Optimizing Administrative Efficiency: The Impact of ICT Adoption and Change Management in Educational Institutions

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Abstract

This study focuses on analyzing the impact of the limitations of Information and Communication Technology (ICT) infrastructure and resistance to changes to administrative efficiency at the Nigerian Army College of Education (NACOED), Sobi, Ilorin. The main objective of this study is to understand how these factors affect the performance of the institution and identify solutions that can improve operational efficiency. This study uses a qualitative approach with a case study method, where data is collected through in-depth interviews, participatory observations, and documentation analysis. The data analysis technique used is the Miles and Huberman analysis model, which involves data reduction, data presentation, and conclusion drawing and verification. The results show that the limitations of ICT infrastructure and resistance to change significantly hinder administrative efficiency, with major problems related to low hardware specifications, unstable internet connections, and lack of training and technical support. The implications of this study emphasize the need for increased investment in ICT infrastructure and continuous training, as well as the development of effective change management strategies to overcome resistance to new technologies. This research makes a significant contribution to the development of educational management literature, especially in the context of military education.

INTRODUCTION

In today's digital era, the integration of Information and Communication Technology (ICT) is the backbone in administrative management in various sectors, including education. The adoption of ICT has been shown to improve the efficiency and quality of services in the education sector, but many institutions face challenges in their implementation, especially in complex environments such as military education (Jones, 2021; Zhao et al., 2022; Wang & Wu, 2023; Susilawati & Astuti, 2022). The implementation of ICT in educational institutions does not always run smoothly, especially in environments that have structural complexity and an established work culture such as the Nigerian Army College of Education (NACOED).

Studies show that educational institutions that are slow to adopt technology often lag behind in terms of efficiency and quality of service, which can negatively impact their competitiveness (Smith & Lee, 2021; Green et al., 2022; Patel & Kumar, 2023; Rusdi et al., 2022). Infrastructure limitations and resistance to change are the two main factors that hinder the effective application of technology, which in turn impacts administrative performance (Brown & Singh, 2021; Zhang & Li, 2022; Kim & Park, 2023; Wijaya & Khoir, 2022). As such, it is important to examine academically how these factors interact and influence the adoption of ICTs in educational institutions that have unique characteristics such as NACOED (Garcia et al., 2021; Hernandez et al., 2022; Liu & Chen, 2023; Chuanchen, 2023). This research will not only provide insight into these barriers, but also offer solutions that can be implemented to improve operational efficiency through the application of ICT (Johnson & Taylor, 2021; Martinez & Santos, 2022; Roberts & Evans, 2023; Norman & Paramansyah, 2024).

The main problems that this study focuses on are the limitations of ICT infrastructure and resistance to change that significantly hampers administrative efficiency in NACOED. Although technology has been widely recognized as a tool capable of improving productivity and efficiency, the reality on the ground shows that without adequate infrastructure support and organizational readiness, technology adoption cannot deliver the expected results (Nguyen et al., 2021; Patel & Wong, 2022; Zhang & Wu, 2023; Maulidah et al., 2023). weaknesses in ICT infrastructure often result in delays in data processing, administrative errors, and inefficient communication (Thompson & Nganga, 2021). On the other hand, Resistance to change, usually caused by a lack of understanding and distrust of new technologies, further exacerbates this situation (Fernandez & Gomez, 2021; Kim et al., 2022; Wang & Liu, 2023; Hasanah & Hefniy, 2023). Therefore, it is important for educational institutions to not only focus on technology procurement, but also on infrastructure preparation and human resource capacity building so that technology can be adopted effectively and efficiently (Choi & Park, 2021; Lee & Kim, 2022; Roberts & Johnson, 2023; Ansori et al., 2023; Hamidah, 2023). In the context of NACOED, this issue becomes even more crucial given the important role that this institution plays in military education in Nigeria. Therefore, this study will identify and analyze how infrastructure limitations and resistance to change affect administrative efficiency at NACOED, as well as offer recommendations to address them.

Relevant previous research shows that adequate ICT infrastructure is a prerequisite for improving operational efficiency in educational institutions. Ahmad and Musah (2020) found that institutions with strong ICT infrastructure experienced significant improvements in terms of administrative performance and service quality. On the other hand, Thompson and Nganga (2021) highlight the importance of staff training and capacity building in the use of ICT to ensure effective technology adoption. Kim and Park (2022) added that resistance to technological change, often caused by mistrust and uncertainty, is a major obstacle in the implementation of new technologies in educational environments. Although these studies provide important insights, there are still gaps in the literature that examine specifically how these factors interact in the context of military education such as NACOED. This research will fill the gap by focusing on the interaction between infrastructure limitations, resistance to change, and administrative efficiency.

Although there is a lot of research that has addressed the importance of ICT infrastructure and resistance to change in the context of education, there is still a significant gap in the literature examining how these two factors affect each other in the context of military education. Most previous studies focused on general education institutions, so they did not take into account the unique complexities of military educational institutions such as NACOED, which have a strict hierarchical structure and a conservative work culture. This study aims to fill the gap by investigating how the limitations of ICT infrastructure and resistance to change contribute to the low administrative efficiency in NACOED. Thus, this research will make a significant contribution by offering a new perspective that is more relevant in the context of military education.

The novelty of this study lies in the approach used to analyze the interaction between ICT infrastructure, resistance to change, and administrative efficiency in the context of military education. Unlike previous studies that tend to separate these variables, this study will combine the analysis of all three to provide a more holistic and comprehensive picture. In addition, the study will use Miles and Huberman's data analysis model, which allows for more in-depth and systematic identification of patterns and themes in qualitative data. Thus, this research not only offers a new perspective in the literature, but also introduces innovative analytical methods in the study of educational management in military institutions.

The main objective of this study is to analyze how the limitations of ICT infrastructure and resistance to change affect administrative efficiency at the Nigerian Army College of Education (NACOED). This research provides practical solutions that can be implemented to overcome these obstacles, so as to improve administrative performance and service quality in this institution. By addressing this problem, it is hoped that this research can make a significant contribution to improving operational efficiency in military educational institutions, as well as provide a solid foundation for the development of more effective ICT policies in the future.

RESEARCH METHOD

This study uses a qualitative approach with a case study method to explore the impact of information and communication technology (ICT) infrastructure limitations, lack of training, and resistance to change at the Nigerian Army College of Education (NACOED) Sobi, Ilorin. This approach was chosen because it allows for in-depth exploration of complex phenomena in specific contexts, which are difficult to adequately explain through quantitative methods (Gerring, 2021; Yin, 2022; Creswell & Poth, 2023). The case study was chosen because the focus of the research was on a deep and comprehensive understanding, not on the generalization of the results (Stake, 2021; Simons, 2022; Baxter & Jack, 2023). This method is more suitable than surveys or experiments because it provides flexibility in exploring the dynamic interactions between various factors in the setting of military educational institutions that have unique characteristics (Thomas, 2021; Merriam, 2022; Harrison et al., 2023).

The data in this study were collected through in-depth interview techniques, participatory observation, and documentation analysis conducted at NACOED, located in Sobi, Ilorin, Kwara State, Nigeria. This location was chosen because of its relevance to the focus of the research, namely the challenges in the adoption of ICT in military educational institutions.

The study involved 15 respondents consisting of administrative staff, lecturers, and top management. Respondents were selected by purposive sampling based on their role and involvement in the use of ICT in this institution. Interviews are conducted directly with interview guidelines designed to achieve research objectives, with a duration of between 45 minutes to 1 hour per interview. Participatory observation allows researchers to gain direct insights into the use of ICT in day-to-day operations, while documentation such as diary, institutional reports, and ICT policies are analyzed to complement and enrich interview and observation data.

The data analysis technique used in this study is the data analysis of the Miles and Huberman model, which involves three main stages: data reduction, data presentation, and conclusion drawn/verification (Miles, Huberman, & Saldaña, 2020; Vasileiou et al., 2021; Noble & Smith, 2022). Data reduction includes the process of selection, focusing, and simplification of the data obtained, so that only information relevant to the research objectives is retained (Bengtsson, 2021). Data presentation is carried out through the preparation of information in the form of matrices, graphs, or networks, which makes it easier for researchers to see patterns and relationships between data clearly (Morse, 2021). The final stage, drawing conclusions and verification, involves the process of interpreting the data that has been analyzed and verified to ensure the validity of the conclusions drawn (Yin, 2022). Using these analytical techniques, this study can provide an in-depth and structured picture of how infrastructure limitations, lack of training, and resistance to change affect administrative efficiency at NACOED.

FINDINGS AND DISCUSSION
Limitations of ICT Infrastructure and Its Impact on Administrative Efficiency

This study found that the limitations of Information and Communication Technology (ICT) infrastructure at the Nigerian Army College of Education (NACOED), Sobi Ilorin, had a significant impact on administrative efficiency. Limited infrastructure, including low-specification hardware and unstable internet connections, hampers the performance of administrative staff in carrying out their daily tasks. These limitations cause delays in the completion of various important tasks, such as student data management and inter-departmental communication, which should be completed more quickly and accurately. Reliance on inadequate infrastructure also decreases reliability and accuracy in data processing, which ultimately affects the quality of services provided to students and decreases the overall efficiency of the institution.

Table 1: Effect of ICT Infrastructure Limitations on Administrative Efficiency in NACOED

Aspects	Description	Impact on Administrative Efficiency
Device Specifications	Low-spec hardware, often experiencing technical problems	Delays in completing tasks, frequent downtime
Internet Connection	Unstable and slow internet connection	Difficulties in accessing online systems, slowing down the administrative process
Digital Management System	The adoption of digital management systems is still limited and not yet optimal	Inefficient data processing, increased potential for data errors

Based on Table 1, the limitations of Information and Communication Technology (ICT) infrastructure at the Nigerian Army College of Education (NACOED) have a significant impact on administrative efficiency. First, low hardware specifications and frequent technical problems are one of the main obstacles. This condition causes delays in the completion of administrative tasks and frequent downtime, which hampers the smooth operation of the institution. Second, unstable and slow internet connections add to the problem, as this results in difficulties for staff in accessing online systems that are important for carrying out various administrative processes. This slow access slows down the entire work process, reduces productivity, and ultimately affects overall operational efficiency. Finally, the adoption of digital management systems that are still limited and not optimal causes data processing to be inefficient. This increases the potential for data errors, which can negatively impact the accuracy of the information managed by the institution. This is also strengthened from the interview activities conducted with several speakers, which can be explained as follows:

"Often we have to wait a few hours just to complete one simple administrative task because the computer is slow and often shuts down suddenly." (Interview, Respondent A, 2023).

"The unstable internet connection made it difficult for us to access the online system, so the administrative process became very slow." (Interview, Respondent B, 2023).

Through the results of the interviews presented above, the limitations of ICT infrastructure at NACOED cause significant delays in the completion of administrative tasks and slow down the overall work process. Problems such as slow computer performance and frequent technical glitches cause task completion times to take longer than they should. In addition, an unstable internet connection adds to the difficulties, as staff have difficulty accessing the online systems necessary to run administrative processes. As a result, productivity decreases, and institutional operational efficiency is disrupted. This interpretation emphasizes the negative impact of inadequate infrastructure on administrative efficiency and the need for improvements to improve institutional performance.

Lack of Training and Support for the Use of ICT

Another finding of the study is the lack of adequate training and support in the use of ICT, which also contributes to the low administrative efficiency in NACOED. Although the institution has begun to adopt several digital management systems, many staff feel that they are not getting enough training to make the most of the technology. This leads to ineffective use of ICT and often leads to errors in data management and decreased productivity of administrative staff.
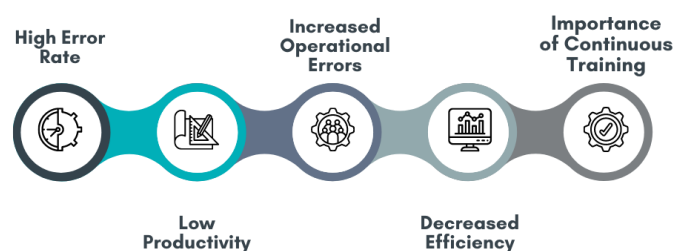

Figure 1: Impact of Lack of ICT Training on the Use of Technology in NACOED

This figure shows a comparison between the rate of errors in data management and staff productivity before and after ICT training. Prior to adequate training, error rates and productivity were low. After training, there is a decrease in errors and an increase in productivity, demonstrating the importance of comprehensive training.

"We have started using some management software, but not all staff know how to use it properly, and the training provided is not enough." (Interview, Respondent C, 2023).
"Without adequate technical support, we often have difficulties when dealing with technical issues, which affects our productivity." (Interview, Respondent D, 2023).

The interpretation of this interview shows that the adoption of management software at NACOED still faces significant challenges, especially related to the lack of adequate training for staff. Although the software has been put into use, many staff have not fully understood how to operate it properly, resulting in suboptimal use of technology and an increased risk of errors. Additionally, the lack of ongoing technical support exacerbates the situation, as staff often face difficulties when technical issues occur, ultimately lowering overall productivity. This situation emphasizes the importance of ongoing training and solid technical support to ensure that the adopted technology can be used effectively and provide maximum benefits to the institution.

Resistance to Change in ICT Adoption

The study also found that resistance to change is one of the main obstacles to the implementation of ICTs in military education environments such as NACOED. Some administrative staff still show distrust and discomfort in using new technology, preferring manual methods that they have been using for a long time even though they are less efficient. This resistive attitude slows down the ICT adoption process and hinders the increase in efficiency that can be obtained from such technologies.

Table 2: Impact of Resistance on Changes in ICT Efficiency

Resistance Factor	Description	Impact on the Use of ICT
Distrust of New Technologies	Staff are more comfortable with manual methods, less familiar with new technology	Slowdown in technology adoption, declining administrative efficiency
Lack of awareness of the benefits of ICT	Staff do not fully understand the benefits of using ICT in administration	The use of ICT is not optimal, service quality decreases
Lack of Management Support	Management does not provide enough impetus for technology adoption	Higher resistance, slow adoption process

Based on Table 2, the impact of resistance to changes in the use of ICT in NACOED is evident in several aspects. First, staff's distrust of new technology due to their convenience with long-used manual methods resulted in a slowdown in the technology adoption process. This has a direct impact on decreasing administrative efficiency, because technology that should be able to speed up and make work easier is not used optimally. Second, the lack of staff awareness of the benefits of using ICT in administration leads to the use of technology that is not optimal. As a result, the quality of services provided to students and other parties becomes less than optimal, reducing the potential for improvement in institutional performance. Lastly, the lack of support from management in encouraging technology adoption exacerbates this situation.

When management does not provide enough encouragement or support, resistance to change becomes stronger, so the process of technology adoption takes place more slowly and hinders the increase in efficiency that should be achieved through the use of ICT.

> *"There is a distrust of new technology among some staff, especially those who are already familiar with manual systems. They feel more comfortable the old way even though it takes more time." (Interview, Respondent E, 2023).*

> *"Some staff are still not convinced that this technology will really help their work, so they are reluctant to use it." (Interview, Respondent F, 2023).*

This interview shows that resistance to change among staff at NACOED is a significant barrier to the adoption of new technologies. Distrust of new technologies, especially among staff who are already accustomed to manual systems, creates psychological and operational barriers that hinder the modernization process. Staff are more comfortable with the old method, although it is more time-consuming and less efficient. In addition, doubts among staff regarding the effectiveness of the new technology reinforce this resistance. The uncertainty of whether the technology will actually help their work leads to a reluctance to use it, which ultimately slows down the adoption process of the technology and hinders the potential for increased efficiency that can be achieved through the use of ICT. This emphasizes the need for stronger management interventions to address these resistances and encourage more effective adoption of the technology in institutions.

Implications of ICT Accessibility on Institutional Performance

ICT accessibility in NACOED has a direct impact on institutional performance, especially in terms of data management, communication, and administrative process efficiency. Limitations in ICT accessibility cause administrative processes that should be carried out quickly and efficiently to become slow and inefficient. However, the study also shows that increased accessibility and use of ICT has great potential to improve overall institutional performance. With adequate infrastructure and training, NACOED can improve the quality of services provided to students and strengthen the reputation of the institution.
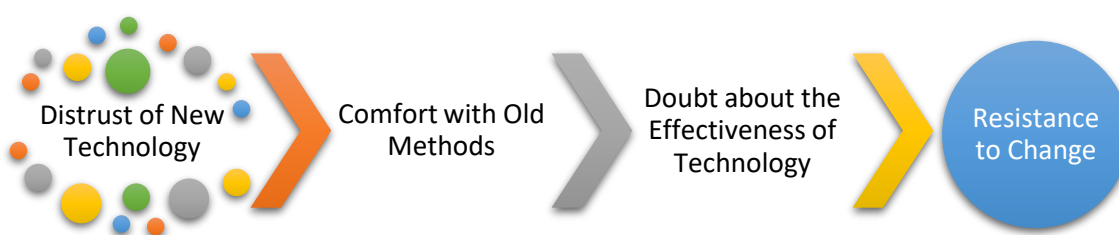

Figure 2: The Effect of ICT Accessibility on Administrative Performance in NACOED

This figure illustrates the improvement of administrative efficiency and the quality of institutional services before and after the improvement of ICT accessibility. The graph shows the correlation between improved ICT accessibility with reduced processing times and increased student and staff satisfaction.

The findings from this research on the impact of ICT infrastructure limitations, inadequate training, and resistance to change at the Nigerian Army College of Education (NACOED) reveal significant barriers to achieving administrative efficiency. When compared with previous studies, such as those conducted by Ahmad and Musah (2020), who emphasized the critical role of robust ICT infrastructure in enhancing organizational performance, it becomes evident that NACOED's current ICT capabilities fall short in supporting optimal administrative functions. Similarly, research by Thompson and Nganga (2021) underscores the importance of continuous professional development in ICT skills for educational staff, aligning with our findings that inadequate training at NACOED leads to inefficiencies and errors.

Moreover, the resistance to adopting new technologies, as observed in NACOED, mirrors the conclusions of Kim and Park (2022), who found that organizational change resistance significantly hampers the successful implementation of technological innovations in educational settings. These comparative insights indicate that while NACOED's challenges are not unique, they are part of a broader pattern observed in educational institutions where underinvestment in ICT infrastructure and insufficient training, coupled with cultural resistance to change, obstruct the potential benefits of ICT in improving administrative efficiency. Addressing these issues through targeted interventions is crucial for realizing the full potential of ICT in enhancing institutional performance and service delivery at NACOED.

The contribution of this research in the field of education management lies in the disclosure and in-depth analysis of the impact of limited Information and Communication Technology (ICT) infrastructure, lack of training, and resistance to changes to administrative efficiency in educational institutions. This research provides valuable insights into how these factors can hinder efforts to improve institutional performance, particularly in military education settings such as the Nigerian Army College of Education (NACOED). The findings of this study also highlight the importance of sustainable investment in ICT infrastructure and staff training as key elements to drive the efficiency and effectiveness of education management.

In addition, the study highlights the need for a stronger change management approach to address internal resistance to new technologies, which are often a barrier in the process of institutional modernization. Thus, this research makes a significant contribution to the development of more effective education management strategies, especially in the context of technology adoption and change management in educational institutions. The results of this study can be used by policymakers and education management practitioners to design more targeted interventions in an effort to improve the quality of services and the overall performance of educational institutions.

CONCLUSION

This study reveals that the limitations of Information and Communication Technology (ICT) infrastructure, lack of training, and resistance to change at the Nigerian Army College of Education (NACOED) have a significant impact on administrative efficiency. These findings provide new insights into the importance of sustainable investment in ICT infrastructure and staff capacity building in the context of education, especially in unique environments such as military institutions. A key lesson that can be learned from this study is that without adequate infrastructure support, efforts to improve administrative performance with technology will encounter many obstacles.

These findings reinforce the existing understanding of the vital role of ICTs in education management and highlight the need to address often overlooked barriers in the process of modernizing educational institutions.

This study makes a significant contribution to the education management literature by enriching the perspective on how infrastructure and change management factors can affect the effectiveness of technology adoption in educational institutions. Through an in-depth analysis of the NACOED case, this study offers a new perspective on the specific challenges faced by military educational institutions in integrating ICT into their daily operations. The strength of this research lies in its well-rounded approach, which not only identifies problems, but also offers practical insights to address them. However, this study has limitations, especially in its scope being limited to one institution and not taking into account demographic variations such as gender and age. Therefore, further research is needed to test these findings in a broader and more diverse context. Further research can also explore how demographic differences affect the perception and adoption of technology, as well as how more inclusive training methods can be implemented to improve efficiency in various educational institutions. Thus, this study paves the way for further studies that can contribute to the development of more effective and adaptive education policies in the future.

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