

ICT-Based Teaching and Integration in Relation to Students' Academic Achievement of Cuaming Elementary and Cuaming High School

Giovanni Pongcol Bayot
Cebu Technological University - Main Campus
bayotgiovanni01@gmail.com, giovanni.bayot@deped.gov.ph

Date Submitted:

August 21, 2026

Date Accepted:

September 16, 2026

Date Published:

October 17, 2026

DOI:

10.5281/zenodo.23435574

ABSTRACT

ICT-based teaching and integration refers to the extent to which teachers utilize ICT tools and digital resources as part of their instructional practices to improve lesson delivery, learner engagement, classroom interaction, and achievement of learning objectives. This study assessed the ICT-based teaching and integration in relation to students' academic achievement of Cuaming Elementary and Cuaming High School during the School Year 2025-2026 as basis for the development of an action plan to improve technology-assisted instruction. Adopting a descriptive quantitative analysis enriched by qualitative insights, the study surveyed 40 elementary and secondary school teachers, focusing on the effectiveness of ICT-based teaching and integration to classroom learning. The study was found out that both ICT-based teaching and ICT integration were highly effective. The study revealed that ICT-based teaching and ICT

integration, academic achievement and ICT-based teaching and academic achievement and ICT integration are significantly related to each other, concluding that there was a greatly contribution of ICT-based teaching and integration to the students' academic achievement through its General Scholastic Average and recommends that teachers must undergo training programs, seminars and LAC Sessions on the integration of ICT in teaching and learning to enhance more the students' academic achievement.

Keywords: *Students' Academic Achievement, ICT-Based Teaching and Integration*

INTRODUCTION

The use of instructional videos, simulations, information systems, records, concept mapping, guided exploration, brainstorming, music integration, and web-based learning resources are just a few of the creative and engaging teaching techniques available in technology-based education (Ghavifekr & Rosdy, 2015). These approaches contribute to a more meaningful and enriching learning experience for students. Moreover, the integration of technology enables teachers to design and deliver lesson plans more effectively, thereby enhancing the overall quality of instruction. When properly implemented, technology integration can significantly improve student engagement, increase motivation, and promote clearer understanding of lessons. Therefore, this study assumes that ICT-based integration and instruction play an important part in affecting students' academic achievement.

Despite these benefits, a number of modifications impede the efficient technology integration in the classroom. The digital division, or the difference between people or groups who have access to contemporary technologies and those without. This gap in access to ICT infrastructure may lead to unequal learning opportunities and limit the potential benefits of teaching using technology. Furthermore, inadequate professional development and training in ICT for teachers remain significant challenges. Integration continues to be a major obstacle. Many

teachers lack the requisite abilities, understanding and self-assurance to fully employ technology in their teaching procedures, thereby affecting the quality of technology-enhanced learning.

Prior research has shown that integrating technology into the classroom increases opportunities for active participation and enhances student learning (Jamieson-Proctor et al., 2013). However, there is still a gap in conceptualizing whether the technology integration and technology-based instruction has a direct impact on students' academic achievement in specific local contexts. To address this gap, this study examines the relationship between the effectiveness of ICT integration, the utilization of technological devices, and students' academic success.

The incorporation of technology into education in the Philippines has been started by the Information and Communications Technology Commission. (CICT), the text discusses the promotion of ICT utilization in education at all levels. To support this initiative, the Department of Education implemented the DepEd Computerization Program (DCP), which aims to equip schools with technology. But difficulties like insufficient ICT infrastructure, erratic power supplies, poor internet access, and teachers are still impacted by inadequate technological proficiency, especially in Bohol's Inabanga North District. These limitations impede the efficient utilizing technology in the classroom.

Although prior studies have verified that the advantages of integrating technology into teaching, limited research has been conducted among public elementary and secondary schools in rural districts such as Inabanga North District, Bohol Division. Moreover, there is insufficient local evidence regarding how ICT-based teaching practices influence students' academic achievement in resource-constrained school settings.

In Cuaming Elementary and Cuaming High School, teachers encountered various challenges connected to the utilization and integration of technology in their teaching practices. These challenges include limited access to digital devices, unstable or insufficient internet connectivity, inadequate ICT facilities, a limited technical support, restricted admission to appropriate online educational learning resources, and differing levels of teaching skills and confidence in employing technology for instruction. These challenges suggest the need to examine more closely how ICT utilization and integration are being implemented in these schools and how such conditions may affect teachers' instructional practices and the overall learning environment.

Through these gaps, the researcher aims to conduct research to evaluate the outcome of ICT-based teaching and integration to the academic achievement of elementary and secondary school students. The findings of this study would serve as a basis for emerging practical intervention program aimed at improving technology-assisted instruction, thereby promoting better learning outcomes in Cuaming Elementary School and Cuaming High School, Inabanga North District, Inabanga, Bohol.

Statement of the Problem

This research assessed the ICT-based teaching and integration to classroom learning in relation to students' academic achievement of Cuaming Elementary and Cuaming High School during the school year 2025-2026 as bases for an enhancement program with action plan to improve technology-assisted instruction.

Specifically, the study sought to answer the following questions:

1. What is the level of effectiveness on ICT utilization in terms of teaching and classroom learning?
2. What is the level of students' academic achievement as effect on the utilization of ICT-based teaching and integration to classroom learning?
3. Is there a significant degree of correlation between ICT-based teaching and ICT integration in classroom learning, ICT-based teaching and students' academic achievement, and ICT integration in classroom learning and students' academic achievement?
4. To what extent do ICT-based teaching and ICT integration influence students' academic achievement?
5. Based on the findings of the study, what enhancement program with action plan can be proposed to improve technology assisted instruction and students' academic achievement?

METHODS

Research Design

This study employed a descriptive-correlational research design to examine the current use of ICT devices in teaching and classroom learning. Additionally, it sought to explore the relationship between the ICT-based teaching and integration and students' academic achievement. It assessed the effectiveness of ICT-based teaching and the integration of ICT in classroom learning. Further, examined whether there are significant relationships between the teachers' profiles and ICT-based teaching and ICT integration in classroom learning. It would also determine whether significant relationships exist between ICT-based teaching and ICT integration in classroom learning, between ICT-based teaching and students' academic achievement, and between ICT integration in classroom learning and students' academic achievement.

Respondents

This study involved forty (40) teachers from Cuaming Elementary School and Cuaming High School, both situated in the Inabanga North District, Inabanga, Bohol. The researcher employed purposive sampling, a non-probability sampling technique in which participants are deliberately selected based on specific characteristics, experiences, or qualifications that are relevant to the objectives of the study. This sampling approach enabled the researcher to identify and include respondents who possessed the necessary knowledge, experiences, and characteristics pertinent to the research variables, thereby ensuring that the data gathered were relevant to the purpose and scope of the study.

Instrument

The study primarily employed a structured questionnaire adapted from the instrument developed by Ghavifekr and Rosdy (2015). Necessary modifications would be made to ensure that the questionnaire corresponds with the objectives of the present investigation and appropriately reflects the context of technology utilization and integration. Data were collected through self-administered questionnaires and analyzed using descriptive, inferential, and content analysis to generate comprehensive findings.

Data Gathering Procedure

After obtaining permission from the Schools Division Office and the principals of the sampled schools, the researcher finalized the validated and reliability-tested questionnaire. A formal request to conduct the study was approved, after which the purpose of the study, the contents of the questionnaire, and the respondents' roles were explained to the School Head. The questionnaire was administered face-to-face, allowing the researcher to clarify items and ensure complete and accurate responses. Completed questionnaires were collected, organized, and prepared for analysis, while ethical considerations such as informed consent, confidentiality and anonymity, voluntary participation, and the right to withdraw were strictly observed throughout the process.

Statistical Treatment

The data gathered in this study were analyzed using appropriate statistical tools. Weighted means and standard deviations were used to determine the level of availability of ICT resources, the frequency of ICT utilization in teaching, the effectiveness of ICT-based teaching, and the extent of technology integration in classroom learning. Mean and standard deviation were also used to determine the level of students' academic achievement. To determine the significance and degree of the relationships among ICT-based teaching, ICT integration in classroom learning, and students' academic achievement, the Pearson Product-Moment Correlation Coefficient (Pearson r) was employed. Furthermore, Multiple Regression Analysis was used to determine the extent to which ICT-based teaching and technology integration in classroom learning predicted students' academic achievement. The findings of the study served as the basis for the development of an action plan aimed at improving technology-assisted instruction.

RESULTS AND DISCUSSIONS

Table 1. *Level of Effectiveness of ICT-Based Teaching n = 40*

Statement	Mean	SD	Interpretation
I feel confident in teaching my lessons applying ICT.	3.80	0.41	Highly Effective
I find it easier to teach my lessons by using ICT	3.88	0.33	Highly Effective
I am aware of the great opportunities that ICT offers for effective teaching.	3.85	0.36	Highly Effective
I think that ICT supported teaching makes learning more effective.	3.85	0.36	Highly Effective
The use of ICT helps teachers to improve teaching with more updated materials.	3.90	0.30	Highly Effective
I think the use of ICT improves the quality of teaching.	3.88	0.33	Highly Effective
I think the use of ICT helps to prepare teaching resources and materials.	3.88	0.33	Highly Effective
The use of ICT enables the students to be more active and engaging in the lesson.	3.85	0.36	Highly Effective
I have more time to cater to students' needs if ICT is used in teaching.	3.58	0.50	Highly Effective
I can still have an effective teaching without the use of ICT.	3.20	0.56	Moderately Available
I think the ICT in teaching is not a waste of time.	3.35	0.48	Highly Effective
I am confident that my students learn best without the help of ICT.	3.08	0.49	Moderately Effective
The classroom management is in control if ICT is used in teaching.	3.55	0.50	Highly Effective
Students pay more attention when ICT is used in teaching.	3.15	0.50	Moderately Effective
Students make effort for their lesson if ICT is used in teaching.	3.50	0.51	Highly Effective
OVERALL MEAN AND SD	3.62	0.48	Highly Effective

Parameters: 3.25-4.00 – Highly Effective, 2.50-3.24 – Moderately Effective, 1.75-2.49 – Slightly Effective, 1.00-1.74 – Not Effective

Table 1 presents the level of effectiveness of ICT-Based Teaching as perceived by the teachers. The overall mean of 3.62, with a standard deviation (SD) of 0.48, indicates that ICT-Based Teaching is effective, falling under the “Highly Effective” category. This suggests that teachers generally perceive ICT as an important and effective tool in supporting lesson preparation, instructional delivery, teaching quality, classroom management, and student engagement.

Among the specific indicators, “The use of ICT helps teachers to improve teaching with more updated materials” obtained the highest mean of 3.90 (SD = 0.30), interpreted as “Highly Effective.” This indicates that teachers strongly recognize the value of ICT in providing access to updated instructional materials and information. Similarly, “I find it easier to teach my lessons by using ICT” obtained a mean of 3.88 (SD = 0.33). The statements “I think the use of ICT improves the quality of teaching” and “I think the use of ICT helps to prepare teaching resources and materials” also obtained a mean of 3.88 (SD = 0.33). These findings suggest that ICT facilitates lesson preparation and delivery while helping teachers improve the quality and availability of instructional resources.

The indicators “I am aware of the great opportunities that ICT offers for effective teaching” and “I think that ICT-supported teaching makes learning more effective” both obtained a mean of 3.85 (SD = 0.36), interpreted as “Highly Effective.” Likewise, “The use of ICT enables the students to be more active and engaging in the lesson” obtained a mean of 3.85 (SD = 0.36). These results indicate that teachers recognize ICT not only as a tool for improving their instructional practices but also as a means of encouraging students to become more active and engaged in classroom learning.

The statement “I have more time to cater to students’ needs if ICT is used in teaching” obtained a mean of 3.58 (SD = 0.50), interpreted as “Highly Effective.” Similarly, “The classroom management is in control if ICT is used in teaching” obtained a mean of 3.55 (SD = 0.50), while “Students make effort for their lesson if ICT is used in teaching” obtained a mean of 3.50 (SD = 0.51). These findings suggest that teachers perceive ICT as contributing positively to classroom management, students’ participation, and their ability to attend to learners’ needs.

On the other hand, “I can still have an effective teaching without the use of ICT” obtained a mean of 3.20 (SD = 0.56), interpreted as “Moderately Effective.” This indicates that although teachers recognize the importance of ICT, they also believe that effective teaching can still be achieved without technology. Meanwhile, “I am confident that my students learn best without the help of ICT” obtained a mean of 3.08 (SD = 0.49), interpreted as “Moderately Effective.” This result should be interpreted carefully because the statement is negatively oriented toward ICT.

The statement “Students pay more attention when ICT is used in teaching” obtained a mean of 3.15 (SD = 0.50) and was interpreted as “Moderately Effective.” This suggests that teachers generally observe improved student attention when ICT is incorporated into instruction, although the level of agreement is lower compared with the indicators related to instructional materials and teaching quality.

Eventually, findings indicate that the Cuaming Elementary and Secondary teachers have sufficient expertise in utilizing technology as a medium for the transfer of learning in their classroom set-ups. This validates what Cox & Marshall (2014) discovered, which was that traditional teacher-centered instruction can help teachers enhance ICT proficiency in the classroom. Their belief that ICT may be a useful instrument for learning—especially when it comes to drawing links with real-world practices—is the reason for this. Through ICT as support to students in creating and constructing knowledge, this component has altered the way that teaching is given.

It further supports Ghavifekr et al., (2015), who reported that technology-based teaching provides diverse and engaging opportunities which enhance the teaching and learning process. This supports to the present study that focus on the effectiveness of ICT-based teaching in facilitating engaging and meaningful classroom learning experiences. From this perspective, technology-integrated or embedded instructional approaches improve teaching quality while also allowing students to grow as learners, improve their knowledge and information retention, and build their abilities. The majority of educators are aware of the benefits and applications of technology in the classroom, and they work with educators to enhance their instruction by providing more modern resources.

Table 2. *Level of Effectiveness of ICT Integration to Classroom Learning n = 40*

Statement	Mean	SD	Interpretation
ICT allow students’ to be more creative and imaginative.	3.70	0.52	Highly Effective
The use of ICT helps students to find related knowledge and information for learning.	3.67	0.53	Highly Effective
The use of ICT encourages students to communicate more with their classmates.	3.65	0.53	Highly Effective
The use of ICT increases students’ confidence to participate actively in the class.	3.59	0.55	Highly Effective

I think students learn more effectively with the use of ICT.	3.65	0.53	Highly Effective
I think the use of ICT helps to broaden students' knowledge paradigm.	3.50	0.78	Highly Effective
I think the use of ICT helps to improve students' ability specifically in reading, writing.	3.55	0.55	Highly Effective
The students are more behaved and under control with the use of ICT.	3.15	0.58	Highly Effective
The use of ICT enables students to express their ideas and thoughts better.	3.33	0.62	Highly Effective
The use of ICT promotes active and engaging lesson for students' best learning experience.	3.62	0.54	Highly Effective
OVERALL MEAN AND SD	3.54	0.60	Highly Effective

Parameters: 3.25-4.00 – Highly Effective, 2.50-3.24 – Moderately Effective, 1.75-2.49 – Slightly Effective, 1.00-1.74 – Not Effective

As shown in Table 2, Indicator 1, “ICT allows students to be more creative and imaginative,” obtained the highest mean score of 3.70 with a standard deviation of 0.52, which is described as Highly Effective. This was followed by Indicator 2, “The use of ICT helps students to find related knowledge and information for learning,” which garnered a mean of 3.67 and a standard deviation of 0.53, also interpreted as Highly Effective. Likewise, Indicators 3 and 5, namely “The use of ICT encourages students to communicate more with their classmates” and “I think students learn more effectively with the use of ICT,” both obtained a mean of 3.65 with a standard deviation of 0.53, indicating that respondents strongly perceive ICT as highly effective in promoting communication and improving learning outcomes.

Furthermore, Indicator 10, “The use of ICT promotes active and engaging lessons for students' best learning experience,” obtained a mean of 3.62 and a standard deviation of 0.54, while Indicator 4, “The use of ICT increases students' confidence to participate actively in the class,” recorded a mean of 3.59 and a standard deviation of 0.55. Both indicators were interpreted as Highly Effective, indicating that ICT contributes significantly to students' participation and engagement in classroom activities. Similarly, Indicator 7, “I think the use of ICT helps to improve students' ability specifically in reading and writing,” obtained a mean of 3.55 and a standard deviation of 0.55, while Indicator 6, “I think the use of ICT helps to broaden students' knowledge paradigm,” garnered a mean of 3.50 and a standard deviation of 0.78, both described as Highly Effective.

Only Indicator 8, “The students are more behaved and under control with the use of ICT,” obtained a mean of 3.15 with a standard deviation of 0.58, which falls under the Moderately Effective category. This suggests that while ICT contributes positively to learning, its influence on classroom behavior and discipline is perceived to be less evident compared to its impact on creativity, participation, and learning effectiveness.

This finding has implications for the study conducted by Aslan and Zhu (2016), which found that teachers' perceptions of ICTs and their capacity to use for teaching and learning activities govern the adoption and integration of these tools. As a result, the integration of ICTs in teaching and learning is very complex, and these complexities prevent teachers from adopting and integrating them (Eynon and Geniets, 2016).

The present study is consistent with Liu et al. (2022), who reported that technology integration in teaching and learning can support cognitive understanding and academic achievement to the students. Their systematic review further highlighted the potential of technology to enhance instructional practices and promote student engagement. These findings support the present study's results, suggesting that the effective integration of ICT into classroom instruction can provide learners with additional opportunities to access learning resources, interact with teachers and peers, and participate actively in learning activities. Therefore, the findings underscore the importance of appropriate and purposeful ICT integration in supporting effective classroom instruction and students' learning experiences.

Table 3. *Academic Achievement of the Students n=40*

Grading Scale	Frequency (f)	Percentage (%)	Descriptor
90-100	1	2.5	Outstanding
85-89	33	82.5	Very Satisfactory
80-84	6	15	Satisfactory
75-79	0	0	Fairly Satisfactory
Below 75	0	0	Did Not Meet Expectation

Based on the results presented in Table 3, out of 40 advisory, 33 or 82.5% obtained grades ranging from 85–89, which corresponds to the Very Satisfactory descriptor. This indicates that majority of the students demonstrated very satisfactory level of academic achievement, suggesting that most learners were able to meet and perform beyond the expected learning standards.

Meanwhile, 1 or 2.5% of the advisory obtained grades ranging from 90–100, described as Outstanding. This indicates that a small proportion of the students achieved an excellent level of academic performance. Furthermore, 6 or 15% of the students obtained grades ranging from 80–84 falls under the Satisfactory category. This suggests that students met the expected learning standards, although their academic performance was comparatively lower than those in the Very Satisfactory category.

It is also noteworthy that none of the advisory (0%) obtained grades within the 75–79 range, classified as Fairly Satisfactory, and likewise, no student (0%) obtained a grade below 75 which classified as Did Not Meet Expectations.

Majority of the respondents demonstrated satisfactory results based on the latest academic grades of their learners. This finding suggests that the effective use of ICT in teaching may contribute to the provision of engaging and supportive learning experiences. The finding is consistent with Suárez-Rodríguez et al. (2018), who emphasized that the integration of Information and Communication Technology (ICT) into teaching is a complex process in which teachers play a decisive role. Their study further indicated that teachers' technological and pedagogical competencies are important in determining how ICT is integrated into classroom instruction.

Table 4. *Significant Relationship Between ICT-based teaching, ICT integration and academic achievement n = 40*

Variables	df	α	r	p -value	Interpretation	Decision
ICT-based teaching and ICT integration	38	.05	.970	<.000001	Significant	Reject H_o
ICT-based teaching and students' academic achievement	38	.05	.986	<.000001	Significant	Reject H_o
ICT integration and students' academic achievement	38	.05	.933	<.000001	Significant	Reject H_o

It can be noted from the table that there is a significant relationship between ICT-based teaching and ICT integration, $r(38) = .970, p < .000001$. Likewise, a significant relationship exists between ICT-based teaching and students' academic achievement, $r(38) = .986, p < .000001$. Furthermore, a significant relationship was found between ICT integration and students' academic achievement, $r(38) = .933, p < .000001$, respectively.

Since all the computed p -values are lower than the .05 level of significance, there is sufficient statistical evidence to reject the null hypotheses. The results indicate that ICT-based teaching is significantly associated with

ICT integration and students' academic achievement. Similarly, ICT integration is significantly associated with students' academic achievement.

The very high positive correlation coefficients ($r = .970, .986, \text{ and } .933$) indicate very strong positive relationships among the three variables. This suggests that higher levels of ICT-based teaching are associated with higher levels of ICT integration and academic achievement. Likewise, higher ICT integration is associated with higher students' academic achievement. Thus, the findings provide sufficient evidence to reject all three null hypotheses, indicating that there are significant relationships among ICT-based teaching, ICT integration, and students' academic achievement in the study.

These findings are consistent with Rafi et al. (2019), who emphasized the importance of technology integration in supporting students' information and digital literacy. Their study highlighted how the effective integration of technology can facilitate students' access to, selection, and interpretation of information, thereby supporting meaningful learning experiences. In a related study, Basri et al. (2018) found a significant relationship between ICT adoption and students' academic performance among students from four Saudi universities.

Table 5. *Effectiveness of ICT-Based Teaching and Integration to Classroom Learning on Academic Performance of the Students $n = 40$*

Variables	R^2	df	α	F	p-value	Interpretation	Decision
ICT-Based Teaching and Integration to Classroom Learning on Academic Achievement of the Students	.981	2 37	.05	980. 25	< .000001	Significant	Reject H_0

Multiple-Regression

The results of regression analysis indicated a significant relationship between ICT-Based Teaching and ICT Integration to Classroom Learning and the Academic Achievement of the Students, $R^2 = .981$, $F(2, 37) = 980.25$, $p < .000001$. The p-value is substantially lower than the .05 level of significance, indicating that the regression model is statistically significant.

Consequently, there is sufficient evidence to reject the null hypothesis. The R^2 value of .981 suggests that 98.1% of the variance in students' academic achievement is explained by ICT-Based Teaching and ICT Integration to Classroom Learning, while the remaining 1.9% may be explained by other factors not included in the model.

This finding implies that ICT-Based Teaching and ICT Integration to Classroom Learning have a significant and substantial association with students' academic achievement. Therefore, the hypothesis stating that there is no significant relationship between ICT-Based Teaching, ICT Integration to Classroom Learning, and students' academic achievement is rejected.

This significant relationship shown in multi-regression analysis validates the claim of Asad et al. (2021), indicates that better instructional outcomes are the result of teachers integrating technology more effectively. Thus, the most effective measures of technological integration were productivity and professional practice.

A related study by Magtoto (2022) examined the relationship between technology integration in the teaching-learning process and students' academic achievement among private senior high schools in Plaridel, Bulacan. The study found a significant relationship between technology integration and students' academic achievement, resulting to reject the null hypothesis. These findings are consistent with the present study, which likewise examines the relationship between technology integration in classroom learning and students' academic achievement. The findings suggest that purposeful integration of technology into teaching and learning may be associated with improved academic outcomes among students. The study recommended strengthening teachers' and learners' ICT skills and literacy to further support technology integration in education.

Nevertheless, this also relates to the research by Lawrence and Tar (2018), which claims that teacher traits and ICT expertise are major factors influencing the adoption and integration of ICTs. As a result, the teacher with the necessary skills is better suited to determine if incorporating and utilizing ICTs into lesson plans is beneficial

(Eger et al., 2018). Thus, the presence of technology tools in the classroom benefits the students since it encourages the instructor to utilize them.

Findings

The findings suggest that teacher-respondents were highly effective in ICT-based teaching and the teacher-respondents were highly effective in ICT integration. Majority of the respondents were doing well as reflected in the General Scholastic Average of their students who met the standard level of expectation. It was found out that ICT-based teaching and ICT integration, academic achievement and ICT-based teaching and academic achievement and ICT integration are significantly related to each other. Multiple Regression analysis indicated has significant effect on the technology-based teaching and technology integration on students' academic achievement.

CONCLUSION

In conclusion, the findings revealed the agreement between teachers' ICT practices and their perceived effectiveness in using technology to support teaching and learning. The finding is consistent with the high level of ICT-based teaching and ICT integration reported by the respondents, although students' academic achievement may also be influenced by other instructional, learner-related, and contextual factors. Furthermore, the correlation analysis established that ICT-based teaching, ICT integration, and students' academic achievement were significantly related to one another. This finding agrees with the general pattern of the study; wherein higher level of technology-related teaching practices and integration were accompanying with students' academic achievement. Finally, the multiple regression analysis indicated that ICT-based teaching and ICT integration significantly effect on students' academic achievement. This finding strengthens the results of the correlation analysis because it indicates that the technology-related variables were significant predictors of academic achievement when examined within the regression model. Nevertheless, the results do not imply that ICT-based teaching and ICT integration are the only determinants of students' performance.

Recommendations

To address these gaps, the enhancement program is designed to strengthen teachers' competence in ICT-based instruction and technology integration, with the ultimate goal of improving learners' academic performance across various domains and Key Result Areas (KRAs) reflected in the Individual Performance Commitment and Review (IPCR). The study revealed a relationship between ICT-based teaching, ICT integration, and learners' academic achievement. Therefore, enhancing teachers' knowledge and skills in ICT-based instruction can increase their capacity to effectively integrate technology into classroom teaching, which may contribute to improved learner performance and the achievement of organizational goals.

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