

**Empowerment technology implementation, instructional practices, and academic performance of Grade 11 students in Legislative District 1, Isabela**

**Camille Faith A. Gannaban\***

Santiago City, Isabela, Philippines

**ABSTRACT**

The integration of Information and Communication Technology (ICT) into the K–12 curriculum has made Empowerment Technology a vital subject in preparing senior high school students for academic, professional, and digital demands. However, limited local studies have specifically examined how the implementation of Empowerment Technology influences the academic performance of Grade 11 students in Philippine public senior high schools. This study determined the impact of Empowerment Technology on the academic performance of Grade 11 students in public senior high schools in Legislative District 1, Isabela, during the School Year 2025–2026. Using a descriptive-normative research design, data were gathered from 46 Empowerment Technology teachers selected through purposive sampling using a validated questionnaire, documentary analysis, and unstructured interviews. Frequency, percentage, and weighted mean were used to analyze the data. The findings revealed that the Most Essential Learning Competencies were generally realized, teachers strongly agreed that Empowerment Technology positively influenced students' academic performance, and learner-centered strategies such as project-based learning, multimedia integration, and hands-on activities were frequently used and perceived as highly effective. Although teachers encountered moderately serious challenges related to ICT resources, software, and instructional time, the results indicate that effective curriculum implementation and appropriate instructional practices contribute to improved student learning. Strengthening ICT facilities, instructional support, and professional development is recommended to maximize the benefits of Empowerment Technology.

**Keywords:** Empowerment technology, academic performance, Grade 11 students, instructional strategies, ICT integration.

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**INTRODUCTION**

The twenty first century has been characterized by unprecedented technological advancement that has reshaped nearly every dimension of society, with education emerging as one of the sectors most profoundly influenced by digital transformation. The shift from traditional teacher centered instruction toward technology enhanced learning environments

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\*Corresponding author / Email: [camillefaithgannaban@gmail.com](mailto:camillefaithgannaban@gmail.com)

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reflects the growing recognition that Information and Communication Technology (ICT) is fundamental to the development of learners who can effectively access, evaluate, create, and communicate information in an increasingly digital world. As educational systems continue to adapt to these changes, digital literacy has become an essential competency that equips students with the knowledge and skills necessary to participate productively in contemporary society (Cîrneanu & Moldoveanu, 2024). The rapid expansion of educational technology has further accelerated this transformation by creating learning environments that are more flexible, accessible, and responsive to diverse learner needs.

The integration of educational technology gained remarkable momentum during the COVID 19 pandemic, when educational institutions around the world transitioned to online and blended learning modalities. This global disruption prompted substantial investments in digital infrastructure, virtual learning platforms, learning management systems, and interactive educational applications that fundamentally redefined instructional delivery. As a result, technology has become more deeply embedded in educational practice, promoting learner centered approaches that support independent learning, collaboration, and continuous access to educational resources (Josué et al., 2023). At the same time, emerging innovations such as Artificial Intelligence, Augmented Reality, and Virtual Reality have expanded the possibilities for teaching and learning by enabling personalized instruction, immersive experiences, and adaptive feedback mechanisms. In particular, generative artificial intelligence has demonstrated significant potential to enhance instruction through the creation of learning materials, customized educational activities, and timely feedback that supports students' academic development (Mao et al., 2024). Collectively, these technological advancements underscore the growing importance of preparing learners to navigate digital environments effectively while maximizing the educational benefits of technological innovation.

Recognizing these global developments, the Philippine educational system incorporated Empowerment Technology as a core subject within the K to 12 Senior High School curriculum to strengthen students' digital competencies beyond basic computer literacy. The subject is designed to cultivate learners' knowledge, skills, and attitudes necessary for the responsible, ethical, and productive use of digital technologies while encouraging creativity, collaboration, communication, and responsible digital citizenship (Al Abdullatif & Gameil, 2021). As a required subject for Grade 11 and Grade 12 students, Empowerment Technology prepares learners for higher education, employment, and lifelong learning by enabling them to create, manage, and share digital content appropriate to their academic and technical vocational specializations. The eighty-hour curriculum encompasses both foundational and advanced ICT competencies, including information and communication technology, online safety, cyber ethics, productivity software, multimedia production, graphic design, website development, cloud computing, and collaborative digital platforms. Its culminating project requires students to develop collaborative ICT based solutions that address authentic social concerns, thereby promoting meaningful applications of technology in real world contexts (Department of Education [DepEd], 2016).

Despite its comprehensive design and clearly articulated objectives, the implementation of Empowerment Technology continues to encounter significant challenges that influence the quality of instruction and student learning outcomes. One of the most persistent barriers is the digital divide, particularly in geographically isolated and economically disadvantaged communities where limited internet connectivity and inadequate access to digital devices constrain students' opportunities to participate fully in technology-based learning. These inequities reduce the effectiveness of ICT integration and widen disparities in educational experiences. Equally important are the limitations in teachers' technological competence and professional preparation, which often create inconsistencies between the intended curriculum and its actual classroom implementation. Although the curriculum requires learners to perform

technology intensive tasks such as multimedia production, website development, and online collaboration, many schools continue to experience shortages in infrastructure, technological resources, and instructional support necessary to implement these learning activities effectively (Murcia & Pepper, 2018). Consequently, variations in resource availability, teacher preparedness, and instructional quality may significantly influence students' ICT competencies and academic achievement.

Existing scholarship consistently recognizes the educational value of technology integration in enhancing student engagement, learning experiences, and academic performance. However, much of the current literature has concentrated on the general effectiveness of educational technology rather than examining Empowerment Technology as a distinct curricular component within the Philippine Senior High School program. This indicates a significant gap in empirical evidence regarding whether the subject fulfills its intended objectives of strengthening ICT competencies while contributing to improved academic outcomes among learners. As noted by Ramaila and Molwele (2022), there remains a need for more context specific investigations that evaluate the implementation and educational effectiveness of technology related curricula rather than technology integration in general. Addressing this gap is particularly important in the Philippine context, where disparities in technological resources, instructional practices, and school environments may substantially influence curriculum implementation and learning outcomes.

The present study responds to these gaps by examining the implementation of Empowerment Technology and its relationship with the academic performance of Grade 11 students in public Senior High Schools within Legislative District 1, Isabela. Specifically, it investigates the implementation of the subject, the instructional strategies employed by teachers, the challenges encountered during classroom implementation, and the extent to which Empowerment Technology contributes to students' academic achievement. By generating empirical evidence regarding these relationships, the study seeks to provide valuable insights for curriculum enhancement, instructional improvement, stronger ICT integration, and educational policy development while contributing to the expanding body of literature on educational technology in the Philippine educational system.

The study is conceptually grounded in the complementary perspectives of Vygotsky's Social Constructivism Theory (Vygotsky, 1978) and Davis's Technology Acceptance Model (Davis, 1989), which collectively explain how the implementation of Empowerment Technology may influence students' academic performance. Rather than assuming a direct relationship between curriculum implementation and academic achievement, the study posits that this relationship is mediated by the quality of classroom learning experiences and students' acceptance and utilization of digital technologies. Vygotsky's Social Constructivism Theory provides the pedagogical foundation by emphasizing that learning is a socially constructed process in which knowledge develops through interaction, collaboration, communication, and guided participation within meaningful cultural contexts. Central to this perspective is the Zone of Proximal Development, which explains that learners achieve higher levels of understanding when appropriate guidance and collaborative support are provided. These principles are reflected in the Empowerment Technology curriculum, which emphasizes collaborative projects, problem solving, authentic learning experiences, and teacher facilitation to strengthen ICT competencies alongside higher order thinking skills.

Complementing this pedagogical perspective, the Technology Acceptance Model explains how students' willingness to engage with technology is shaped by their perceptions of its usefulness and ease of use (Davis, 1989). Within the context of Empowerment Technology, perceived usefulness refers to students' beliefs that digital technologies enhance their academic

performance and prepare them for future educational and professional opportunities, while perceived ease of use reflects their perceptions regarding the accessibility and usability of technological tools and learning activities. These perceptions are influenced by several contextual factors, including teacher competence, the availability of ICT resources, and students' previous technological experiences. When learners perceive digital technologies as both beneficial and manageable, they are more likely to actively participate in technology enhanced learning experiences, thereby increasing engagement and strengthening academic performance.

Drawing from these complementary theoretical perspectives, the study argues that effective implementation of the Empowerment Technology curriculum promotes meaningful classroom interaction, collaborative learning, and positive technology acceptance, which together contribute to improved ICT competencies and academic achievement. This relationship is operationalized through an Input, Process, Output framework in which the input consists of respondents' demographic characteristics, the implementation of the Most Essential Learning Competencies, instructional strategies employed in teaching Empowerment Technology, and the challenges encountered during instruction. The process involves assessing curriculum implementation and examining how instructional practices and student engagement influence learning outcomes within public Senior High Schools in Legislative District 1, Isabela. The expected output is reflected in students' academic performance, which is anticipated to improve through effective curriculum implementation, appropriate instructional strategies, and meaningful ICT integration. Furthermore, the findings are expected to generate evidence-based recommendations that support curriculum enhancement, instructional improvement, and policy development aimed at strengthening the implementation of Empowerment Technology and promoting more effective technology enhanced learning in Philippine Senior High Schools.

#### Statement of the problem

This study determined the impact of Empowerment Technology on the academic performance of Grade 11 students in public senior high schools in Legislative District 1, Isabela, during the School Year 2025–2026.

Specifically, the study sought to answer the following research questions:

1. What was the demographic profile of the teacher respondents in terms of age, sex, civil status, highest educational attainment, present position, latest performance rating, length of teaching experience, and level of in-service training attended?
2. To what extent were the Most Essential Learning Competencies (MELCs) in Empowerment Technology implemented in public senior high schools in Legislative District 1, Isabela?
3. To what extent did Empowerment Technology influence the academic performance of Grade 11 students, as perceived by the teacher respondents?
4. To what extent were the different instructional strategies employed in teaching Empowerment Technology utilized and perceived to be effective?
5. To what extent did the teacher respondents encounter challenges in teaching Empowerment Technology?

#### METHODOLOGY

The study employed the descriptive-normative research design to examine teachers' perceptions of the impact of Empowerment Technology on the academic performance of Grade 11 students in public senior high schools in Legislative District 1, Isabela. This quantitative

approach was appropriate for describing existing conditions, analyzing current practices, and interpreting relationships among variables. The descriptive-normative method enabled the researcher to gather, organize, analyze, and interpret data concerning the implementation of Empowerment Technology and its perceived influence on students' academic performance (Best, 1999; Good & Scates, 2001; Van Dalen & Meyer, 1999; Whitney, 1999).

The study was conducted in public senior high schools located in the nine municipalities comprising Legislative District 1 of Isabela, namely Cabagan, Delfin Albano, Divilacan, Maconacon, Palanan, San Pablo, Santa Maria, Santo Tomas, and Tumauini. The respondents consisted of 46 Empowerment Technology teachers, who were selected through purposive sampling because of their direct involvement in teaching the subject.

Data were collected using a researcher-developed questionnaire, which served as the primary instrument. The questionnaire consisted of five parts covering the respondents' demographic profile, the implementation of the Most Essential Learning Competencies (MELCs), the perceived impact of Empowerment Technology on students' academic performance, instructional strategies employed in teaching the subject, and the challenges encountered during instruction. To strengthen the credibility of the findings, documentary analysis and unstructured interviews were also conducted to validate and supplement the survey data. Before its administration, the questionnaire underwent pilot testing and expert validation, and the comments and recommendations obtained were incorporated into the final version of the instrument.

Prior to data collection, the researcher secured the necessary approvals from the Schools Division Superintendent and school administrators. The validated questionnaires were personally administered and retrieved by the researcher. The collected data were then organized, tabulated, analyzed, and interpreted in accordance with the objectives of the study.

For data analysis, frequency and percentage were used to describe the demographic profile of the respondents. At the same time, the weighted mean was employed to determine the extent of implementation of the Most Essential Learning Competencies, the perceived impact of Empowerment Technology on students' academic performance, the utilization and effectiveness of instructional strategies, and the challenges encountered by teachers in teaching the subject.

## RESULTS AND DISCUSSION

The study involved 46 Empowerment Technology teachers from public senior high schools in Legislative District 1, Isabela. Most respondents were 31–35 years old (36.96%), female (60.87%), married (58.70%), Bachelor's degree holders (73.91%), and Teacher III (43.48%). A large majority received an Outstanding performance rating (78.26%), while 58.70% had one to five years of teaching experience. Most had attended district-level in-service training, indicating active participation in professional development at the local level. Overall, the respondents represented a relatively young but professionally competent group of teachers with satisfactory qualifications and performance records.

The implementation of the Most Essential Learning Competencies (MELCs) in Empowerment Technology was generally positive. The first-quarter competencies obtained an average weighted mean of 4.27 (Fully Realized), while the second-quarter competencies obtained 3.88 (Realized), resulting in an overall mean of 4.08 (Realized). Teachers reported stronger implementation of competencies related to internet research, online safety, and the use of productivity tools than those involving web design, website evaluation, and ICT project promotion. This pattern suggests that schools are more successful in developing students'

foundational digital skills than in facilitating more advanced and technology-intensive competencies, which often require greater access to digital resources and technical support.

Teachers expressed a very high level of agreement that Empowerment Technology contributes positively to students' academic performance, as reflected in the overall weighted mean of 4.78 (Strongly Agree). They particularly recognized the subject's role in strengthening students' critical evaluation of online information, improving research skills, promoting creativity and innovation, enhancing collaboration, and making learning more interactive and meaningful. These findings suggest that Empowerment Technology extends beyond the development of technical ICT skills by fostering higher-order thinking, independent learning, and responsible use of digital resources, all of which support improved academic achievement.

Regarding instructional practices, teachers reported that Empowerment Technology strategies were very often employed, with an overall weighted mean of 4.33. Project-based learning, real-life task integration, multimedia resources, and hands-on activities were the most frequently used approaches. Likewise, the overall effectiveness of these strategies was rated Very Effective (weighted mean = 4.56). Demonstration methods, real-life learning tasks, multimedia integration, and hands-on activities received the highest effectiveness ratings. These findings indicate that student-centered and experiential teaching approaches are widely adopted because they encourage active participation, practical application of ICT skills, and meaningful learning experiences. They also reflect the nature of Empowerment Technology as a performance-based subject in which students learn best through authentic and collaborative activities rather than through lecture alone.

Despite these positive findings, teachers acknowledged that the implementation of Empowerment Technology continues to face several constraints. The overall level of challenges was Moderately Serious (weighted mean = 3.21). The most pressing concerns were the lack of updated software and digital tools, insufficient ICT resources, limited time for practical lessons, and inconsistent student engagement during online activities. In contrast, lack of teacher training was viewed as the least serious concern. These findings suggest that the major barriers to effective implementation are not primarily related to teacher competence but to limitations in infrastructure, instructional resources, and the availability of adequate learning time. Addressing these institutional concerns would likely improve the delivery of Empowerment Technology and enable schools to maximize its contribution to students' academic performance.

In general, the findings indicate that Empowerment Technology is being implemented effectively in public senior high schools in Legislative District 1, Isabela. Teachers perceive the subject as making a meaningful contribution to students' academic performance by developing digital literacy, critical thinking, collaboration, and problem-solving skills. Nevertheless, continued investment in ICT facilities, updated software, internet connectivity, and instructional resources remains necessary to ensure that all competencies are implemented effectively and that students fully benefit from technology-enhanced learning.

## CONCLUSION

Based on the findings of the study, it is concluded that the teacher-respondents were generally young to mid-career professionals who demonstrated strong academic qualifications and satisfactory professional performance. Most were female, married, Bachelor's degree graduates, held the position of Teacher III, received outstanding performance ratings, had one to five years of teaching experience, and regularly participated in district-level in-service training. These characteristics suggest that the respondents possess the competence and professional preparation necessary to implement Empowerment Technology effectively.

The implementation of the Most Essential Learning Competencies (MELCs) in Empowerment Technology was generally successful. The first-quarter competencies were fully realized, particularly those related to internet research, online safety and ethics, productivity tools, and ICT content creation. In contrast, the second-quarter competencies were realized but showed a lower level of implementation, with the development of an ICT Project for Social Change emerging as the only competency that was fully realized. These findings indicate the need to sustain the effective implementation of first-quarter competencies while providing greater instructional support, sufficient learning time, and closer monitoring of second-quarter competencies to ensure their consistent attainment.

The findings further revealed that teachers strongly believed that Empowerment Technology positively influences the academic performance of Grade 11 students. They recognized its contribution to improving digital literacy, research skills, collaboration, creativity, confidence, time management, and learner engagement. These results affirm the value of the subject in preparing students for technology-rich learning environments and emphasize the importance of continuously strengthening ICT integration, digital citizenship, and project-based instruction through sustained professional development.

The study also established that teachers frequently utilized learner-centered instructional strategies, particularly project-based learning, real-life task integration, multimedia resources, hands-on activities, demonstration methods, collaborative learning, and digital output assessment. These strategies were likewise perceived to be highly effective in promoting meaningful learning experiences. Thus, teachers should continue employing these instructional approaches while exploring additional innovative strategies that further enhance student participation and learning outcomes.

Despite these positive findings, teachers continued to encounter moderately serious challenges in implementing Empowerment Technology. The most pressing concerns involved inadequate ICT resources, outdated software and digital tools, limited time for practical activities, and inconsistent student engagement in technology-based learning. These findings highlight the need for schools to invest in updated ICT facilities, software, and digital resources while strengthening administrative support for classroom implementation. Partnerships with local government units, private organizations, and other stakeholders may likewise be established to improve ICT infrastructure and expand learning opportunities for students.

Generally, the findings demonstrate that Empowerment Technology contributes positively to students' academic performance when supported by competent teachers, effective instructional practices, and adequate learning resources. Continued efforts to strengthen curriculum implementation, enhance teachers' professional competencies, improve ICT facilities, and provide sufficient instructional support are essential to maximize the benefits of the program. Future researchers may also conduct similar studies in other districts, grade levels, or subject areas to validate the present findings and further explore factors that influence the successful implementation of Empowerment Technology in Philippine schools.

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