USE OF DIGITAL TOOLS IN ENHANCING THE CAPABILITIES OF DOCTORAL SUPERVISORS IN RESEARCH SUPERVISION IN PUBLIC UNIVERSITIES IN ENUGU STATE

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ABSTRACT: The study assessed the use of digital tools in enhancing the capabilities of doctoral supervisors in research supervision in public universities in Enugu State. This study was guided by two research questions and two hypotheses. The study adopted a descriptive survey research design. The population for the study was 294 academic staff which comprised 176 male and 118 female academic staff. There was no sampling procedure because the population was manageable. The instrument for data collection was a 10-item researcher-structured questionnaire titled "Use of Digital Tools by Doctoral Supervisors for Research Supervision Questionnaire (UDTDSRSQ)". The instrument was validated by three research experts, two in Department of Educational Management and one in Measurement and Evaluation unit of Department of Mathematics and Computer Education, all from Faculty of Education, Enugu State University of Science and Technology (ESUT), Enugu. To ascertain the internal consistency of the instrument, Cronbach Alpha statistic was used which yielded 0.83 and 0.81 for clusters 1 and 2 with an overall reliability index of 0.80 which indicates that the instrument was reliable. The research questions were answered using mean and standard deviation while the hypotheses were tested with t-test statistic at 0.05 level of significance. The findings of the study indicated that most academic staff do not use the identified digital tools in research supervision in public universities in Enugu State notwithstanding its numerous benefits. In view of the findings, the researcher recommended that Universities should organize regular workshops and training sessions to enhance academic staff's digital literacy and competence in using digital tools for research supervision.
Keywords: Digital tools, Doctoral Supervisors, Research, Supervision, Public Universities

Introduction

Education involves the transfer of valuable knowledge, skills, values, and beliefs to individuals, whether young or adult, who are eager to learn. It is regarded as a guiding light that eliminates ignorance, equipping individuals with the essential competencies needed to navigate the challenges of contemporary society and contribute meaningfully to its development (Ikechukwu, 2016). Quality education is a key component of the United Nations' 2030 sustainable development agenda, aiming to ensure equitable and inclusive access to high-standard education for all. Digital technologies are essential in achieving this

goal, as they have become deeply integrated into daily life, influencing how people live, work, and learn. Büyükbaykal (2015) stated that in higher education, technology significantly enhances learning experiences, streamlines administrative tasks, and supports research and collaboration through online learning platforms.Online learning platforms and advanced research tools have transformed traditional education, making it more accessible, engaging, and efficient. The effectiveness of digital tools depends on technological advancements, as they are built on hardware and software systems that have evolved to become more sophisticated, powerful, and widely available (Biletska, Paladieva, Avchinnikova & Kazak, 2021). Kigwilu and Nyonje (2024) stated that the adoption of online digital technologies in higher education teaching and learning has accelerated in the post-COVID-19 period. Many higher education institutions have implemented capacity-building programs to enhance the effective use of these technologies for instructional purposes through digital tools. Meanwhile, digital tools encompass software applications, programs, and technologies designed to assist users in accomplishing tasks, achieving objectives, and enhancing productivity within the digital space. According to Biletska et al. (2021) and Ukeh Nwankwo (2023), these tools harness the capabilities of computers, the internet, and electronic devices to optimize workflows, automate processes, and introduce innovative functionalities. Their primary role is to support communication, collaboration, and information management, enabling individuals and organizations to create, modify, store, and share data, documents, and multimedia content (Mikre, 2011). Digital tools span multiple categories, including productivity software such as word processors, spreadsheets, and presentation tools, as well as project management systems, collaboration platforms, data analysis applications, graphic design software, and video editing tools. These tools provide several advantages, such as improved efficiency, greater accuracy, enhanced creativity, and expanded opportunities for innovation. They facilitate task automation, enable large-scale data access and analysis, and support remote communication and collaboration through advanced features (Büyükbaykal, 2015). Additionally, digital tools have significantly impacted various fields, including education, healthcare, business, entertainment, and research, revolutionizing learning methods, business operations, service accessibility, and daily tasks (Biletska et al., 2021). Furthermore, they have accelerated digitalization, digital transformation, and the evolution of new digital business models. Okechukwu and Ukeh (2022) stated that with these advancements, digital tools have also created new possibilities for improving the supervision process, particularly in research supervision. Research supervision refers to the process of providing guidance, support, and mentorship to researchers during their academic or scientific pursuits. The primary objective of research supervision is to facilitate the successful completion of research projects and the development of independent researchers. In research supervision, a supervisor or mentor works closely with the research student or team, providing expertise, advice, and constructive feedback throughout the various stages of the research process (Büyükbaykal, 2015). The supervisor helps in defining the research topic, formulating research questions or hypotheses, designing methodologies, conducting data collection and analysis, and interpreting the results. Doctoral supervisors play a crucial role in guiding and supporting doctoral candidates throughout their research journey. They are experienced academics who provide mentorship, expertise, and oversight during the process of completing

a doctoral degree. Supervisors oversee the progress of the doctoral research, ensuring that the project stays on track and meets academic standards (Camilleri & Camilleri, 2017). They provide feedback on research proposals, literature reviews, and methodologies, offering suggestions for improvement. Supervisors encourage collaboration by facilitating connections with other researchers, scholars, and institutions in the field. They may help students present their work at conferences, publish research papers, or engage in collaborative projects. Traditional supervision methods often rely on face-to-face interactions and physical resources. Digital tools currently being used by doctoral supervisors in research supervision within public universities include a range of technologies and platforms designed to facilitate communication, collaboration, organization, and research management. These tools aim to enhance the efficiency and effectiveness of the supervision process. In recent years, the utilization of digital tools has become increasingly prevalent in various fields, including academia (Kovács, Murray, Rozinaj, Sulema & Rybárová, 2015). Doctoral supervision, being a critical aspect of research training, can greatly benefit from the integration of digital tools. Digital tools such as online communication platforms, collaborative software, and data analysis tools can provide supervisors with improved means of supporting their students' research progress. Digital tools have brought significant advancements to various fields, including research supervision. The integration of technology in the research supervision process has numerous benefits, enhancing the efficiency, effectiveness, and overall quality of the process. According to Mikre (2011), digital tools enable seamless and instant communication between supervisors and research students. Email, messaging apps, and video conferencing platforms facilitate timely and convenient discussions, eliminating the need for face-to-face meetings. This allows supervisors to provide quick feedback, answer queries, and offer guidance, irrespective of geographical distances. Digital tools enable research supervisors and students to collaborate effectively, even if they are not physically present in the same location. According to Ukeh et al. (2020), virtual collaboration tools, such as cloud-based document sharing platforms, project management software, and version control systems, facilitate real-time collaboration, allowing supervisors to review, comment, and track progress on research work remotely. It is important to note that while these benefits are widely perceived, the effectiveness and impact of digital tools in the research supervision process can vary based on individual preferences, technological infrastructure, and specific research requirements. Therefore, it is based on the above the discourse that the present study assessed the use of digital tools in enhancing the capabilities of doctoral supervisors in research supervision in public universities in Enugu State.

Statement of the Problem

Doctoral supervision is essential for the successful completion of research projects in public universities, as supervisors provide crucial guidance, support, and expertise to doctoral candidates throughout their academic journey. However, traditional supervision methods often fail to take full advantage of digital tools and technologies, limiting the overall efficiency of the supervisory process and restricting timely communication between supervisors and doctoral candidates. This lack of digital integration can result in delays in feedback, reduced accessibility to essential research resources, and a less collaborative academic environment. The primary issue is the insufficient integration of digital tools in research supervision

within public universities. Despite rapid technological advancements, many supervisors continue to rely on conventional methods such as face-to-face meetings, emails, and paper-based documentation. This study aims to examine the effectiveness of digital tools in enhancing the supervisory capabilities of doctoral supervisors in public universities in Enugu State. By exploring the impact of these tools, the study seeks to determine how digital solutions improve the research supervision process, enhance communication, and streamline academic mentoring.

Purpose of the Study

The general purpose of the study ascertained the use of digital tools in enhancing the capabilities of doctoral supervisors in research supervision in public universities in Enugu State. Specifically, the study sought to:

1. identify the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State;
2. Examine the perceived benefits of incorporating digital tools into the research supervision process.

Research Questions

The following research questions guided the study:

1. What are the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State?
2. What are the perceived benefits of incorporating digital tools into the research supervision process?

Hypotheses

The following null hypotheses guided this study and were tested at .05 level of significance:

H_{O1}: There is no significant difference between the mean ratings of male and female academic staff on the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State.

H_{O2}: There is no significant difference between the mean ratings of male and female academic staff on the perceived benefits of incorporating digital tools into the research supervision process.

Research Method

The study adopted a descriptive survey research design. Nworgu (2015) defined descriptive survey research design as one which aims at collecting data and describing in a systematic manner the characteristic features or facts about a given population. The population for the study was 294 academic staff which comprised 176 male and 118 female academic staff. There was no sampling procedure because the population was manageable. The instrument for data collection was a 10-item researcher-structured questionnaire titled “Use of Digital Tools by Doctoral Supervisors for Research Supervision Questionnaire (UDTDSRSQ)”. The instrument was validated by three research experts. To ascertain the internal consistency of the instrument, Cronbach Alpha statistic was used which yielded 0.83 and 0.81 for clusters 1 and 2 with an overall reliability index of 0.80 which indicates that the instrument was reliable. The researcher used mean scores, cluster mean and standard deviation in answering the five research questions. In rating the mean, each response option had a numerical value based on real limit of numbers: SA = 3.50-4.00; A = 2.50-3.49; D = 1.50-2.49; SD = 0.00-1.49. T-test statistic was used to test the null hypotheses at 0.05 level of significant. The interpretation of the test of hypotheses was based on

the significance (sig.) values from the SPSS output. The null hypothesis was not rejected when the probability values are less or equal to 0.05, but was rejected when the probability values are greater than 0.05.

Results and Data Presentation

Research Question 1: What are the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State?

Table 1: Mean ratings of male and female academic staff on the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State

	ITEMS	Male Academic Staff - 176			Female Academic Staff - 118		
S/N	**The following digital tools are currently being used by doctoral supervisors in research supervision:**	**$\bar{x}$**	**SD**	**Dec.**	**$\bar{x}$**	**SD**	**Dec.**
1.	E-learning tools like canvass and moodle.	2.01	.91	D	2.02	.85	D
2.	Task management apps (e.g., Todoist, Wunderlist) for tracking tasks	2.07	.86	D	2.00	.86	D
3.	Communication tools like Microsoft teams.	1.78	.89	D	1.84	.90	D
4.	Reference management software.	2.11	.95	D	2.05	.89	D
5.	Communication and collaboration tools.	2.08	.91	D	2.11	.90	D
	Cluster Mean/SD	**2.01**	**.90**	**D**	**2.00**	**.88**	**D**

The findings in Table 1 reveal that both male and female academic staff perceive the utilization of digital tools in doctoral supervision within public universities in Enugu State as generally low. The mean ratings for e-learning tools like Canvas and Moodle were 2.01 (SD = 0.91) for male academic staff and 2.02 (SD = 0.85) for female academic staff, both indicating disuse (D). Similarly, task management apps such as Todoist and Wunderlist had mean ratings of 2.07 (SD = 0.86) for males and 2.00 (SD = 0.86) for females, also reflecting disuse. The overall cluster mean of 2.01 (SD = 0.90) for male staff and 2.00 (SD = 0.88) for female staff suggests that doctoral supervisors in these institutions largely do not incorporate digital tools in their supervision practices.

Research Question 2: What are the perceived benefits of incorporating digital tools into the research supervision process?

Table 2: Mean ratings of male and female academic staff on the perceived benefits of incorporating digital tools into the research supervision process

	ITEMS	Male Academic Staff – 176			Female Academic Staff - 118		
S/N	**The following are the benefits of incorporating digital tools into the research supervision process:**	**$\bar{x}$**	**SD**	**Dec.**	**$\bar{x}$**	**SD**	**Dec.**
6.	It enables remote supervision, allowing	2.61	.89		2.58	.86	

	supervisors to work with students who may be in different locations or time zones.			A			A
7.	It provides effective means for tracking research progress and milestones.	2.58	.96	A	2.60	.89	A
8.	It offers sophisticated solutions for managing and analysing research data.	2.55	.90	A	2.53	.90	A
9.	It ensures greater accessibility and inclusivity in the research supervision process.	2.60	.88	A	2.59	.95	A
10.	It enhances feedback and evaluation.	2.56	.90	A	2.61	.91	A
	Cluster Mean/SD	**2.58**	**.91**	**A**	**2.58**	**.90**	**A**

Table 2 indicates that both male and female academic staff acknowledge the benefits of incorporating digital tools into the research supervision process, as shown by the overall cluster mean of 2.58 (SD = 0.91) for males and 2.58 (SD = 0.90) for females, both indicating agreement (A). The highest-rated benefit among male staff was enabling remote supervision, with a mean of 2.61 (SD = 0.89), while female staff rated enhanced feedback and evaluation the highest, with a mean of 2.61 (SD = 0.91). Tracking research progress and milestones was also widely acknowledged, with mean ratings of 2.58 (SD = 0.96) for males and 2.60 (SD = 0.89) for females. These results suggest that academic staff recognize digital tools as valuable in improving accessibility, supervision efficiency, and research management.

Hypotheses

Ho_1: There is no significant difference between the mean ratings of male and female academic staff on the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State.

Table 3: Summary of t-test analysis of the mean ratings of male and female academic staff on the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State

Group		n	$\bar{x}$	SD	df	P-value	Decision
Male Staff	**Academic**	176	2.01	.90			Do not reject Ho_1
					292	.010	
Female Staff	**Academic**	118	2.00	.88			

Table 3 presents the t-test analysis comparing the mean ratings of male and female academic staff on the digital tools currently being used by doctoral supervisors in research supervision within public universities in Enugu State. The results show that the mean rating for male academic staff is 2.01 (SD = 0.90), while that of female academic staff is 2.00 (SD = 0.88), with a degrees of freedom (df) of 292. The obtained p-value is 0.010, which is less than the conventional 0.05 significance level, leading to the decision to not reject the null hypothesis (Ho1). This indicates that there is no statistically significant difference between the perceptions of male and female academic staff regarding the digital tools currently used in research supervision.

Ho_2: There is no significant difference between the mean ratings of male and female academic staff on the perceived benefits of incorporating digital tools into the research supervision process.

Table 4: Summary of t-test analysis of the mean ratings of male and female academic staff on the perceived benefits incorporating digital tools into the research supervision process

Group		n	$\bar{x}$	SD	df	P-value	Decision
Male Staff	**Academic**	176	2.58	.91	292	.00	Do not reject Ho_2
Female Staff	**Academic**	118	2.58	.90			

Table 4 presents the t-test analysis comparing the mean ratings of male and female academic staff on the perceived benefits of incorporating digital tools into the research supervision process. The results show that both male and female academic staff have an identical mean rating of 2.58, with standard deviations of 0.91 and 0.90, respectively, and a degrees of freedom (df) of 292. The obtained p-value is 0.00, which is below the conventional 0.05 significance level, leading to the decision to not reject the null hypothesis (Ho2). This indicates that there is no statistically significant difference between the perceptions of male and female academic staff regarding the benefits of digital tools in research supervision.

Discussion of Findings

The findings of the study revealed that the majority of academic staff do not integrate digital tools into research supervision within public universities in Enugu State. The low mean ratings across various digital tools, such as e-learning platforms, task management apps, and communication software, indicate that traditional supervision methods are still predominantly used. This suggests a gap in the adoption of technology-driven supervision strategies, which could potentially enhance efficiency, accessibility, and collaboration in the research process. The finding aligns with the study by Büyükbaykal (2015), which demonstrated that most academic staff do not incorporate digital tools into the research supervision process. Büyükbaykal's research highlighted that supervisors primarily rely on conventional methods such as face-to-face meetings, emails, and printed documents, limiting the potential benefits of digital technologies. This similarity in findings suggests a persistent reluctance or lack of awareness among academic staff regarding the effective use of digital tools to enhance research supervision. The findings of the study revealed that incorporating digital tools into the research supervision process offers numerous benefits within public universities in Enugu State. These benefits include improved remote supervision, better tracking of research progress, enhanced feedback and evaluation, and greater accessibility for both supervisors and students. The positive mean ratings from academic staff indicate a strong recognition of the potential of digital tools to enhance efficiency, streamline communication, and support more effective research supervision. The finding aligns with Mikre (2011), who asserted that the use of digital tools in the research supervision process provides numerous significant benefits. Mikre's study highlighted that digital tools enhance collaboration, facilitate efficient communication, and improve the overall research experience for both supervisors and students. This consistency in findings reinforces the idea that integrating technology into research supervision can lead to better academic outcomes and a more streamlined supervisory process.

Conclusion

The study revealed that most academic staff in public universities in Enugu State do not utilize the identified digital tools in research supervision, despite their numerous benefits. This limited adoption may hinder efficiency, collaboration, and the overall quality of research supervision. Addressing barriers such as inadequate training, lack of institutional support, and resistance to technology is crucial for improving digital tool utilization. Universities should implement targeted training programs and provide necessary resources to encourage adoption. Enhancing digital literacy among academic staff will ultimately improve research supervision and contribute to better educational outcomes.

Recommendations

In line with the findings, the following recommendations were proffered:

1. Universities should organize regular workshops and training sessions to enhance academic staff's digital literacy and competence in using digital tools for research supervision.
2. Public universities should invest in reliable internet access, digital platforms, and necessary software to facilitate the seamless integration of digital tools in research supervision.
3. Institutions should develop and enforce policies that mandate the adoption of digital tools in research supervision while providing incentives and technical support to encourage lecturers' participation.

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