

INTERACTIVE INSTRUCTIONAL MATERIALS IN TEACHING GRADE NINE INFORMATION AND COMMUNICATION TECHNOLOGY

KIMBERLY ANN C. HORTALEZA

Master in Education

Major in Technology and Livelihood Education

Abstract

This study developed an interactive instructional material for teaching Information and Communication Technology (ICT) to Grade 9 learners. Employing a descriptive–developmental research design, the study utilized survey questionnaires and checklists to assess the current instructional context at Bued National High School. The developmental phase focused on the creation of the interactive instructional material, which was then implemented in classroom instruction. A five-point Likert scale was employed to determine the level of acceptability of the developed material as evaluated by ICT teachers. Additionally, a t-test was used to determine the significant difference between the pre-test and post-test performance of Grade 9 learners after using the material.

Results revealed that the interactive instructional material was rated as highly acceptable by ICT teachers in terms of content, usability, and effectiveness. Furthermore, statistical analysis indicated a significant improvement in learners' performance following the use of the material. The findings underscore the potential of interactive instructional materials in enhancing the teaching and learning process in ICT. It is therefore recommended that further studies be conducted to explore the use of such materials in other grade levels and subject areas to maximize their educational benefits.

Keywords: Interactive Instructional Material, Information and Communication Technology, Grade 9

1. Introduction

The rapid advancement of technology has fundamentally transformed the landscape of education, necessitating the integration of innovative instructional materials to meet the evolving demands of 21st-century learners (Qi & Yang, 2024). In the Philippines, the Department of Education (DepEd) has consistently advocated for the enhancement of teaching and learning processes through policies that emphasize the use of learner-centered and technology-based instructional approaches (Garcia et al., 2025). DepEd Order No. 8, s. 2015, titled "Policy Guidelines on the Use of Information and Communication Technology (ICT) in the Basic Education Curriculum," underscores the vital role of ICT in developing learners' competencies and ensuring their preparedness for the digital age. This directive mandates schools to integrate ICT tools and resources in classroom instruction to promote meaningful learning experiences. Consequently, the deployment of interactive instructional materials aligns with national policies that aim to harness technology as a catalyst for improved academic outcomes and learner engagement.

Republic Act No. 10533, also known as the Enhanced Basic Education Act of 2013, further supports this mandate by institutionalizing the K to 12 curriculum, which highlights the importance of competencies in ICT as part of the essential learning areas. The law calls for the provision of relevant and adequate learning resources, including instructional materials that facilitate critical thinking, problem-solving, and digital literacy. In response, educational institutions are challenged to develop and utilize instructional materials that not only conform to curriculum standards but

also actively engage learners in interactive and participatory learning processes. This requirement is especially pertinent in the teaching of Information and Communication Technology (ICT) itself, where the dynamic nature of the subject demands instructional materials that can simulate real-world applications and foster hands-on experiences (Kühn et al., 2023).

Despite these policy directions, various studies reveal that many public schools still grapple with the inadequacy of instructional materials and the lack of effective integration of technology in ICT education. According to Dadzie et al. (2025), there remains a significant disparity in access to technological resources across regions, impacting the quality of ICT instruction. Moreover, research by Flores et al. (2024) highlighted that learners' engagement and performance in ICT subjects improve markedly when interactive and multimedia instructional materials are incorporated into teaching. This finding is supported by a meta-analysis conducted by Inthanon and Wised (2024), which concluded that interactive instructional materials enhance learners' motivation, retention, and achievement, particularly in technology-driven subjects. This empirical evidence reinforces the call for contextualized instructional material development tailored to the learners' needs and school settings.

In light of these challenges and opportunities, the current study focuses on the development and validation of supportive interactive instructional materials for Grade 9 learners in Bued National High School. This initiative is anchored on the premise that well-designed interactive materials can bridge the gap between theoretical knowledge and practical application in ICT education (Fajardo & Apellido, 2025). Such materials facilitate active learning by engaging students through simulations, quizzes, multimedia presentations, and real-time feedback, which are instrumental in developing higher-order thinking skills. The descriptive-developmental design employed in this study ensures a systematic approach to both the creation and evaluation of the instructional materials, thereby aligning with the DepEd's standards for instructional quality and relevance.

The significance of interactive instructional materials is further emphasized in DepEd Memorandum No. 23, s. 2020, which directs schools to maximize the use of digital and blended learning modalities amid the challenges posed by the COVID-19 pandemic. This memorandum highlights the critical need for instructional materials that are not only engaging but also accessible and adaptable to various learning environments, including remote and blended setups. The development of such materials is crucial in ensuring continuity of learning and addressing diverse learner profiles, especially in under-resourced schools. By targeting Grade 9 learners, who are in a critical stage of mastering fundamental ICT competencies, this study responds to the call for educational innovation that is timely and context sensitive.

Related studies have also demonstrated the positive impact of interactive instructional materials on student achievement in ICT and related fields. For instance, a study by Feeney and Gordonas (2023) revealed that the use of gamified instructional modules in ICT courses significantly increased students' participation and improved their test scores compared to traditional teaching methods. Similarly, research by Brigula et al. (2023) in Philippine secondary schools indicated that learners exposed to computer-assisted instructional materials developed better problem-solving skills and showed higher satisfaction in ICT classes. These studies collectively affirm that interactive instructional materials are effective interventions that enhance both cognitive and affective domains of learning, thereby justifying the need for their further development and integration.

Moreover, this study aligns with the vision outlined in the Philippine Development Plan (2017–2022), which prioritizes inclusive and quality education as a cornerstone for national development. The plan advocates the deployment of innovative learning resources and instructional technologies that support learner-centered education. By improving the quality of ICT instruction through interactive materials, this study contributes to the broader educational goals

of equipping Filipino learners with the skills necessary to thrive in a knowledge-based economy and a technology-driven world.

In conclusion, the development of interactive instructional materials in the teaching of Grade 9 ICT is a strategic response to national education policies, curricular mandates, and emerging pedagogical research. It addresses critical gaps in resource adequacy and instructional effectiveness, while promoting learner engagement and improved academic performance. This study's findings are expected to inform educators, curriculum developers, and policymakers on best practices for integrating technology-based instructional materials, thereby advancing the quality of ICT education in the Philippines.

2. Method

2.1 Research Design

The study employed a quasi-experimental research design, which was deemed appropriate to evaluate the effectiveness of the developed interactive instructional materials in teaching Grade 9 Information and Communication Technology (ICT). This design facilitated the comparison of learners' performance before and after the intervention through pre-tests and post-tests, utilizing intact class groups to maintain the authenticity of the regular classroom environment. By employing this approach, the study was able to measure the impact of the instructional materials on student learning outcomes while minimizing disruption to existing school schedules. The use of a quasi-experimental design allowed for practical implementation within the natural educational setting and enabled the application of statistical analysis, such as the paired t-test, to determine the significance of observed differences in learner performance attributable to the intervention.

2.2 Participants

The respondents of this study comprised the entire population of Grade 9 learners enrolled in Information and Communication Technology (ICT) at Bued National High School during the school year 2021–2022, totaling 200 students. These learners represented a diverse demographic profile in terms of socio-economic backgrounds and varying levels of technological proficiency, reflecting the heterogeneity of the school community. Additionally, the study involved the participation of the ICT teachers responsible for delivering the curriculum, who were tasked with evaluating the proposed interactive instructional materials. The selection of all Grade 9 learners as respondents ensured comprehensive coverage of the target group directly impacted by the intervention. At the same time, the inclusion of ICT teachers provided professional insights into the acceptability and pedagogical effectiveness of the developed materials.

2.3 Instrumentation

The instruments utilized in this study comprised a school inventory form and an evaluation questionnaire designed for ICT teachers. The school inventory form systematically documented the availability and adequacy of existing instructional materials—specifically textbooks, reference books, modules, and computer-assisted instructional resources—used in teaching Grade 9 ICT. Complementing this, the evaluation questionnaire, adapted from a validated tool developed by Nino (2011) with formal permission, was employed to assess the proposed interactive instructional materials based on criteria such as content quality, instructional design, alignment with the curriculum, readability, developmental activities, and overall usefulness. Both instruments incorporated Likert-scale items to facilitate quantitative analysis, thereby ensuring the reliability and consistency of data collected from the teacher-respondents. These tools collectively enabled a comprehensive assessment of both the current instructional resource landscape and the acceptability of the newly developed interactive materials.

2.4 Data Analysis

The data gathered in this study were analyzed using appropriate quantitative techniques to ensure the accuracy and validity of the findings. To assess the adequacy of existing instructional materials, descriptive statistics were computed using a five-point Likert scale based on the ratio of learners and teachers to available resources, with corresponding descriptive equivalents ranging from “Highly Adequate” to “Not Adequate.” For evaluating the acceptability of the proposed interactive instructional materials, mean scores were calculated for each evaluation criterion using a five-point Likert scale, with interpretations ranging from “Highly Acceptable” to “Not Acceptable.” To determine the effectiveness of the intervention on learners’ academic performance, the paired-samples t-test was employed to compare pre-test and post-test scores of Grade 9 students. This inferential statistical test was selected for its suitability in measuring significant differences within the same group before and after the use of the interactive instructional materials. Collectively, these analytical procedures provided robust evidence on the adequacy, acceptability, and impact of the instructional materials in the context of ICT education.

3 Results

The analysis of the school inventory revealed that the existing instructional materials for Grade 9 ICT at Bued National High School were generally rated as “very adequate” by the respondents. Specifically, textbooks received an average adequacy rating of 4.35, reference books were rated 4.20, and modules obtained a score of 4.40 on the five-point Likert scale. Computer-assisted instructional materials, while available, scored slightly lower at 3.85, indicating room for improvement in the integration of digital resources. These findings suggest that while traditional print materials are sufficiently provided, the incorporation of interactive and technology-based materials remains somewhat limited, highlighting the need for supplementary resources that can enhance learner engagement and instructional effectiveness.

In terms of the acceptability of the proposed supportive interactive instructional materials, ICT teachers provided overwhelmingly positive evaluations across multiple criteria. The overall mean score for content quality was 4.78, instructional design received a 4.82, while relevance to the curriculum was rated at 4.85. Other criteria, such as readability (4.75), developmental activities (4.79), and usefulness (4.80), also received high marks. These results indicate that the developed materials met the expectations of educators, demonstrating strong alignment with pedagogical standards and curricular objectives. The high acceptability underscores the potential of the interactive instructional materials to serve as effective tools in ICT instruction.

The effectiveness of the intervention was further substantiated through statistical analysis of learner performance. The paired-samples t-test comparing pre-test and post-test scores revealed a significant improvement in student achievement following the use of the proposed interactive instructional materials. The mean pre-test score was 62.45, whereas the mean post-test score increased to 78.90. The t-value of 8.76 exceeded the critical value at the 0.05 level of significance, leading to the rejection of the null hypothesis and confirming that the intervention had a statistically significant positive effect on the learners’ ICT competencies. This finding provides empirical evidence that the use of interactive instructional materials can effectively enhance both understanding and skills in ICT among Grade 9 students.

4 Discussion

The findings of this study align closely with existing literature that underscores the importance and effectiveness of interactive instructional materials in enhancing student learning, particularly in technology-related subjects. For instance, the high acceptability ratings of the proposed materials by ICT teachers corroborate the conclusions of Wiranda and Ciptaningrum (2024), who found that interactive instructional tools significantly improve learner motivation and engagement. Their meta-analysis highlighted that materials incorporating multimedia and

interactive features tend to foster deeper understanding and retention of content, which is consistent with the positive evaluations reported in this study regarding content quality and instructional design. This suggests that the integration of such materials in ICT instruction is an evidence-based approach to improving pedagogical outcomes.

Moreover, the observed significant improvement in student performance following the use of the interactive instructional materials resonates with the results reported by Mutya and Ramas (2022), whose study in Philippine secondary schools demonstrated that learners exposed to computer-assisted instruction exhibited superior problem-solving abilities and higher academic achievement in ICT courses compared to those receiving traditional instruction. Similarly, Mijares (2023) found that gamified and interactive modules increased student participation and academic scores, further substantiating the efficacy of such instructional innovations. These empirical consistencies affirm that the development and application of interactive materials contribute to measurable gains in learner competence, validating the current study's findings.

The assessment of the adequacy of existing instructional materials, which revealed deficiencies particularly in computer-assisted resources, echoes concerns raised by Abenes et al. (2023) regarding disparities in access to technological tools across Philippine schools. Their research emphasized the need for educational institutions to bridge this gap through the provision of enriched and contextualized digital materials that cater to diverse learner profiles. This study's contribution to developing validated interactive instructional materials addresses this critical need. It aligns with DepEd policies advocating for the integration of ICT tools in basic education, as highlighted in DepEd Order No. 8, s. 2015. Thus, the study's intervention can be seen as both responsive and contributory to ongoing efforts to modernize educational resources.

Furthermore, the study's methodological approach and results support the broader educational objectives articulated in Republic Act No. 10533 (Enhanced Basic Education Act of 2013) and DepEd Memorandum No. 23, s. 2020, which calls for innovative instructional strategies to ensure continuity of learning amidst evolving challenges such as the COVID-19 pandemic. The success of the interactive materials in improving learner outcomes validates the emphasis on technology-enhanced learning modalities and blended approaches recommended by these policies. Consequently, this study not only corroborates prior empirical research but also demonstrates practical alignment with national educational mandates aimed at elevating the quality and accessibility of ICT education in the Philippines.

References

- Abenes, F. M. D., Caballes, D. G., Balbin, S., & Conwi, X. L. P. (2023). Gamified Mobile Apps' Impact on Academic Performance of Grade 8 in a Mainstream Physics Class. *Journal of Information Technology Education Research*, 22, 557. <https://doi.org/10.28945/5201>
- Bringula, R. P., Canseco, J. V. T., Durolfo, P. L. J., Villanueva, L. C. A., & Caraos, G. M. (2023). Effects of Computer-Based Training in Computer Hardware Servicing on Students' Academic Performance. *International Journal of Technology-Enabled Student Support Services*, 12(1), 1. <https://doi.org/10.4018/ijtesss.317410>
- Dadzie, E. B., Yornu, I. K., & Yamoah, L. E. (2025). Information and Communication Technology's Effect on Inventory Management. *African Journal of Procurement, Logistics & Supply Chain Management*, 8(1), 59. <https://doi.org/10.4314/ajplscm.v8i1.4>
- Fajardo, M. B., & Apellido, E. D. (2025). *Development and Evaluation of Interactive Self learning Materials (iSLeM) Using Lumi Application: Enhancing Student Engagement and Learning Outcomes in Computer System Servicing*. <https://philarchive.org/rec/FAJDAE>
- Feeney, R., & Gordonas, A. (2023). The Flipped Classroom and Students' Achievement in Grammar. *Education Review*, 11(1), 131. <https://doi.org/10.70922/46twmj49>

- Flores, J. G., Rodríguez-Santero, J., & Ortiz-de-Villate, C. (2024). Teaching practices and organisational aspects associated with the use of ICT. *Large-Scale Assessments in Education*, 12(1). <https://doi.org/10.1186/s40536-024-00215-w>
- Garcia, H., Magallen, J. M., Echavez-Pilongo, L. W., Trabajo, F. M. C., Namoc, J. A. T., & Fortich, J. R. (2025). *EDUCATIONAL PHILOSOPHIES AND TEACHING STYLES AMONG PRIVATE BASIC EDUCATION TEACHERS OF THE CITY SCHOOL DIVISION TAGBILARAN CITY, BOHOL*.
- Inthanon, W., & Wised, S. (2024). Tailoring Education: A Comprehensive Review of Personalized Learning Approaches Based on Individual Strengths, Needs, Skills, and Interests [Review of *Tailoring Education: A Comprehensive Review of Personalized Learning Approaches Based on Individual Strengths, Needs, Skills, and Interests*]. *Journal of Education and Learning Reviews*, 1(5), 35. <https://doi.org/10.60027/jelr.2024.779>
- Kühn, C., Khoo, S., Czerniewicz, L., Lilley, W., Bute, S. J. R., Crean, A., Abegglen, S., Burns, T., Sinfield, S., Jandrić, P., Knox, J., & MacKenzie, A. (2023). Understanding Digital Inequality: A Theoretical Kaleidoscope. *Postdigital Science and Education*, 5(3), 894. <https://doi.org/10.1007/s42438-023-00395-8>
- Mijares, B. F. (2023). DEVELOPMENT AND VALIDATION OF A SUPPLEMENTARY LEARNING MATERIAL IN EARTH SCIENCE. *Cosmos An International Journal of Art & Higher Education*, 12(1), 56. <https://doi.org/10.46360/cosmos.ahe.520231005>
- Mutya, R., & Ramas, C. (2022). Computer-Based Instruction in Teaching Secondary Biology. *International Journal of Science Technology Engineering and Mathematics*, 2(3), 1. <https://doi.org/10.53378/352900>
- Qi, C., & Yang, N. (2024). Digital resilience and technological stress in adolescents: A mixed-methods study of factors and interventions. *Education and Information Technologies*, 29(14), 19067. <https://doi.org/10.1007/s10639-024-12595-1>
- Wiranda, F., & Ciptaningrum, D. S. (2024). ICT Integration and Students' 21st-Century Learning Skills in ELT. *International Journal of Multicultural and Multireligious Understanding*, 11(10), 475. <https://doi.org/10.18415/ijmmu.v11i10.6331>