refinement to meet evolving digital demands.

Table 5. *Summary of the Acceptability of the Edu-Graphics*

	Subscales	Mean	SD	Verbal Description
1.	Content	4.53	0.58	Excellent
2.	Relevance	4.63	0.29	Excellent
3.	Instructional Quality	4.53	0.46	Excellent
4.	Presentation	4.47	0.52	Excellent
	Overall	**4.54**	**0.46**	**Excellent**

3.2 Students' Productivity Software Skills

Before Intervention

Table 6 presents the onset level of productivity software skills of the control and experimental groups in terms of word processing, presentation, and spreadsheet software.

Table 6. *Students' Productivity Software Skills Before the Intervention*

Productivity Software	Control				Experimental			
	Mean	SD	PL	VD	Mean	SD	PL	VD
Word Processing Software	1.15	0.29	1	Novice	1.25	0.38	1	Novice
Presentation Software	1.13	0.26	1	Novice	1.21	0.41	1	Novice
Spreadsheet Software	1.01	0.02	1	Novice	1.01	0.02	1	Novice
Overall	**1.09**	**0.18**	**1**	**Novice**	**1.72**	**0.22**	**1**	**Novice**

Note: PL = Proficiency Level, VD = Verbal Description, mean = Mean, SD = Standard Deviation

Table 6 shows the control and experimental groups' initial productivity software skill levels. The control group had a mean score of 1.09 (SD = 0.18), while the experimental group scored slightly higher at 1.16 (SD = 0.22). Both were categorized as "Novice" (Proficiency Level 1), indicating a significant need for skill development. Among the three categories, Spreadsheet Software scored the lowest (M = 1.01, SD = 0.02), highlighting a persistent gap in technical ICT skills. These results support Fernández-Batanero et al. (2022), who emphasized the ongoing digital divide in foundational computer competencies. Low initial scores may also reflect students' anxiety or unfamiliarity with new instructional formats, according to Duggal et al. (2024). These findings underscore the importance of accessible, interactive approaches like Edu-Graphics to improve digital proficiency in productivity tools.

After the Intervention

Table 7 displays the outset level of students' productivity software skills after the intervention for the control and experimental groups across three categories: word processing, presentation, and spreadsheet. The table above presents the baseline level of students' productivity software skills in the control and experimental groups before the intervention. The control group recorded an overall mean score of 1.84 (SD = 0.39), indicating a Basic Skill level. Specifically, students showed Intermediate proficiency in Word Processing (M = 1.96, SD = 0.41) and Presentation Software (M = 1.87, SD = 0.42), while their skills in Spreadsheet Software (M = 1.71, SD = 0.42) were rated at the Novice level. These results suggest that students develop uneven and generally low digital competencies without targeted instructional materials.

Table 7. *Students' Productivity Software Skills After the Intervention*

Productivity Software	Control				Experimental			
	Mean	SD	PL	VD	Mean	SD	PL	VD
Word Processing Software	1.96	0.41	2	Intermediate	3.38	0.74	3	Competent
Presentation Software	1.87	0.42	2	Intermediate	3.32	0.71	3	Competent
Spreadsheet Software	1.71	0.42	1	Novice	3.06	0.69	3	Competent
Overall	**1.64**	**0.39**	**2**	**Intermediate**	**3.25**	**0.69**	**3**	**Competent**

Note: PL = Proficiency Level, VD = Verbal Description, mean = Mean, SD = Standard Deviation

In contrast, the experimental group demonstrated a higher outset level with an overall mean of 3.25 (SD = 0.69), classified as Good Skill. They attained Competent proficiency across Word Processing (M = 3.38, SD = 0.74), Presentation Software (M = 3.32, SD = 0.71), and Spreadsheet Software (M = 3.06, SD = 0.69). This immediate improvement can be attributed to implementing Edu-Graphics: A Graphics-Enhanced Intervention Material, which has significantly bolstered foundational digital skills. These findings align with Olipas et al. (2023), who highlighted the impact of targeted interventions in advancing students' ICT competencies. Likewise, Afzal et al. (2023) emphasized that enhancing ICT proficiency through engaging approaches is vital for reducing the digital divide. Thus, the apparent performance gap between the two groups underscores the Relevance and effectiveness of the Edu-Graphics approach in delivering visual and interactive instruction that supports meaningful digital learning.

3.3 Difference in the Onset Level of Productivity Software Skills

Table 8 compares the control and experimental groups regarding productivity software skills among students before the intervention.

Table 8. *Difference in the Onset Level of Students in Productivity Software Skills*

	Experimental		Control		t(31)	p
	mean	SD	mean	SD		
Word Processing Software	1.25	0.34	1.15	0.29	1.54	0.13
Presentation Software	1.21	0.34	1.13	0.26	1.26	0.21
Spreadsheet Software	1.01	0.02	1.01	0.02	0.00	1.00
Total Score	**1.16**	**0.22**	**1.09**	**0.18**	**1.40**	**0.16**

Note: a=0.05 level of significance

Proficiency in productivity software is essential for students, as it equips them with the necessary skills to manage academic and professional tasks efficiently. Table 16 presents the pre-test results for the control and experimental groups, indicating that students exhibited novice proficiency in Word Processing, Presentation Software, and Spreadsheet Software. The control group recorded mean scores of 1.15 (SD = 0.29) for Word Processing, 1.13 (SD = 0.26) for Presentation Software, and 1.01 (SD = 0.02) for Spreadsheet Software. Similarly, the experimental group displayed slightly higher mean scores of 1.25 (SD = 0.34) for Word Processing, 1.21 (SD = 0.34) for Presentation Software, and 1.01 (SD = 0.02) for Spreadsheet Software. Despite these minor differences, both groups remained within the novice proficiency level. This result suggests that students had only a basic understanding of fundamental functions such as text formatting, slide creation, and simple spreadsheet calculations, likely due to informal exposure rather than structured instruction.

This interpretation aligns with Vijitha (2024), who found that early, unstructured exposure to digital tools influences initial skill levels but does not ensure deeper competency. Furthermore, statistical analysis revealed p-values of 0.13, 0.21, 1.00, and 0.16 for Word Processing, Presentation Software, Spreadsheet Software, and Total Score, respectively. Since all p-values exceed 0.05, the two groups had no statistically significant differences in pre-test scores. This result confirms that both groups started with comparable skill levels before the intervention, providing a reliable baseline for assessing the impact of Edu-Graphics. These findings reinforce Dela Roca's (2024) observations, which emphasized that many students lack advanced productivity software skills, highlighting the urgency of structured digital training. Similarly, Enakrire (2024) concluded that technology-enhanced and well-designed instructional programs are vital in developing students' digital proficiency and engagement, an approach echoed in the implementation of Edu-Graphics.

3.4 Difference in the Outset Level of Productivity Software Skills

Table 9 compares the control and experimental groups regarding students' productivity software skills following the intervention. Table 9 shows a statistically significant improvement in post-test scores for the experimental group compared to the control group, confirming the effectiveness of the intervention. The control group achieved intermediate-level scores with means and standard deviations of 1.96 (SD = 0.41) in Word Processing, 1.87 (SD = 0.42) in Presentation Software, and 1.71 (SD = 0.42) in Spreadsheet Software. These scores suggest moderate improvement, likely influenced by regular classroom exposure, but insufficient for reaching higher proficiency levels.

Table 9. *Difference in the Outset Level of Students in Productivity Software Skills*

	Experimental		Control		t(31)	p
	mean	SD	mean	SD		
Word Processing Software	3.38	0.74	1.96	0.41	5.25	<.001
Presentation Software	3.33	0.71	1.87	0.42	7.09	<.001
Spreadsheet Software	3.06	0.69	1.71	0.42	5.05	<.001
Total Score	**1.16**	**0.69**	**1.84**	**0.39**	**7.82**	**<.001**

Note: a=0.05 level of significance

In contrast, the experimental group reached competent proficiency, with significantly higher scores: 3.38 (SD = 0.74) in Word Processing, 3.33 (SD = 0.71) in Presentation Software, and 3.06 (SD = 0.69) in Spreadsheet Software. The total mean score of the experimental group (M = 3.25, SD = 0.69) was markedly higher than that of the control group (M = 1.84, SD = 0.39), with p-values < 0.00001 across all categories. This statistically significant Difference indicates that the Edu-Graphics intervention, designed with structured strategies and visually enhanced Content, strongly affected students' productivity software skills.

These results affirm the findings of Dela Roca (2024), who emphasized the impact of interactive and visual training in enhancing digital literacy. They also support Olipas et al. (2023), who advocated for targeted instruction to advance students beyond intermediate proficiency. The notable gains observed in the experimental group underscore the Relevance and novelty of using graphics-enhanced interventions to foster deeper engagement and more effective learning of digital tools.

3.5 Differences in Productivity Software Skills

Table 10 compares the control and experimental groups' mean gain scores in productivity software skills. The data indicate that the experimental group, which received instruction using Edu-Graphics, achieved a mean gain score of 2.10 (SD = 0.68), compared to the control group's mean gain score of 0.76 (SD = 0.36). This substantial disparity suggests that the intervention significantly enhanced students' digital proficiency across all productivity software categories by providing a more engaging and structured learning experience. Statistical analysis further supports this observation, with t-values ranging from 9.60 to 10.77 and p-values of <0.00001 for MS Word, Presentation Software, Spreadsheet Software, and the Total Score. These results indicate statistically significant improvements at $\alpha = 0.05$, confirming that the Edu-Graphics intervention had a measurable and meaningful impact on students' productivity software skills.

Table 10. *Difference in Productivity Software Skills*

	Experimental		Control		t(31)	p
	mean	SD	mean	SD		
Word Processing Software	2.12	0.73	0.82	0.41	9.60	<.001
Presentation Software	2.12	0.71	0.75	0.39	10.36	<.001
Spreadsheet Software	2.06	0.70	0.70	0.42	10.30	<.001
Total Score	**2.10**	**0.68**	**0.76**	**0.36**	**10.77**	**<.001**

Note: a=0.05 level of significance

The experimental group's higher mean gain scores validate the effectiveness of integrating visually enriched instructional materials into digital literacy education. These findings reinforce the importance of using structured and innovative strategies in skill development. These findings align with Pifarré and Argelagós (2020), who highlighted that interactive and well-designed digital learning tools are especially beneficial for students with low initial proficiency. The results also contribute new evidence to the growing support for technology-enhanced instruction that addresses the digital competency gap in education.

4.0 Conclusion

This study investigated the impact of Edu-Graphics: An Enhanced Instructional Intervention on students' ICT proficiency in productivity software. The findings revealed that the Edu-Graphics module significantly enhanced students' digital literacy, particularly in organizing data, structuring tasks, and producing digital outputs. The instructional materials, reviewed and validated by experts, were rated highly for Relevance, clarity, and instructional quality, confirming their value in fostering interactive and engaging learning experiences.

A key finding was the identification of proficiency gaps, especially in advanced spreadsheet functionalities. These gaps highlight the importance of targeted instruction within specific software skills to further strengthen students' ICT competencies. Despite these gaps, the experimental group showed substantial progress, particularly in using advanced software features, validating the impact of graphics-enhanced instruction on deeper learning. Statistical analysis supported these findings. The first hypothesis—no significant difference in pre-test proficiency between control and experimental groups—was accepted, confirming a fair baseline. In contrast, the second and third hypotheses were rejected, as post-test results showed significantly higher proficiency in the experimental group. This result underscores the effectiveness of structured, visually engaging instructional strategies in fostering digital skills, aligning with broader goals in ICT education such as closing the digital divide and preparing students for technology-driven environments.

Overall, Edu-Graphics contributes to the evolving landscape of ICT education by demonstrating that well-designed, graphic-enhanced instructional materials can bridge gaps in digital proficiency and promote 21st-century skills. This study supports the integration of similar instructional models across diverse educational contexts. Future research may focus on refining Edu-Graphics to address specific skill deficiencies, particularly in spreadsheet applications, and adapting the module for different grade levels or subject areas. Employing mixed-method or longitudinal approaches could provide deeper insights into student engagement, retention of digital skills, and long-term impact. Additionally, exploring personalized or adaptive versions of Edu-Graphics may help accommodate varied learning styles, ensuring a more inclusive and effective development of digital competencies.

5.0 Contributions of Authors

The researcher led the conceptualization, design, and execution of the study, including the development of the Edu-Graphics instructional materials and the construction of research instruments. She also collected data, performed the statistical analysis, and wrote the manuscript. Expert reviewers played a vital role in enhancing the quality and credibility of the study through their contributions, which included content validation of the Edu-Graphics module to ensure alignment with the Technology and Livelihood Education (TLE) curriculum and ICT learning competencies, instructional design review for feedback on clarity, visual appeal, and pedagogical soundness of the materials, and validation of the pre-test and post-test instruments to ensure they accurately measured digital proficiency outcomes. Their insights were incorporated through multiple rounds of feedback, leading to improvements in both the instructional intervention and the evaluation tools, ultimately strengthening the study's validity, instructional quality, and overall impact. The researcher oversaw the incorporation of the reviewers' suggestions, ensuring that all components adhered to academic standards and approved the final version of the manuscript.

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7.0 Conflict of Interests

The researcher declares no conflict of interest in this study's conduct, results, or publication.

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