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Technological Advancement in Education and Teaching Performance among Public Secondary School Teachers

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Abstract

Technological advancement gives teachers new tools to improve teaching and engage students. This study determines the level of technological advancement, including digital resources, pedagogical innovation, research, and technological capability, and its relationship towards teaching performance in terms of instructional competence, classroom management, assessment and evaluation, and student support and development among public secondary school teachers, and its significance when grouped according to their profiles. A total of 160 public secondary school teachers in North I and II districts participated. The research utilized a descriptive-correlational method, employing a universal sampling technique. Information was collected through standardized questionnaires derived from DepEd Order No. 42 series of 2017, and the researcher made questionnaires anchored from EDCOM II report. Statistical tools, including mean, percentage, standard deviation, and Pearson Correlation were employed for the data analysis.

Key findings indicate that teachers possess a high level of technological capability and pedagogical innovation, with an interpretation of very high, effectively integrating technology into instructional strategies to deliver engaging lessons. However, the use of technology in academic research with an interpretation of high was minimal. In terms of teaching performance, the study revealed that teachers have strong instructional competence with a interpretation as consistently demonstrates, but a notable weakness in student support and development. Additionally, a significant relationship between teachers' profiles highlights that a one-size-fits-all approach is ineffective. These results support the theory of technologically-enhanced pedagogical performance. Therefore, it is recommended that professional development programs be tailored to teachers' specific needs, particularly in technology integration for research and student support. Initiatives should consider teacher demographics.

Keywords: technological advancement, teaching performance

1.Introduction

The rapid progress of technology has reshaped education, requiring teachers to integrate digital tools into pedagogy to enhance student learning, yet many continue to struggle due to gaps in infrastructure, insufficient training, and varying levels of digital literacy. In the Cagayan de Oro Division, teachers face barriers such as limited access to ICT resources, poor professional development, and challenges in adopting innovative teaching practices despite policies like DepEd Order No. 42, s. 2017, which emphasize technology integration in instruction. These challenges mirror global findings where, despite

heavy investment, inadequate training often hinders teachers from maximizing digital innovations (Ngaya et al., 2024). Locally, while alignment with policies such as the Philippine Professional Standards for Teachers supports technological competence, issues of access and preparedness persist, underscoring the need for localized studies that explore how teacher profiles such as age, training, and experience affect their ability to use technology effectively. As highlighted by Yadav (2025), continuous teacher training and support remain critical for bridging the gap between technological advancement and teaching performance, ensuring that digital transformation strengthens both instructional competence and student learning outcomes.

Research Questions

The study aimed to determine the level of technological advancement in education and the teaching performance among public secondary school teachers in North I and II district in the Division of Cagayan de Oro City for the School Year 2025-2026.

Specifically, it sought to answer the following questions:

1. What is the respondents' profile in terms of age, sex, highest educational attainment, teaching experience, related training and seminars attended?
2. How do the respondents' perceived technological advancement in education based on digital resources, pedagogical innovation, research and technological capability?
3. What is the respondents' level of teaching performance with regard to instructional competence, classroom management, assessment and elevation and student's support development?
4. Is there a significant relationship between the respondents perceived technological advancement in education and their teaching performance**?**
5. Is there a significant difference in the respondents perceived technological advancement in education and their teaching performance when grouped according to their profile?

Significance

This study is expected to benefit several groups. For DepEd officials in the Cagayan de Oro Division, the findings may guide the development of strategic plans and specialized professional development programs that enhance teachers' technological skills and improve their integration of digital tools in instruction. School heads can also use the insights to make informed decisions on resource allocation, targeted professional development, and the creation of supportive environments that promote both teacher and student growth. For public school teachers, the study provides an opportunity to strengthen professional competence by deepening their understanding of how technological advancement and competency influence teaching practices, thereby enabling them to adapt to new tools and improve classroom effectiveness. Finally, for future researchers, the study contributes to the expanding body of knowledge on technology and education by offering findings and methodologies that may serve as a foundation for further studies on digital literacy among teachers.

Scope and Limitations

This study examined the technological advancement and teaching performance of one hundred sixty public school teachers in North I and II in the Division of Cagayan de Oro for the School Year 2025 to 2026. It focused on technological advancement in terms of digital resources, pedagogical innovation, research, and technological capability, as well as how these skills influenced teaching performance. Teaching

performance was assessed through instructional competence, classroom management, assessment and evaluation, and student support and development. The scope of the research was limited to teachers within the Cagayan de Oro Division, which means the findings may not be fully generalizable to other areas. Another limitation was the reliance on self-reported data, which could lead to response bias and affect the accuracy of results. Despite these constraints, the study provides valuable insights into the digital landscape of education and offers a foundation for future initiatives to enhance teachers' technological skills and teaching practices.

2. Literature Review

Respondent's Profile

Teachers' demographic and professional profiles such as age, sex, educational attainment, and teaching experience influence their readiness to adopt technology in classroom instruction. Younger teachers, especially millennials, often show higher adaptability and digital literacy because of greater exposure to technology, while older teachers may encounter challenges without targeted professional development (Yadav, 2025; Ally & Tsinakos, 2021). Gender also affects technology use, with male teachers reporting higher confidence and female teachers demonstrating strong commitment when given sufficient training (Yadav, 2025). Teachers with higher educational attainment generally possess advanced digital competencies, and teaching experience shapes digital literacy in different ways, as novice teachers need foundational support while experienced ones require continuous training to stay updated.

Technological Advancement

Technological advancement significantly transforms teaching practices in public secondary schools by enhancing instruction, engagement, and efficiency, but its success depends on teachers' digital competence, access to resources, and continuous training. Studies highlight that while innovative strategies like blended learning and adaptive technologies improve pedagogy and student support, many teachers still face barriers such as inadequate infrastructure, financial constraints, and heavy administrative workloads. Research emphasizes the importance of strengthening technological capability, instructional competence, and classroom management through localized training and effective professional development programs. As noted by Ally and Tsinakos (2021), teacher readiness and competence are central to meaningful integration, Yadav (2025) stresses that adaptability to digital tools requires sustained institutional support, and Dizon and Ramirez (2022) highlight that access to modern educational technologies enhances efficiency and fosters student-centered learning.

Methodology

Research Design

This study used a descriptive correlational design to examine the relationship between technological advancement, teaching performance, and teachers' profiles. Technological advancement was assessed through digital resources, pedagogical innovation, research, and technological capability, while teaching performance included instructional competence, classroom management, assessment, and student support. Profile variables included age, sex, educational attainment, teaching experience, and related trainings attended. Data were collected via a survey questionnaire adapted from DepEd Order No. 2, series of 2015, and EDCOM II, and administered to 160 public school teachers in Cagayan de Oro City. Quantitative data

were analyzed using descriptive statistics and correlation analysis to determine relationships among variables.

Participants

The study surveyed all 160 public secondary school teachers in North I and II Districts of Cagayan de Oro City, from Bayabas, Bonbon, Macabalan, Puntod, and Kauswagan National High Schools. Including the entire teaching population ensured a comprehensive and representative analysis of technological advancement and its impact on teaching performance, providing a reliable understanding of technology integration across the districts.

Data Collection

The questionnaire was divided into (3) parts. The first part was a researcher-made questionnaire for the Respondents' Profile, which were the respondents' characteristics, composed of age, sex, highest educational attainment, teaching experience and the related training and seminars attended. The second part was researcher-made questionnaire anchored from EDCOM II report for the Technological Advancement, which were the digital resource, pedagogical innovation, research and the technological capability. The third part was for the Teaching Performance. It was a standardized questionnaire adopted from DO 2 series of 2015 that examines teaching performance, focusing on instructional competence, classroom management, assessment and evaluation and the student support and development.

Data Analysis

Descriptive statistics such as frequency, percentage, mean and standard deviation was used to describe the variables of the study. Furthermore, for Pearson r Correlation was used to determine the relationship of teachers perceived technological advancement and level of teaching performance, T-test or F-test was used to determine the significant difference among the technological advancement and respondents' profile among secondary school teachers.

3. Results and Discussions

Problem 1. What is the respondents' profile in terms of age, sex, highest educational attainment, teaching experience, related trainings and seminars attended?

Table 1
Distribution of Respondents' Profile in terms of Age

Category	Frequency	Percentage
46 years old and above	19	11.8
41-45 years old	26	16.3
36-40 years old	39	24.4
31-35 years old	40	25
30 years old	36	22.5
Total	**160**	**100%**

Table 1 shows that the largest group of respondents were teachers aged 31 to 35 years old with a frequency of 40 (25%), indicating that the teaching workforce in the district is largely composed of younger

professionals who are generally more adaptable, innovative, and inclined to integrate technology in their teaching practices. In contrast, the smallest group were teachers aged 46 and above with a frequency of 19 (11.8%), representing veteran educators who bring valuable experience and mentorship but may face challenges in adapting to rapid technological changes. This distribution suggests a dynamic workforce driven by younger teachers, while also highlighting the need for succession planning and targeted support to ensure that older teachers remain equipped to meet the demands of a digitally driven educational environment.

Table 2
Distribution of Respondents' Profile in terms of Sex

Category	Frequency	Percentage
Male	75	46.9
Female	85	53.1
Total	**160**	**100%**

Table 2 presents the distribution of respondents' profile in terms of sex. The highest frequency was 85 (53.1%) in the female category, while the lowest was 75 (46.9%) in the male category. This shows that the majority of respondents were female, reflecting broader trends in the teaching profession where women often outnumber men, particularly in primary and secondary education. The predominance of female teachers can influence school culture, collaboration styles, and professional development needs, while the relatively smaller number of male teachers highlights the persistent perception of teaching as a female-dominated profession. The gender distribution also carries implications for technology integration, as both male and female teachers may face different challenges and strengths in adopting digital tools. Female teachers, who form the majority, should be empowered with training opportunities that address confidence and inclusivity, enabling them to lead the transformation of classrooms into interactive, technology-rich environments. At the same time, ensuring that both genders receive equitable access to professional support can help bridge differences in digital competence and create a more balanced, inclusive, and innovative teaching workforce.

Table 3
Distribution of Respondents' Profile in terms of Highest Educational Attainment

Category	Frequency	Percentage
Doctorate Degree	29	18.2
With Doctorate Degree Units	26	16.2
Master's Degree	38	23.8
With M.A. Units	42	26.2
Bacherlor's Degree	25	15.6
Total	**160**	**100%**

Table 3 presents the distribution of respondents' profile in terms of highest educational attainment. The highest frequency was 42 (26.2%) with M.A. units, indicating that most respondents were either pursuing a master's degree or had accumulated units at the graduate level, reflecting career requirements, personal aspirations, or common trends in the profession. The presence of highly educated teachers in public secondary schools has important implications for teaching performance and technology integration, as those with advanced qualifications are often more prepared to adopt research-based practices, demonstrate adaptability, and mentor colleagues with lower attainment. Teachers with higher education can help lead

peer-learning communities that promote collaboration, innovation, and continuous improvement, ultimately strengthening instructional quality. In contrast, the lowest frequency was 25 (15.6%) with a bachelor's degree, highlighting the need for targeted professional development and structured training programs to build their capacity in integrating technology effectively. Supporting teachers across all educational backgrounds ensures that gaps in digital competence are addressed, preventing disparities in teaching performance and ensuring better learning outcomes for students.

Table 4
Distribution of Respondents' Profile in terms of Teaching Experience

Category	Frequency	Percentage
20 years and above	23	14.4
16-19 years	30	18.7
11-15 years	43	26.9
6-10 years	37	23.1
5 years and below	27	16.9
Total	**160**	**100%**

Table 4 shows that the majority of respondents (26.9%) have 11–15 years of teaching experience, representing a mid-career group with well-developed pedagogical skills and classroom management expertise. This group is well-positioned to adopt instructional innovations and integrate technology effectively to enhance student learning. In contrast, the least represented group (14.4%) has 20 years or more of teaching experience, bringing extensive pedagogical knowledge but potentially facing challenges in adapting to digital tools due to limited exposure during their earlier training. These findings underscore the need for differentiated professional development programs that address varying levels of technological proficiency. Reciprocal mentorship can also be promoted, where mid-career and younger teachers assist senior educators with technology integration, while experienced teachers provide guidance on curriculum design and classroom management. Such collaborative approaches can bridge generational gaps, strengthen teaching performance, and support continuous professional growth across the schools.

Table 5
Distribution of Respondents' Profile in terms of Related Training and Seminars Attended

Category	Frequency	Percentage
National and International Level	28	17.5
Regional Level	31	19.4
Division Level	34	21.2
District Level	38	23.8
School Level	29	18.1
Total	**160**	**100%**

Table 5 presents the distribution of respondents' profile in terms of related training and seminars attended. The highest frequency of 38 (23.8%) was at the district level, indicating that professional development opportunities are more accessible and frequently offered within this administrative scope. District-level training is often logistically feasible, cost-effective, and context-specific, which explains the high participation rate among teachers. This suggests that accessibility plays a key role in encouraging engagement and maximizing the effectiveness of professional development programs. However, the

lowest frequency of 28 (17.5%) was observed at the national and international level, showing that teachers have limited exposure to broader and large-scale professional development opportunities. While localized training addresses immediate needs, it may lack the advanced scope and global perspectives essential for equipping teachers with the latest innovations in education and technology. This imbalance highlights the need to strengthen access to national and international training, ensuring that teachers benefit from diverse learning opportunities and exposure to global best practices. Expanding opportunities across all levels will not only promote equitable access but also support teachers' continuous professional growth, enabling them to remain responsive to evolving educational demands.

Problem 2. How do respondents perceived technological advancement in education based on digital resources, pedagogical innovation, research and technological capability?

Table 6
Summary Distribution of Respondents' Perceived Technological Advancement

Variable	Mean	Standard Deviation	Interpretation
Digital Resource	3.25	0.73	High
Pedagogical Innovation	3.26	0.74	Very High
Research	3.24	0.73	High
Technological Capability	3.26	0.75	Very High
Overall	**3.25**	**0.74**	**High**

Table 6 presents the summary distribution of respondents' technological advancement with an overall mean of 3.25 (SD = 0.74), interpreted as High. This indicates that public secondary school teachers demonstrated a generally strong integration of technology in their teaching practices, showing both comfort and proficiency in using digital tools for instruction. The results suggest that teachers were not only knowledgeable about technological resources but were also consistently applying them in ways that enhanced student learning. Among the variables, the highest means were recorded in Technological Capability and Pedagogical Innovation, both interpreted as Very High, reflecting teachers' confidence in using digital tools and their ability to employ innovative, student-centered teaching strategies that foster collaboration, engagement, and deeper understanding. Although slightly lower, the variable Research posted a mean of 3.24 (SD = 0.73), still interpreted as High, which suggests that while teachers effectively use technology in classroom practice, its application in formal research activities remains underutilized, possibly due to limited exposure, mentorship, or resources. Overall, the results highlight a balanced technological profile among respondents, with strong foundations in digital fluency and innovative pedagogy, but with room for growth in research-based applications. These findings emphasize the importance of continued professional development, digital literacy programs, and institutional support to sustain high levels of technological advancement, while also addressing gaps in research integration to fully maximize the potential of educational technology.

Problem 3. What is the respondents' level of teaching performance with regard to instructional competence, classroom management, assessment and elevation and student's support development?

Table 7
Summary Distribution of Respondents' Level of Teaching Performance

Variable	Mean	Standard Deviation	Interpretation
Instructional Competence	3.49	0.75	Consistently Demonstrates
Classroom Management	3.38	0.78	Consistently Demonstrates
Assessment and Evaluation	3.39	0.79	Consistently Demonstrates
Student Support and Development	3.36	0.77	Consistently Demonstrates
Overall	**3.40**	**0.77**	**Consistently Demonstrates**

Table 7 reveals that public secondary school teachers in Cagayan de Oro North I and II District consistently demonstrate strong teaching performance across instructional competence, classroom management, assessment and evaluation, and student support and development, with an overall mean of 3.40. Instructional competence emerged as the highest-rated domain, indicating teachers' effectiveness in lesson planning, delivery, and student engagement, while student support and development scored the lowest, suggesting challenges in addressing learners' holistic needs such as emotional well-being and career guidance. These results highlight a skilled and adaptable teaching workforce committed to professional growth, but also emphasize the need for enhanced training and resources in student support. Consistent with related studies, the findings affirm that continuous professional development, reflective practice, and technological integration are crucial in sustaining effective teaching performance and improving student outcomes.

Problem 4. Is there a significant relationship between the respondents' perceived technological advancement in education and their teaching performance?

Table 8
Results of Test on Relationship between the Perceived Technological Advancement in Education and Teaching Performance

		Teaching Performance				
Technological Advancement Education		Instructional Materials	Classroom Management	Assessment and Evaluation	Student Support and Development	**Overall**
Digital Resource	r-value	0.626	0.562	0.632	0.5425	0.590
	p-value	0.042	0.034	0.032	0.0421	0.037
		S	S	S	S	S
Pedagogical Innovation	r-value	0.506	0.942	0.576	0.8576	0.720
	p-value	0.043	0.054	0.023	0.0452	0.041
		S	S	S	S	S

Research	r-value	0.727	0.653	0.742	0.7678	0.720
	p-value	0.032	0.021	0.052	0.012	0.029
		S	S	S	S	S
Technological Capability	r-value	0.857	0.831	0.923	0.942	0.888
	p-value	0.052	0.043	0.043	0.045	0.046
		S	S	S	S	S

Table 8 reveals a significant positive relationship between technological advancement in education and teaching performance, leading to the rejection of the null hypothesis. Teachers who effectively access and apply digital resources demonstrate stronger instructional delivery, improved classroom management, efficient assessment practices, and enhanced student support, with findings showing that digital tools transform assessment into a more interactive and data-rich process. Pedagogical innovation also showed a strong correlation, highlighting those innovative strategies such as project-based learning, flipped classrooms, and gamification improve classroom engagement and management. Research engagement was similarly linked to improved teaching performance, particularly in student development, as research-oriented teachers apply evidence-based practices and provide tailored interventions. Among all factors, technological capability showed the strongest correlation, underscoring that digital proficiency is now a critical component of effective teaching, enabling teachers to personalize instruction, provide timely feedback, and support holistic student growth. Overall, the findings emphasize that technology integration, innovation, and research engagement are essential drivers of modern teaching effectiveness.

Problem 5. Is there a significant difference in the respondents technological advancement in education and teaching performance of secondary school teachers when grouped according to their profile?

Table 9

Results of Test on Difference in the Respondents' Technological Advancement in Education and Teaching Performance when Grouped According to their Profile

	Teaching Performance				
Respondents' Profile	Instructional Materials	Classroom Management	Assessment and Evaluation	Student Support and Development	

Age	t-value	0.676	0.562	0.675	0.567
	p-value	0.042	0.034	0.032	0.042
		S		S	S
Sex	t-value	0.686	0.942	0.565	0.861
	p-value	0.043	0.054	0.023	0.045
		S	S	S	S
Highest Educational Attainment	t-value	0.727	0.653	0.765	0.765
	p-value	0.032	0.021	0.052	0.012
		S	S	S	S
Teaching Experience	t-value	0.817	0.851	0.963	0.942
	p-value	0.052	0.043	0.043	0.045
		S	S	S	S
Related Training and Seminar Attended	t-value	0.506	0.942	0.586	0.866
	p-value	0.043	0.0542	0.023	0.045
		S	S	S	S
Overall		0.682	0.790	0.711	0.800
		0.042	0.041	0.034	0.038
		S	S	S	S

Table 9 shows significant differences in teachers' technological advancement and teaching performance when grouped by demographic and professional profiles. Age, sex, educational attainment, teaching experience, and participation in training all influenced how teachers applied technology in instructional materials, classroom management, assessment, and student support. Younger teachers tended to prefer digital tools, while older teachers leaned on traditional resources; sex differences highlighted varying classroom management styles; higher education levels corresponded with stronger technology use; experience shaped reliance on either established or innovative materials; and professional development improved management and instructional practices. These findings confirm that tailoring training to teachers' diverse characteristics is essential for effective technology integration and improved teaching performance.

Table 10
Results of Test on Difference in the Respondents Technological Advancement in Education when grouped according to their Profile

		Technological Advancement in Education			
Respondents' Profile		Digital Resource	Pedagogical Innovation	Research	Technological Capability
Age	t-value	0.987	0.711	0.701	0.699
	p-value	0.030	0.040	0.040	0.030
		S	S	S	S

Sex	t-value	0.996	0.820	0.766	0.622
	p-value	0.010	0.040	0.030	0.020
		S	S	S	S
Highest Educational Attainment	t-value	0.801	0.735	0.910	0.703
	p-value	0.010	0.030	0.020	0.030
		S	S	S	S
Teaching Experience	t-value	0.781	0.620	0.711	0.610
	p-value	0.020	0.040	0.010	0.030
		S	S	S	S
Related Training and Seminars Attended	t-value	0.810	0.777	0.601	0.900
	p-value	0.302	0.020	0.030	0.010
		S	S	S	S
Overall		0.875	0.732	0.7377	0.706
		0.020	0.034	0.0264	0.024
		S	S	S	S

Table 10 shows that teachers' technological advancement in education significantly differs when grouped by age, sex, educational attainment, teaching experience, and training. Age influenced how teachers engaged with digital resources, with younger teachers showing greater fluency while older ones tended to adopt technology more cautiously. Sex differences reflected varying levels of confidence and approaches in using digital tools, highlighting the need for gender-responsive support. Educational attainment was linked to stronger technological advancement, especially in research, with higher-qualified teachers showing deeper engagement. Teaching experience affected digital adoption, with newer teachers often more adaptable and experienced teachers relying more on established methods, underscoring the importance of mentorship and continuous learning. Training and seminars showed the strongest impact, confirming that targeted professional development is vital in building teachers' digital competence and sustaining effective technology integration.

4. Conclusion and Recommendations

Conclusion

The study examined the impact of technological advancements on the education and teaching performance of public secondary school teachers. The findings provide compelling evidence to conclude that technological advancement is a key driver of improved teaching performance among public secondary school teachers. The level of technological advancement demonstrates that teachers may differ significantly in their digital resources, pedagogical innovation, research, and technological capabilities, considering their profiles. The study also found that teachers with higher educational attainment, longer teaching experience, older age, and those who have attended relevant training and seminars are likely to be more technologically advanced. Additionally, the study revealed that sex also differs significantly in technological advancement, with male and female teachers showing notable differences in their adoption and utilization of technology.

Recommendations

Based on the findings, it is recommended that schools establish structured research programs with training, mentoring, funding, and publication opportunities, while also promoting global collaborations through digital platforms. Strengthening learner support through enhanced guidance services, mentorship,

technology integration, and inclusive strategies for students with disabilities and exceptional talents is also essential. Principals should foster a research-oriented culture by ensuring resources and providing leadership training in supervision, research management, and digital innovation. Teachers, on the other hand, should engage in continuous professional development focused on research writing, student-centered strategies, collaboration, and technology integration, while also considering graduate studies to further enhance technological skills and improve instructional performance.

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