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Optimizing ICT Integration Across Sectors: A PICRAT Model Analysis

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Abstract

This study explored the utilization of Information and Communication Technology (ICT) across three major sectors—education, business, and information technology—focusing on teachers from the Mandaue City Division, employees of Cebuana Lhuillier Mandaue branches, and IT professionals from OSL International Inc., Cebu City, during the fiscal year 2025. Employing a survey-based research design, the study analyzed trends in ICT use through a structured process that involved preparation, administration, scoring, and data analysis. Guided by the PIC-RAT model, results revealed that the education sector primarily used ICT for Amplification, indicating that technology served to enhance existing teaching and learning practices, with 48.36% of respondents emphasizing interactive tools. In contrast, the business sector demonstrated a high level of transformation (86.49%), where technology was used innovatively to reshape work processes and improve efficiency. Meanwhile, the IT sector reflected Creativity (21.31%) within the Replacement category, showing how professionals utilized ICT to substitute traditional methods with more dynamic digital approaches. These findings reveal distinct patterns of ICT integration and highlight the diverse stages of technological adaptation among the three sectors. Overall, the study underscores the crucial role of continuous professional development in strengthening ICT competence. It is strongly recommended that the proposed training and development design be adopted to further enhance digital literacy, innovation, and effective ICT application in education, business operations, and information technology services.

Keywords

Information and Communication Technology (ICT), PIC-RAT Model, Amplification, Transformation, Replacement, Training, and Development

1. Introduction

The integration of Information and Communication Technology (ICT) has become a cornerstone for the modernization and progress of key sectors such as education, business, and Information Technology (IT). It involves embedding digital tools, platforms, and systems into the core activities and practices of organizations and institutions, aiming to enhance efficiency, productivity, communication, and access to information. As digital transformation accelerates globally, ICT integration has become a critical factor in enabling innovation and fostering economic and social growth. As the world continues to embrace digital transformation, ICT has increasingly played a crucial role in revolutionizing processes, enhancing efficiency, and expanding opportunities in these sectors. The integration of ICT in education, business, and the IT sector is no longer optional but essential for thriving in the digital age [1].

The integration of Information and Communication Technology (ICT) in the business, education, and information technology (IT) sectors has proven to be a catalyst for growth and development, but it also presents several problems and issues. Despite the widespread potential of ICT, its integration is not without challenges, often depending on the specific sector, organizational context, and the manner in which technology is implemented. These gaps affect the full realization of ICT's potential to transform these sectors in the Philippines. These issues are the digital divide, especially in access to infrastructure and devices, which continues to create inequality; cybersecurity concerns remain a critical issue as digital threats grow in scale and sophistication; a lack of skilled professionals in advanced ICT fields makes it difficult to implement and manage modern digital solutions; high implementation costs, especially for small businesses and educational institutions, limit ICT adoption; and resistance to change in organizational culture and outdated curricula restrict the effective integration of technology [2].

To overcome these challenges, there needs to be a collaborative approach among the government, private sector, educational institutions, and ICT service providers to address infrastructure gaps, enhance digital literacy, promote cybersecurity best practices, and invest in research and development. Addressing these issues will enable the Philippines to unlock the full potential of ICT across key sectors. In this context, the PIC-RAT model emerges as a powerful analytical framework for understanding how ICT can be integrated and utilized across sectors. The model is divided into two components: PIC (Passive, Interactive, Creative) and RAT (Replacement, Amplification, Transformation). The PIC component focuses on the engagement level with technology, ranging from passive use to more active and creative applications. The RAT component highlights the impact of ICT, from simple replacement of traditional methods to the amplification and, ultimately, the transformation of processes and practices. By categorizing ICT use into manageable stages and understanding its impact through the lenses of passive vs. creative and replacement vs. transformation, the model helps organ-

izations simplify ICT adoption and understand its full potential, create a roadmap for gradual, effective integration of technology, make informed decisions on the best tools to use at different stages, track progress and measure success over time, and encourage innovative thinking and continuous improvement [3].

This research seeks to analyze ICT integration across sectors using the PICRAT model, a framework that evaluates both the nature of learner or user engagement and the degree of technological impact. The PIC dimension consists of three engagement levels: Passive, where users receive information with minimal interaction; Interactive, where users engage directly with digital content through two-way exchanges; and Creative, where users produce original outputs using ICT tools. The RAT dimension examines the extent to which technology affects practice: Replacement, where technology merely substitutes traditional methods without changing outcomes; Amplification, where technology enhances efficiency, productivity, or accessibility; and Transformation, where technology enables previously impossible tasks or redefines processes altogether.

Guided by this model, the primary objective of the study is to investigate how different sectors implement and interact with ICT, the factors influencing these practices, and the outcomes of such integrations in terms of efficiency, innovation, and transformation. By examining both engagement level (PIC) and technological impact (RAT), this research aims to provide a nuanced understanding of ICT integration strategies and their effects across diverse organizational contexts.

2. Methodology

In this section, the research methodology, such as the design, environment, respondents, instruments, data gathering procedures, and treatment of the data, is discussed.

2.1. Research Design

This study used the descriptive design utilizing a quantitative approach. The descriptive research methodology was applied as the study determined the existing condition and prior status of ICT integration in business, educational, and IT management. This research design explored how the PICRAT Model and ICT integration contribute to innovation, creativity, and transformation in the business, IT, and education sectors. The study offered valuable insights into how different sectors adopt and benefit from ICT tools to enhance their processes and outcomes. This involved surveys and questionnaires that were administered to respondents in education, business, IT, and sectors. The purpose was to gather numerical data on the level of ICT integration and its impact on productivity, creativity, learning outcomes, and operational efficiency. The survey assessed the extent to which various sectors apply the PICRAT Model, employee satisfaction with ICT tools and active learning experiences, and organizational/educational outcomes associated with ICT adoption and transformation.

2.2. Environment

The environment for integrating PICRAT and ICT tools across the business, IT, and education sectors varies significantly based on the technological, organizational, external, and regulatory factors within each sector. Businesses focus on customer engagement, IT professionals prioritize innovation and security, while educational institutions aim to adopt active and personalized learning. Understanding these environmental factors is crucial to ensuring the successful application of PICRAT principles in ICT adoption across these diverse sectors. The environment for the integration of PICRAT (Passivity, Interactivity, Creativity, Replacement, Amplification, and Transformation) and ICT (Information and Communication Technology) tools across business, IT, and education sectors plays a critical role in shaping the success and effectiveness of these integrations. Each sector presents unique conditions, infrastructure, and cultural factors that influence the way ICT tools are adopted and integrated. In the education sector, this was represented by DepEd Mandaue City Division. It is part of the larger Department of Education system in the Philippines, responsible for the delivery of basic education within the city of Mandaue. The division oversees public schools, educational programs, and services, ensuring they align with national standards set by DepEd.

2.3. Respondents

The respondents in this study consist of three distinct groups representing key sectors: DepEd Educators, Business Personalities, and Information Technology Experts. A total of 213 DepEd Educators were selected using purposive sampling, as they possess the relevant experience and direct engagement with educational technologies essential to the study. Meanwhile, 177 Business Personalities were chosen through convenience sampling, given their accessibility and willingness to participate, which allowed efficient data collection from the business sector. Lastly, 122 Information Technology Experts were identified through purposive sampling, ensuring that only individuals with verified technical expertise and professional experience contributed to the IT-related insights. Each group offers valuable sector-specific perspectives that enhance the study's understanding of technology usage patterns, communication tools, and platform trends across different professional domains.

The data in Table 1 illustrate the distribution of respondents across three sectors, highlighting the proportional representation of each group within the total sample size of 512. DepEd Educators make up the largest portion of the sample, accounting for 41.60% of the respondents, indicating the prominence of education professionals in the study. Business Personalities represent 34.57% of the sample, reflecting a significant presence of individuals from the business sector. Meanwhile, Information Technology Experts comprise 23.82% of the respondents, offering a solid representation of the IT sector. This distribution ensures a balanced and diverse representation of perspectives across the sectors, enabling a compre-

hensive analysis of trends and behaviors related to ICT usage in different professional fields.

Table 1. Distribution of respondents.

Respondents	Population Size (N)	Percentage (%)
DepEd Educators	213	41.60%
Business Personalities	177	34.57%
Information Technology Experts	122	23.82%
Total	**512**	**100%**

2.4. Instrument

The instrument used in this study was composed of three parts. Part I consisted of research respondents' ICT platforms and tools used, such as email, instant messaging, video conferencing, social media, cloud storage, e-commerce, online learning, and streaming services. Part I also included related information on ICT integration, such as the use of computers, networking equipment, peripherals, operating systems, web browsers, and search engines. Part II included knowledge and skills competence in ICT, and the instrument consisted of the ICT competency assessment focused on technology operations and concepts domains. This instrument was adopted in the study of Batan *et al.* (2022), which was based on the National ICT Competency Standard for Teachers [4]. Data were collected in person, and participants were given ample time to consider the items on the questionnaire, resulting in a more precise data period. Moreover, Part III was the questionnaire on the PICRAT model for technology integration, adapted from the paper of Kimmons *et al.* (2020) [5]. This was to determine the existing condition of the status of ICT integration for the transformation of the knowledge and skills of the respondents, as to the relationship to technology and use of technology, as categorized in PICRAT. The PICRAT model for technology integration was used because it is related to the present research.

2.5. Data Gathering Procedure

A standard preliminary step was taken, such as a letter of transmittal to be forwarded for approval. Afterward, a transmittal letter was given to the respondents, asking their permission to be part of the study to ensure full cooperation. Orientation on the objectives and purpose of the study was carefully discussed. Afterwards, the research questionnaire was distributed and answered by the teachers in DepEd Mandaue City Division, and employees of Cebuana Lhuillier and OSL Inc. For easy access in gathering the data, a Google Form was sent to the respondents. Afterward, the data were collected, tallied, and subjected to statistical analysis for further interpretation of data. Based on the findings of the study, the training and development for ICT integration were crafted as a final output.

2.6. Treatment of Data

The data gathered was tallied, collated, tabulated, and subjected to statistical computations. In answering subproblem number 3, the PICRAT model was used. To determine the demographic profile of the respondents, the Simple Percentage was used. It was also used to determine the existing condition of the ICT competence. In the context of PICRAT Analysis, the weighted mean was used as a statistical treatment to assess the degree to which various types of technology integration (Passive, Interactive, and Creative (PIC) levels with Replacement, Amplification, and Transformation (RAT)) contribute to overall technology integration in a specific educational setting.

3. Results and Discussion

The data gathered was tallied, collated, tabulated, and subjected to statistical computations. This section presents the data that answered the questions in this research. The results were presented, analyzed, and discussed the status of ICT integration for the transformation of knowledge and skills of the respondents as categorized by the PICRAT matrix across education, business, and information technology sectors.

3.1. PIC-RAT Analysis

The integration of technology in education, business, and IT sectors has reshaped how tasks are performed and how goals are achieved. One valuable framework for analyzing the role of technology in these sectors is the PIC-RAT (Replacement, Amplification, Transformation) model. This model categorizes the use of technology into three distinct levels: Replacement, where technology substitutes traditional tools; Amplification, where it enhances existing processes; and Transformation, where technology fundamentally changes and improves the way tasks are executed. This research applies the PIC-RAT analysis to assess how technology is utilized across education, business, and IT, identifying the extent to which technology has revolutionized these sectors. By exploring the relationship between technology and sector-specific tasks, this analysis provides insights into how digital tools contribute to efficiency, innovation, and overall performance across diverse fields. Table 2 presents the PIC-RAT analysis in the education sector.

Table 2. PIC-RAT analysis in the education sector.

PIC-RAT	Passive (%)	**Interactive (%)**	Creative (%)
Replacement	7.04	10.33	5.63
Amplification	3.76	**48.36**	2.82
Transformation	4.69	10.80	6.57

As seen in the Table on Replacement, 7.04% had a small percentage of technology use in the Passive category, which indicated that technology in this context is

mostly used to replace traditional methods without significantly changing the learning process. It suggests a limited impact, where technology is simply an alternative to existing tools. A slightly higher percentage in the Interactive (10.33%) category indicates that while technology in this phase replaces traditional methods, it introduces some interaction, such as digital versions of traditional content or activities. Creative (5.63%) received the lowest percentage in the Creative category, which shows that technology in the Replacement phase is not yet being used in ways that foster creative or innovative thinking. It remains focused on substitution.

In the Amplification phase, passive got 3.76%. This meant that technology was used to enhance existing practices, but it still primarily supports passive learning. The relatively low percentage in this category indicated that the focus remains on enhancing traditional methods without creating significant change. The highest percentage of 48.36% in the Interactive category under amplification showed that technology was being increasingly used to amplify interaction and engagement in the learning process. This suggested that technology was used to make learning more participatory and active, enhancing the overall experience. The Creative (2.82%) category remained quite low, indicating that while amplification is happening, technology was not yet being used to its full potential for developing creativity or new modes of learning.

The PIC-RAT results show that the acceptability of ICT integration is closely tied to how technology is used within each phase—whether it simply replaces, amplifies, or attempts to transform traditional practices. In the Replacement phase, the small percentages in Passive (7.04%), Interactive (10.33%), and Creative (5.63%) indicate that technology is largely perceived as a substitute rather than a meaningful improvement. Because these practices introduce little change in engagement or outcomes, users tend to find them less acceptable. They may recognize minor conveniences, such as digital access to familiar materials, but the low creativity and limited interaction suggest that Replacement-level ICT fails to provide the level of value or innovation that users expect.

In contrast, the Amplification phase demonstrates a clearer link between increased engagement and higher acceptability. The low Passive percentage (3.76%) shows that passive enhancement alone is not compelling to users, but the exceptionally high Interactive score (48.36%) reveals strong acceptability when ICT actively enriches learning and work processes. This suggests that users value technology most when it amplifies participation, engagement, and efficiency. However, the low Creative percentage (2.82%) indicates that opportunities for creativity remain limited, reducing acceptability in areas where innovation is expected. Overall, the PIC-RAT patterns show that acceptability rises when ICT moves beyond substitution and meaningfully amplifies interaction, while acceptability declines when technology does not support deeper creativity or transformation.

In the context of the education sector, Mejías (2023) provides valuable insights into how the PIC-RAT model can enhance student-centered learning [6]. This

aligns with the Amplification category identified in the present study, where technology is used to enhance engagement and participation. According to Mejías, the integration of ICT tools like digital portfolios, collaborative platforms, and real-time interaction supports a more engaging and dynamic learning environment. These tools encourage student autonomy, allowing learners to take ownership of their learning while simultaneously facilitating personalized teaching strategies.

Furthermore, Mensah *et al.* (2024) reported that teachers saw increased satisfaction with their teaching practices after implementing the PIC-RAT model, due to the enhanced interaction and engagement of students [7]. This result further supports the educational benefits highlighted in the current study, where the amplification and interactive use of technology was linked to improved student participation and overall educational outcomes. Together, the findings from both studies underscore the positive impact of integrating interactive and amplification technologies in education to improve learning processes, foster student collaboration, and increase teacher satisfaction.

Table 3 presents the percentages of technology integration across the PIC-RAT framework in the Business sector, categorized into Passive, Interactive, and Creative levels under Replacement, Amplification, and Transformation. These percentages reflect the varying degrees to which technology is used to either substitute traditional methods or enhance and transform business processes.

Table 3. PIC-RAT analysis in the business sector.

PIC-RAT	Passive	Interactive	**Creative**
Replacement	0	0	0
Amplification	0	56.76	9.09
Transformation	0	**86.49**	22.08

As seen in Table 3, the Business sector showed no use of Passive, Interactive, or Creative technology at the Replacement phase, suggesting that the sector did not adopt technology merely for substitution but focused on more engaging and transformative applications. In the Amplification phase, there was a strong emphasis on Interactive use (56.76%), with a smaller portion used for Creative purposes (9.09%). This indicated that businesses were mainly focused on enhancing existing practices through interactive tools but were still in the early stages of using technology for creativity. In the Transformation phase, Interactive technology usage jumped significantly (86.49%), indicating a shift towards highly engaging and dynamic processes. Furthermore, there was also a notable focus on Creative uses of technology (22.08%), reflecting efforts to leverage digital tools for innovation and strategic transformation. Overall, the data suggested that the Business sector was actively using technology to enhance interactivity and creativity, particularly in the Amplification and Transformation phases, while less emphasis was placed on passive or merely substitutive uses of technology.

The high perceived usefulness and ease of use of technology help explain why the Business sector shows strong integration patterns in the Amplification and Transformation phases rather than remaining at the Replacement level. When users view technology as both valuable and easy to operate, they are more likely to adopt tools that enhance engagement, which aligns with the sector's strong emphasis on Interactive use in amplification (56.76%) and an even greater increase in the Transformation phase (86.49%). These positive perceptions also support the sector's growing use of technology for Creative purposes—9.09% in amplification and 22.08% in transformation—indicating that businesses are confident in leveraging digital tools for innovation and strategic change. In contrast, low reliance on passive or merely substitutive technology suggests that when usefulness and ease of use are high, organizations naturally gravitate towards applications that amplify or transform processes rather than simply replacing traditional methods.

The findings of Aldoseri *et al.* (2023) provide robust support for the results observed in the business sector of the current study, particularly in relation to the PIC-RAT model categorized as *Transformation* and *Interactive*. Aldoseri *et al.* (2023) introduced a framework for integrating ICT into business operations based on the PIC-RAT model, highlighting the significant role of process and interaction components in improving internal processes and organizational efficiency [8]. This aligns with the Transformation category found in the current study, in which 86.49% of businesses utilized interactive technology to enhance user engagement and operational effectiveness.

The study by Aldoseri *et al.* (2023) emphasized that businesses which effectively integrate the process and interaction components of the PIC-RAT model saw notable improvements in productivity and collaboration. Technologies such as Enterprise Resource Planning (ERP) systems, project management software, and automated reporting tools were instrumental in streamlining workflows, increasing accuracy, and fostering better communication among employees. This mirrors the findings in the current study, where business professionals extensively used interactive technologies to improve processes, resulting in a more dynamic and efficient workplace environment.

Furthermore, the interactive technology usage observed in the business sector, with a high percentage of businesses leveraging tools that enable real-time communication and collaboration, aligns closely with Aldoseri *et al.*'s findings. The emphasis on selecting the right tools to foster collaboration within organizations is evident in the current study, where platforms such as Google Drive, Shopee, and YouTube were widely adopted across businesses, contributing to improved content management and team interactions. These tools align with Aldoseri *et al.*'s suggestion that selecting the right technology is critical for enhancing organizational interaction and optimizing processes. Hence, both studies underscore the importance of adopting interactive and transformative technologies to improve business operations. The adoption of tools that promote communication,

collaboration, and streamlined workflows leads to more efficient processes and better engagement among employees, thereby enhancing overall business performance.

The study by Alabi (2024) offers valuable insights that strongly align with the findings in the business sector of the current research, particularly in the context of the PIC-RAT model categorized as *Transformation* and *Interactive*. Alabi's exploration of how the PIC-RAT model is applied in the digital transformation of businesses highlights the crucial role of the Process and Interaction components for businesses to successfully undergo digital transformation. This directly supports the current study, where 86.49% of businesses in the *Interactive* category for *transformation* indicated that technology was being used extensively to engage employees and enhance organizational processes.

Alabi (2024) emphasizes that the Process component of the PIC-RAT model is central to digital transformation [9]. This involves restructuring business operations to maximize efficiency through the use of technology. In the current study, businesses that implemented interactive technologies—such as project management software, cloud-based tools, and collaborative platforms—saw significant improvements in their operational workflows, aligning with Alabi's assertion that businesses must leverage technology to redesign and optimize internal processes. Technologies like Google Drive and Shopee, which were highly adopted across businesses in the current study, exemplify tools that streamline operations and facilitate more efficient content management, thereby supporting the Process component of the PIC-RAT model.

Moreover, Alabi (2024) also underscores the importance of the Interaction component, which facilitates collaboration both within organizations and between employees and customers. This is consistent with the current study's findings, where businesses in the *Transformation* category extensively used interactive tools to foster communication, teamwork, and collaboration. Tools like Google Classroom (for educational content management) and YouTube (for engaging customers through video content) demonstrate how technology is being used to enhance engagement and interaction, which aligns with Alabi's findings that collaboration across departments and with customers is critical to successful digital transformation.

Overall, both Alabi's study and the current research highlight that the successful digital transformation of businesses is reliant on the effective integration of the components of the PIC-RAT model. Businesses that use technology to streamline operations, foster collaboration, and improve communication are more likely to experience successful transformations, as reflected in the high levels of technology adoption and interaction observed in the current study's business sector results.

The table presents the percentages of technology integration across the PIC-RAT framework in the IT sector, categorized into Passive, Interactive, and Creative levels under the Replacement, Amplification, and Transformation phases. These percentages represent the degree to which technology is utilized to enhance

or transform processes in the IT sector, indicating how IT professionals and businesses use technology in various ways across these stages.

Table 4. PIC-RAT analysis on IT sector.

PIC-RAT	Passive	Interactive	**Creative**
Replacement	14.75	4.92	**21.31**
Amplification	6.56	16.39	11.48
Transformation	9.84	6.56	8.20

As seen in Table 4 on the Replacement phase, the Passive category had a relatively high percentage (14.75%) in the Replacement phase, suggesting that a portion of technology use in this phase was still primarily focused on replacing traditional tools without significant enhancement or engagement. This represents the substitution of older technologies with newer ones without necessarily improving functionality or interactivity. A small percentage (4.92%) of Interactive use under replacement indicates that, while some interactive elements were introduced, the primary goal was still to replace rather than engage users in dynamic ways. A significant percentage (21.31%) in the Creative category under replacement indicated that some level of creativity was being introduced, even at this phase, where technology was being used to not only replace but also bring about creative approaches to existing processes or tools.

In the Amplification phase, the Passive category had a relatively small percentage (6.56%), suggesting that technology was not being used simply to enhance passive learning or processes. Instead, the emphasis was on more engaging and participatory forms of integration. The Interactive category under amplification showed a moderate percentage (16.39%), indicating that technology was used to enhance interactions and engagement in the IT sector. This phase likely involved the adoption of tools that improve collaboration, communication, and user participation. The Creative category in amplification showed a relatively moderate percentage (11.48%), implying that while technology was being used to enhance existing methods, it also facilitated some degree of creativity in the processes, promoting innovative solutions or practices.

In the Transformation phase, the Passive category under transformation had a low percentage (9.84%), showing that while there was still some passive use of technology, the focus in this phase was on more dynamic and transformative applications rather than just replacing or automating traditional processes. The Interactive use in the Transformation phase (6.56%) is relatively modest. This indicated that the IT sector may be less focused on interactivity and more on using technology for more fundamental transformations of business processes or workflows. The Creative use of technology in the Transformation phase (8.20%) suggested that although there is some degree of creativity introduced at this stage, the main focus remained on transforming existing processes rather than developing

new and innovative approaches.

Replacement in the IT sector saw a noticeable focus on Creative use (21.31%), indicating that even in the early phase of technology adoption, some level of creative thinking and problem-solving was being introduced, though the sector was still engaged in substituting older tools. Amplification emphasized Interactive technology use (16.39%) to enhance user participation and engagement. This phase showed moderate use of Creative technology (11.48%), indicating that the sector was beginning to use technology to enhance creativity, though not to a large extent. Transformation saw a slight focus on Interactive and Creative technologies (6.56% and 8.20%, respectively), pointing to a moderate but not dominant use of technology to drive creativity and interactive experiences. The main goal here was likely to shift or transform existing workflows, processes, or systems in the IT sector. Overall, the IT sector was progressively incorporating technology across various levels, with Replacement and Amplification showing the highest engagement in Creative and Interactive use. However, transformation showed a relatively lower emphasis on creativity and interactivity, with a larger focus on transforming existing IT practices.

The study by Smith and Johnson (2022) offers valuable insights that closely align with the findings in the Information Technology (IT) sector of the current research, particularly in the context of the PIC-RAT model categorized as Replacement and Creative. Smith and Johnson (2022) explore the use of the PIC-RAT model in IT Service Management (ITSM), emphasizing how technology can optimize service processes, improve interaction between IT staff and end-users, and enhance content delivery through digital platforms. This resonates with the current study's findings, where 21.31% of IT sector respondents used creative technology in the Replacement category, reflecting the ongoing integration of creativity into existing processes.

Smith and Johnson (2022) highlight the critical role of process automation in optimizing service workflows, which mirrors the *Replacement* aspect of the current study's findings [10]. Technologies like automated service workflows and ITSM tools are used to replace older manual processes with more efficient digital solutions. In the IT sector of the current study, tools and technologies that streamline processes and improve the delivery of services were frequently adopted, indicating that technology is not only replacing older systems but also introducing creative improvements in service delivery and management.

Moreover, the study by Smith and Johnson also underscores the importance of Interaction and Content components in improving communication and content delivery. The creative technology found in the IT sector of the current study (21.31%) demonstrates how IT professionals are adopting innovative tools that improve interaction, such as communication platforms and knowledge bases, which were key to improving both internal collaboration and user engagement. For instance, systems that automate responses and enhance the user experience (UX) reflect a creative approach to existing processes. These innovations align

with the study's emphasis on user experience improvements, which were found to increase customer satisfaction and response times, contributing to a more responsive IT service management system.

Both studies emphasize the role of creative technology in enhancing IT processes, improving interaction, and ensuring efficient content delivery. The IT sector's integration of creative technologies to replace traditional systems mirrors the broader trend of IT professionals adopting more efficient and user-centric solutions. As reflected in the findings of both studies, the effective use of automation, communication tools, and knowledge management systems in ITSM leads to improved service quality, increased customer satisfaction, and faster response times—key indicators of a successful application of the PIC-RAT model in the IT sector.

Another study to support the findings of the current study was the study by Tanvir *et al.* (2024), which offers significant insights that align well with the findings in the Information Technology (IT) sector of the current research, particularly in the context of the PIC-RAT model categorized as *Replacement* and *Creative*. Tanvir *et al.* (2024) explore the role of ICT in business analytics within IT consulting firms, focusing on how the PIC-RAT model can optimize the integration of technologies such as data analytics platforms, visualization tools, and big data solutions [11]. This study highlights how aligning processes, interaction, content, and audience through technology results in improved decision-making and more relevant business insights, which strongly correlates with the findings in the IT sector, where 21.31% of respondents were involved in creative technology adoption under the *Replacement* category.

Moreover, the interaction and content components in Tanvir *et al.*'s study highlight the collaborative and communicative role of technologies in improving business insights. The use of visualization tools and collaborative platforms for sharing insights directly parallels the adoption of interactive technologies in the IT sector, where tools that enhance communication and collaboration—such as data visualization and cloud-based platforms—are used creatively to improve processes. This interaction enables decision-makers to better understand data and take action more effectively, just as the creative technologies identified in the current study serve to foster more dynamic and innovative approaches to existing IT processes.

Finally, the audience aspect of Tanvir *et al.*'s study, which focuses on presenting data to decision-makers and stakeholders, aligns with the current study's findings in the IT sector, where technology adoption supports better user engagement and decision-making. In both studies, the integration of creative technologies empowers stakeholders to make more informed, timely decisions by presenting data in more accessible, interactive formats. Overall, both Tanvir *et al.* (2024) and the current study highlight the importance of creative technology in the IT sector, particularly in the Replacement category of the PIC-RAT model. The integration of advanced tools like data analytics platforms, collaborative technologies, and visualization tools significantly improves processes, enhances interaction, opti-

mizes content delivery, and ultimately empowers decision-makers. These findings demonstrate how the creative application of ICT can replace traditional methods and lead to more efficient, innovative outcomes in IT operations.

Table 5 categorizes the relationship of different sectors (Education, Business, and IT) to technology, alongside the predominant use of technology within each sector. It highlights how each sector interacts with technology and how it applies technology in its processes or practices. The Education sector primarily utilizes technology in an **interactive** manner, emphasizing engagement and participation among students and educators. Through online platforms, collaborative tools, and interactive content, technology supports dynamic teaching and learning processes. Rather than completely transforming the educational system, technology in this sector is mainly used to **amplify** existing practices—enhancing accessibility, improving communication, and enriching learning experiences while maintaining traditional instructional frameworks.

Table 5. Summary of PIC-RAT results.

Sector	Relationship to Technology	Use of Technology
Education	Interactive	Amplification
Business	Interactive	Transformation
IT	Creative	Replacement

In the Business sector, technology also plays an interactive role, fostering collaboration and engagement among employees, clients, and customers. Digital tools and platforms enable businesses to improve communication and create more responsive and efficient systems. However, unlike education, businesses primarily use technology to transform their operations—redefining processes, adopting innovative models, and leveraging automation and data analytics. This approach reflects a deeper integration of technology aimed at innovation, optimization, and long-term competitiveness.

The IT sector, meanwhile, maintains a creative relationship with technology, using it as a foundation for innovation and development. IT professionals drive the creation of new tools, systems, and applications that advance digital capabilities across industries. Their focus lies in replacement, where outdated and inefficient systems are substituted with modern, automated, and streamlined technologies. Overall, while Education and Business use technology for interaction and enhancement, the IT sector leads in innovation and modernization, showcasing how different fields harness technology according to their goals and functions.

3.2. Level of Acceptability of ICT Integration for Transformation of Knowledge and Skills of the Respondents as Categorized by the PIC-RAT Matrix Across Sectors

This analysis examines how different sectors—such as education, business, and

information technology—adopt and perceive the usefulness of ICT tools in transforming their practices. By using the PIC-RAT matrix, this study explores how technology can either Replace, Amplify, Integrate, or Transform existing processes, and evaluates the extent to which these tools are accepted and utilized across these sectors to enhance skills and knowledge.

3.2.1. Perceived Usefulness

The degree to which individuals believe that using a particular technology or system will enhance their ability to perform tasks more effectively and efficiently. In the context of Information and Communication Technology (ICT) integration, perceived usefulness is a critical factor influencing the adoption and acceptance of new technologies across various sectors. This concept plays a significant role in driving technology integration in education, business, and IT sectors, as it directly impacts the effectiveness and transformation of knowledge and skills.

The data in Table 6 suggest that respondents perceive the attributes related to perceived usefulness as highly valuable across all groups (X1, X2, and X3). The mean values for each attribute, ranging from 4.42 to 4.56, indicate a very highly acceptable (VHA) level of usefulness. Attributes such as Enhanced Learning and Engagement in Education, Business Efficiency and Competitive Advantage, and IT Sector's Drive for Innovation and Creativity are recognized as important, with particular emphasis on Sector-Specific Training and Development Needs, which received the highest mean score of 4.56. The overall consistency in perceptions across the groups highlights that the respondents strongly value these factors, suggesting that educational, business, and sector-specific development initiatives are seen as crucial for driving progress and meeting evolving demands.

Table 6. Perceived usefulness.

Attributes of perceived usefulness	Respondents						Mean	SD
	X1		X2		X3			
	WM	*VD*	*WM*	*VD*	*WM*	*VD*		
Enhanced Learning and Engagement in Education	4.53	VHA	4.56	VHA	4.47	VHA	4.51	0.0356
Business Efficiency and Competitive Advantage	4.46	VHA	4.52	VHA	4.56	VHA		
IT Sector's Drive for Innovation and Creativity	4.42	VHA	4.46	VHA	4.47	VHA		
Sector-Specific Training and Development Needs	4.56	VHA	4.51	VHA	4.56	VHA		
Overall Weighted Mean:	**4.49**		**4.51**		**4.51**			
Interpretation:	**Very Highly Acceptable**							

3.2.2. Perceived Ease of Use

The degree to which an individual believes that using a particular technology or system will be free from effort. In the context of ICT integration, perceived ease of use plays a crucial role in determining how readily individuals or organizations will adopt and implement new technologies. If a system is considered easy to use, users are more likely to adopt it because they feel confident that it will not require significant effort to learn or operate. This perception is especially important in sectors like education, business, and IT, where technology adoption can enhance productivity, streamline processes, and improve overall outcomes. The easier the technology is to use, the more likely it is that users will integrate it into their daily activities, leading to greater effectiveness in achieving their goals.

The results presented in Table 7 indicate that the perceived ease of use of ICT tools across various attributes is consistently rated as "Very Highly Acceptable" (VHA) by the respondents. The overall weighted mean (WM) values for each attribute—ranging from 4.48 to 4.49—suggest a high level of satisfaction with the ease of use of the technology. Attributes such as Improved Efficiency and Productivity (WM = 4.49, SD = 0.00816), Enhanced Learning and Knowledge Sharing, Facilitating Innovation and Creativity, and Improved Communication and Collaboration all received strong ratings, reflecting that respondents find these technologies both intuitive and effective in enhancing their work processes. The low standard deviation values further reinforce the consistency of respondents' evaluations, signaling a general consensus regarding the ease of use. These findings highlight the importance of user-friendly technology in promoting efficiency and collaboration, which in turn can lead to greater acceptance and integration of ICT tools across sectors.

Table 7. Perceived ease of use.

Attributes of perceived usefulness	Respondents						Mean	SD
	X1		X2		X3			
	WM	*VD*	*WM*	*VD*	*WM*	*VD*		
Improved Efficiency and Productivity	4.51	VHA	4.51	VHA	4.45	VHA	4.49	0.00816
Enhanced Learning and Knowledge Sharing	4.47	VHA	4.52	VHA	4.51	VHA		
Facilitating Innovation and Creativity	4.42	VHA	4.46	VHA	4.47	VHA		
Improved Communication and Collaboration	4.53	VHA	4.52	VHA	4.51	VHA		
Overall Weighted Mean:	**4.48**		**4.50**		**4.49**			
Interpretation:	**Very Highly Acceptable**							

3.2.3. Users' Satisfaction

The overall contentment or fulfillment that users experience when interacting with a particular technology or system. In the context of ICT integration, users' satisfaction is a critical factor that influences the continued use and adoption of technology. When users find that a system meets their needs, is user-friendly, and delivers expected benefits—such as increased productivity, ease of communication, or enhanced learning—satisfaction levels tend to be high. High user satisfaction often correlates with positive attitudes toward technology, increased engagement, and a willingness to explore advanced features. In sectors like education, business, and IT, user satisfaction can directly impact the success of ICT tools, as satisfied users are more likely to embrace and integrate these technologies into their workflows. Therefore, ensuring that ICT solutions are intuitive, effective, and provide value to the users is key to fostering long-term usage and maximizing their potential.

The data from Table 8 on users' satisfaction indicates that the perceived usefulness of the ICT tools across various attributes has been rated as "Very Highly Acceptable" (VHA) by all respondents. The mean values for all attributes, including Enhancement of Performance, Time-Saving, Support for Decision-Making, and Facilitation of Communication and Collaboration, are consistently high, with averages ranging from 4.46 to 4.56. The overall weighted mean (WM) for all respondents was 4.50, suggesting a strong consensus that the ICT tools are extremely effective in improving performance, saving time, supporting decision-making, and enhancing communication and collaboration. The low standard deviation (SD = 0.00816) further highlights the consistency of the respondents' satisfaction levels, indicating that the tools are perceived as highly effective and beneficial across different sectors. This strongly suggests that the integration of ICT tools is well received and has a positive impact on users' performance and efficiency.

Table 8. Users' satisfaction.

Attributes of Perceived Usefulness	Respondents						Mean	SD
	X1		X2		X3			
	WM	*VD*	*WM*	*VD*	*WM*	*VD*		
Enhancement of Performance	4.56	VHA	4.56	VHA	4.46	VHA	4.50	0.00816
Time-Saving	4.46	VHA	4.51	VHA	4.56	VHA		
Support for Decision-Making	4.42	VHA	4.46	VHA	4.47	VHA		
Facilitation of Communication and Collaboration	4.52	VHA	4.51	VHA	4.52	VHA		
Overall Weighted Mean:	**4.49**		**4.51**		**4.50**			
Interpretation:	**Very Highly Acceptable**							

4. Conclusions and Recommendation

This study is limited by its geographical focus on selected organizations within Cebu, which may restrict the generalizability of the findings to other regions or to the national level. The perspectives gathered may reflect the unique technological readiness, infrastructure, and organizational culture of Cebu-based institutions, which could differ significantly from those in other urban or rural areas. Additionally, the study relied on self-reported data, which may introduce response biases and affect the accuracy of the reported ICT practices and perceptions.

This research concluded that the use of Information and Communication Technology (ICT) varies significantly across the Education, Business, and IT sectors. The Education sector primarily uses technology interactively, focusing on amplifying existing educational practices and enhancing communication and learning environments. In the Business sector, technology is also applied interactively, but with an emphasis on transforming business processes to drive innovation and operational optimization. The IT sector shows a creative relationship with technology, developing innovative solutions and focusing on the replacement of outdated systems with modern technological advancements. These findings suggest that each sector has its unique approach to technology, with Education and Business concentrating on improving interaction and engagement, while the IT sector leads in creativity and technological replacement.

Based on the analysis and findings, it is strongly recommended that a comprehensive training and development program be adopted, with sector-specific interventions tailored to the identified gaps in ICT integration. For the Education sector, training should focus on helping educators move beyond the Amplification phase toward transformation, equipping them with skills to design technology-enabled learning experiences that promote creativity, student-driven inquiry, and deeper engagement. In the Business sector, training programs should strengthen competencies in both interactive and creative digital practices, enabling employees to leverage technology for innovation, process redesign, and strategic decision-making. For the IT sector, training should expand on their strong creative capabilities by encouraging applications of creativity beyond system replacement, promoting the development of cutting-edge solutions, automation, and transformative digital systems. Across all sectors, continuous professional development must be sustained to ensure that organizations remain aligned with emerging technologies, fostering long-term growth, innovation, and digital resilience.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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