

Use of Informatics Technologies by Nurses in a Nigerian Teaching Hospital: A Focus on UTAUT Model

Diodemise Ese Ovwasa

Department of Library and Information science,
Faculty of Social Sciences,
Delta State University, Abraka, Nigeria.

ABSTRACT

Technology permeates every aspect of our day-to-day activities, and healthcare personnel, mostly nurses, are not left out. The use of technology enables nurses to carry out their duties diligently as well as enable quick access to relevant information about their patients' health conditions. However, reports have it that, nurses are not interested in using technologies such as nursing informatics technologies (NITs) due to inadequate knowledge. This study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) model. A survey research design was used to assess the adoption and use of NITs among nurses at the Delta State University Teaching Hospital (DELSUTH), Nigeria. The population of the study comprises of 265 Delta State University Teaching Hospital registered nurses. These includes: professional nurses, enrolled nurses and assistant nurses. A sample size of 159 participants was determined using the Taro Yamane formula. Data were collected from participants via self-administered questionnaire. Chi-square and regression analysis were used to analyse the data obtained. The findings reveal that PE and EE are the most rated factors that influenced nurses to use NITs. To increase the use of NITs, it is recommended that teaching hospitals adopt a model that measures nurses' perceptions of NIT use to identify their reasons for acceptance or rejection, and undergo adequate training and retraining for nurses. The study contributes to the development of social informatics and further validates the UTAUT theory.

ARTICLE INFO

Article History

Received: January, 2024

Received in revised form: March, 2024

Accepted: March, 2024

Published online: June, 2024

KEYWORDS

Acceptance, use, nursing informatics,
nurses, teaching hospital

INTRODUCTION

The use of technology is increasingly becoming an integral part of health care delivery system, and has been declared as a means whereby sustained improvement in healthcare outcomes may be attained (Kelly et al., 2020). Healthcare information technology (HIT) is useful for decision-support system and evidence-based medicine (EBM) (Kelly et al., 2020). Informatics is the combination of information science, computer science and discipline-specific science for storing and repositioning of statistics (Ovwasa, 2024) and (Chiang, 2021). Ovwasa (2019) and Chipps et al. (2022) described nursing informatics (NI) as a field

that is related to nursing science and information and communication technology (ICT). It is used in the management, processing and communication of health and nursing data. Extant literature reveals that NI is not just about ICT, but also involves core features which can be derived from data, information, knowledge, and how best nursing science can structure documentation system to ensure that the output meets the needs of patient care (Booth et al., 2021; Harerimana et al., 2021; McGonigle & Mastrian, 2024).

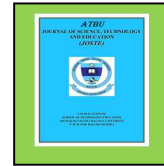
The importance of NI in effective healthcare was reinstated by Gates et al. (2021), who opine that nurses' adoption and use of NI

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewwas.owwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



prevents medication error rates and associated harm to inpatients. It provides, enhances relevance and accurate information access for accurate decision making. It also speeds up delivery and at the same time leads to improved EBM. Nursing informatics assist nurses in contributing to effective job performance in patient records through various support tools such as computers, blood pressure machines, electronic health records (EHRs) and host of others (Gates et al., 2021). A systematic review and meta-analysis of the attitudes of nurses towards clinical informatics by Ferdousi et al. (2020) indicate that NI impact on several aspects of nursing practice, such as documentation, patient safety, quality of treatment, communication, treatment management, nursing tasks and hospital resource management.

Nurses are increasingly confronted with array of complex information that they need to synthesise and incorporate into patient care decision. Access to NI tools will make it easier for nurses to perform these tasks (Booth et al., 2021). Therefore, the basic objective of NI is to improve effective healthcare of the populations, communities, family and individuals through optimization of information management and communication. This is being done through the use of ICT in treatment of patients and administrative purposes in support of lifelong healthcare and nursing research (Booth et al., 2021).

The federal government of the United States of America (USA) stressed the importance of ICT in 2009, when President Barack Obama approved the American Recovery and Reinvestment Act (ARRA) into law, in which the government invested \$48.8 billion in HIT (Melendez, 2018). The essence of this was to improve the quality of healthcare while lowering its costs. The World Health Organisation (WHO) argues that a well-established healthcare system must make use of NI for the most effective healthcare delivery (Saigi-Rubió et al., 2022). This is due to the fact that NI resources in healthcare delivery are more reliable in giving health information needs to nurses in making decision over distance and time. It cannot be overstated

that the adoption of NI in healthcare can create opportunity for EBM and support clinical decision which can contribute greatly to patients' overall quality of life (Owolabi et al., 2017).

The most important components of patient care are communication, clinical decision making, and patient safety (Vaismoradi et al., 2020). Robinson-Bassey and Edet (2015) argue that effective nursing services delivery in this 21st century involve the combination of nursing science, computer science and information science in relation to the diagnosis and treatment of patients. The authors further highlighted various competencies that a professional nurse must possess which include computer competencies, the capacity to access, use and evaluate appropriate NI and information management skills. They also stated that, NI should be included in nursing science curriculum for nursing students. This will provide opportunities that will encourage collaborative learning and effective interactions among nursing science students globally. Hence, nurses must be competent in these areas in order to provide safe and effective patient care.

Since the 1980s, individual behaviour and behavioural intention (BI) to use information technology have become increasingly researched in the field of information systems, and a series of information technology acceptance models have been formed (Pan & Gao, 2021). Mantello et al. (2023) note that the acceptance of new technology is greatly influenced by behavioural factors, determining an individual's attitude towards the emerging technology. User acceptance is a personal attitude which affects an individual's choice to perform or not to perform a specific behaviour. It has been defined as "demonstrable willingness within a user group to employ information technology for the tasks it is designed to support" (Evans & Le Roux, 2015). A wide range of theoretical frameworks have been used to determine factors that influence the adoption of new technology among various healthcare professionals. These theories have been adopted in various studies on the acceptance and use of technologies in different contexts and environments (Al-Rawashdeh et al., 2024).

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewwasas.owwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved

This study employed the use of the unified theory of acceptance and use of technology (UTAUT) to identify the adoption and use of nursing informatics technologies (NITs) among nurses in Nigeria. The UTAUT is a technology acceptance model formulated by Venkatesh and colleagues in 2003, with the intention to bring cohesion and synthesise the technology acceptance theory. It would give a better result on research that relate to adoption and use of technology. Another justification for using the UTAUT in this study is based on the fact that the theory has very high explanatory power of about 70% for the adoption and use of technology behaviour.

The UTAUT condensed all 32 variables found in eight previous models into four primary constructs - performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) (Figure 1). These constructs are

significant determinants of two dependent variables - behavioural intention (BI) and user behaviour (UB), both of which are commonly used for user acceptance of ICT (Venkatesh et al., 2003). Performance expectancy is about the perceived benefits a user believes will be gained from using the technology in his or her job, either to improve productivity or the quality of services. Effort expectancy is “the degree of ease associated with the use of a system”; SI can be described as the extent to which an individual places importance on others’ belief that he or she should use (or not use) a new technology; while FC is an individual’s belief regarding the existence of adequate technical infrastructure as well as management policies and other internal support mechanisms that will encourage the use of the technology (Barchielli et al., 2021).

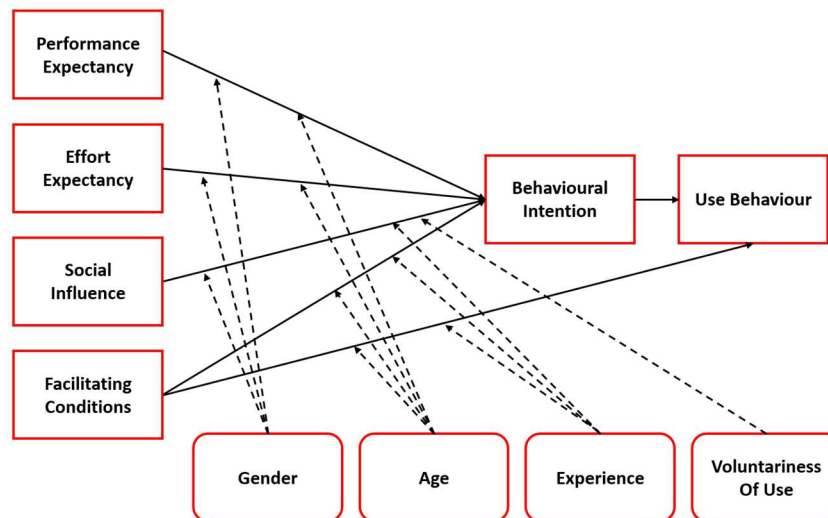


Figure 1: The unified theory of acceptance and use of technology (UTAUT) (Source: Innovation Acceptance Laboratory)

The training of nurses and midwives in Nigeria dates back to the 1930s, mostly in some mission and government hospitals (Auta, 2019). The training activities were at the time regulated by the Nursing and Midwives Board of Nigeria, which was instituted by the 1930 Ordinance. By 1946, when the Nursing and Midwifery Council of Nigeria (NMCN) was established, formal nursing

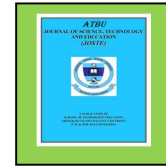
training started. Taking the National Policy on Education into consideration, nursing education aimed at training nurses to function independently and interdependently, as an integral part of the nation’s health sector (Auta, 2019). In response to its mandate, the NMCN has been developing and implementing policies, programmes and activities to promote and maintain high standards in nursing

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewaras.owasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



education and practice. The council also ensures that the curriculum is periodically revised to keep up with current trends in healthcare practice.

The need to improve the technological state of hospitals led to the introduction of NI in Nigeria in the 1990s. The programme started in 1988 as a partnership project between the Computing Centre of the University of Kupio, Finland and Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun State, Southwest Nigeria. In 1990, the project upgraded the rudimentary information system to standardised useable facilities. This opportunity further transformed into the Made-in-Nigeria healthcare around 2004. This initiative was later used to manage the EHRs of patients (Adekunle, 2016). In addition, an open software source was established by the Health Information System programme at the district levels. Since then, there has been the establishment of different software, which are still being used in Nigeria's health sector for the accessibility and easy transportation of patients' data from one hospital to another (Oluwakemi, 2020; Banke-Thomas et al., 2021).

Robinson-Bassej and Edet (2015) reported that the National Universities Commission (NUC) have instructed all universities in Nigeria offering nursing programmes to provide sufficient number of computer systems to students, and to include computer and technology-related courses in the undergraduate nursing programmes. Furthermore, relating to NI education as a technology-dependent programme, Abayomi et al. (2022) emphasised that to embed NI in nursing programmes, it is critical to integrate it into the curriculum. Friday, Owasa and Nwosu (2024) recently noted that adoption of social media in teaching library and information science (LIS) and other courses in public universities in Nigeria is very necessary. However, literature has shown that in Nigeria, the nursing curriculum is still grossly lacking in informatics contents, and that very few universities have NI courses integrated into their curriculum (Abayomi et al., 2022; Ojo et al., 2023). Given the significant role that NI plays in effective healthcare delivery, it is very important to examine the use of the technology by nurses. It is in line with this that

this study seeks to investigate the adoption and use of NI among nurses in a selected teaching hospital in Nigeria.

Study Problem and Rationale

Nursing informatics usage in hospitals has provided great opportunities for improvement of patients' safety, and the adoption of NI is very necessary for nurses to enjoy the benefits of the resources. Darvish et al (2014) reported that there is poor adoption of NI among nurses in many Sub-Saharan African countries including Nigeria. Cho et al. (2021), and Jimma and Enyew (2022) reaffirmed that there is often user resistance to NITs in hospitals, which results in a failure to acquire their full benefits. It should be noted that the successful implementation of NI critically depends on user acceptance. This indicates that the failure of users to use technology in any organization will surely constitute a very big hindrance to the successful adoption of technology system in the organization.

Owolabi (2016) noted that the USA and other developed countries in the world spend a lot of funds on deployment of informatics in their healthcare. The authors indicate that failure of health workers to accept and use NI is placing heavy burden on hospital managements and patients in term of promoting EBM. Based on the foregoing, this study seeks to provide answer to the following research question.

- Which of the four UTAUT constructs influence BI of nurses to accept and use NI in the selected teaching hospital in Nigeria?

RESEARCH METHODOLOGY

This study adopted the survey method which anchor on the positivist research approach, to recruit 159 nurses from a selected teaching hospital in Nigeria. The Delta State University Teaching Hospital (DELSUTH), South-south Nigeria, was selected as it is affiliated to the institution of the researcher. A standardized electronic platform questionnaire based on the UTAUT model, was designed on smartphones and was self-administered. The sample size for the study was drawn from the total population of

Corresponding Author: Diodemise Ese Owasa

✉ ese.ewwas.owasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



nurses at DELSUTH (265). The sample size was determined using the Yamane (1967) sample size calculator formula as described below.

$$n = \frac{N}{1 + N(e)^2}$$

Where; n is the sample size; N is the population size; e is the level of precision (0.05). Substituting the population of the nurses in the formula to calculate the appropriate sample size gave;

$$n = \frac{265}{1 + 265(0.05)^2}$$

n = 159

Study Instrument Administration

Twenty-four questionnaire items were adapted from the UTAUT model which is in line with the independent and dependent variables used for the study. The questionnaire items were designed to measure the factors that influence BI to adopt and use NITs among nurses. However, the words were modified in line with technology under investigation and changes were also made

to the user acceptance scale on a four-point Likert scale in which 4 = strongly agree, 3 = agree, 2 = disagree, and 1 = strongly disagree.

The 159 questionnaires were administered to nurses during their early morning briefing and evening handing-over in order to cater for those on shift duties. The sampling frame used for the study, which is the list of nurses in the hospital, was collected from the head of nursing services. Informed consent was sought, and respondents were assured of confidentiality.

Study Instrument Reliability

A pre-test of the questionnaire was conducted to validate the research instrument as related to construction of the questionnaire, and to remove the questions that look ambiguous. Two experts in the LIS Department critically perused and corrected the questionnaire. Cronbach's alpha was calculated to determine the reliability of the questionnaire. The results indicated that the reliability coefficient was greater than 0.6 which extant literature accepts for research that are related to technology acceptance (Table 1).

Table 1: Reliability of the Study Instrument

Constructs of UTAUT	Number of items	Cronbach's alpha
Performance expectancy	6	7.03
Social influence	6	8.03
Effort expectancy	6	7.12
Facilitating condition	6	7.06

Data Analysis

Chi-square, which measures the goodness of fit, was used to determine the model fitting information, coefficient of determination (Pseudo R²), and parameter estimates of the UTAUT constructs. The results are presented as tables.

RESULTS

Out of 159 questionnaires distributed, 94 were returned which represent 60% response rate.

Relationship between Performance Expectancy and Behavioural Intention to Use Nursing Informatics at the Delta State University Teaching Hospital, Nigeria

The model fitting information, Pseudo R², and parameter estimate results of the relationship between PE and usage at DELSUTH are given in Tables 2, 3, and 4, respectively.



Table 2: Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	37.908			
Final	27.806	19.005	3	0.025

Df: Degree of freedom; Sig.: Significance

Table 3: Pseudo R-Square

Cox and Snell	0.102
Nagelkerke	0.215
McFadden	0.05

Table 4: Parameter Estimates

		Estimate	Standard Error	Wald	Df	Sig.
Threshold	[PEst = 1.00]	0.528	1.759	10.009	1	0.004
	[PEst = 2.00]	0.052	2.590	7.055	1	0.009
	[PEst = 3.00]	0.155	0.978	8.117	1	0.008
	[PEst = 4.00]	0.256	0.636	6.660	1	0.015
Location	[B25=1.00]	5.256	1.709	9.144	1	0.002
	[B25=2.00]	-0.304	0.643	7.335	1	0.021
	[B25=3.00]	-0.307	0.459	5.220	1	0.012
	[B25=4.00]	0a	.	.	0	.

a This parameter is set to zero because it is redundant; Df: Degree of freedom; Sig.: Significance; PEst: Parameter estimate

The result revealed that the Pseudo R2 was 0.215, which indicated that 21.5% variation in PE was explained/predicted by the use of NITs. The chi-square, which measured the goodness of fit of the model, was $\chi^2=19.005$, and was statistically significant at 0.025. The result indicated that PE significantly contributed to the BI of nurses to use NITs ($p= 0.025 < 0.05$). Respondents reported that NI would help them perform better in their jobs.

Relationship between Effort Expectancy and Behavioural Intention to Use Nursing Informatics at the Delta State University Teaching Hospital, Nigeria

The model fitting information and Pseudo R2 results of the relationship between EE and BI at DELSUTH are given in Tables 5 and 6, respectively.

Table 5: Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	37.908			
Final	27.806	10.102	3	0.018

Df: Degree of freedom; Sig.: Significance

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewwasas@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



Table 6: Pseudo R-Square

Cox and Snell	0.102
Nagelkerke	0.115
McFadden	0.05

The result revealed that there was 11.5% variation in the EE explained/predicted by the use of NITs. The chi-square was $\chi^2=10.10$, and it had the significance of 0.018. This is significant at the 5% level of significance, given the fact that $p= 0.018 < 0.05$. Finally, the result indicated that EE contributed to the use of NITs ($p= 0.001 < 0.05$).

Relationship between Social Influence and Behavioural Intention to Use Nursing Informatics at the Delta State University Teaching Hospital, Nigeria

The model fitting information, Pseudo R2 and parameter estimate results of this relationship are given in Tables 7, 8 and 9, respectively, as shown below.

Table 7: Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	45.321			
Final	40.981	13.623	3	0.001

Df: Degree of freedom; Sig.: Significance

Table 8: Pseudo R-Square

Cox and Snell	0.111
Nagelkerke	0.259
McFadden	0.052

Table 9: Parameter Estimates

		Estimate	Std. Error	Wald	Df	Sig.
Threshold	[PE = 1.00]	0.565	1.111	10.009	1	0.001
	[PE = 2.00]	0.448	0.254	7.425	1	0.005
	[PE = 3.00]	0.254	0.548	6.245	1	0.005
	[PE = 4.00]	0.895	0.554	7.002	1	0.018
Location	[B25=1.00]	0.554	0.907	5.025	1	0.022
	[B25=2.00]	-0.304	0.452	5.330	1	0.001
	[B25=3.00]	-0.307	0.568	6.254	1	0.047
	[B25=4.00]	0a	.	.	0	.

This parameter is set to zero because it is redundant.

The result revealed that the Pseudo R2 was 0.259, which indicated that 26% variation in SI was explained/predicted by the use of NITs. χ^2 was 13.623, and it had the significance of 0.001. This is significant at the 5% level of significance

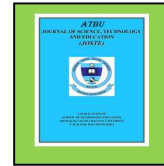
given the fact that $p= 0.001 < 0.05$. Finally, the result indicated that SI significantly influenced the BI of nurses to use NITs.

Corresponding Author: Diodemise Ese Ovwasa

ese.ewaras.ovwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



Relationship between Facilitating Conditions and Behavioural Intention to Use Nursing Informatics at the Delta State University Teaching Hospital, Nigeria

The model fitting information, Pseudo R2 and parameter estimate results of the relationship between FC and BI of nurses to use NITs are given in Tables 10, 11, and 12, respectively.

Table 10: Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	33.385			
Final	26.29	7.095	3	0.029

Table 11: Pseudo R-Square

Cox and Snell	0.073
Nagelkerke	0.083
McFadden	0.036

Table 12: Parameter Estimates

		Estimate	Standard Error	Wald	Df	Sig.
Threshold	[FC = 2.00]	-3.041	0.511	35.446	1	0
	[FC = 3.00]	0.275	0.269	1.046	1	0.306
	[FC = 4.00]	2.619	0.454	33.345	1	0
Location	[B25=1.00]	-3.107	1.477	4.422	1	0.035
	[B25=2.00]	-1.075	0.695	2.393	1	0.122
	[B25=3.00]	0.127	0.452	0.079	1	0.779
	[B25=4.00]	0a	.	.	0	.

This parameter is set to zero because it is redundant; Df: Degree of freedom; Sig.: Significance; FC: Facilitating conditions

The result revealed that the Pseudo R2 was 0.083, which indicated that 8.3% variation in the FC was explained/predicted by the use of NITs. $X^2=7.095$ measured the goodness of fit of the model, and it had the significance of 0.029. This implies that FC contributed to BI of nurses to use NITs ($p=0.029 < 0.05$).

DISCUSSION OF THE FINDINGS

Teaching hospitals, which are tertiary healthcare facilities, in both developed and developing countries around the world continue to invest in HITs. Unfortunately, it has been discovered that user acceptance of these

technologies is a major hindrance to their use, especially in developing countries (Lulin et al., 2020). This study investigated the adoption and use of NITs among nurses in DELSUTH, Nigeria. The study revealed that PE and EE are two UTAUT constructs that greatly influence BI of nurses to accept and use NITs in the teaching hospital. This indicates that nurses that assume using NI tools will be easy and will require a lot of effort will embrace the use of the technology. These findings support that of Cucciniello et al. (2015) which revealed that PE and EE have significant and positive influence on BI toward acceptance and use of ICT. These findings also

Corresponding Author: Diodemise Ese Ovwasa

ese.ewwaras.ovwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



corroborate that reported by Owolabi (2016), Owolabi et al. (2017), Owolabi et al. (2018), and Owolabi (2024), who studied the acceptance and use of clinical informatics tools among medical doctors in selected teaching hospitals in Nigeria and South Africa.

Performance expectancy and EE were identified as the factors from the UTAUT model that influenced the medical doctors' BI to use HIT. Lack of facilities, infrastructure and policy were identified as the main obstacles to its gainful development and access. The authors argue that E. E is a very important factor in measuring clinical informatics acceptance among healthcare professionals.

In contrast, Lulin et al. (2020) reported that PE and EE are not key factors contributing to nurses' acceptance and adoption of NITs in Ghanaian hospitals. Esmailzadeh et al. (2015) used UTAUT to find out the BI of nurses toward the use of NI among nurses in Malaysia. The result revealed that self-efficiency and social network were the factors that influence the use of the technologies. Also, the study of Kim et al. (2016) among nurses in a teaching hospital in Taiwan revealed that attitude is one of the constructs influencing BI of nurses to use NI. Likewise, Dwivedi et al.'s (2019) study on factors that influence nurses' BI to use hospital technology, revealed that FC is the main factor that influence BI to use the resources. Ho et al. (2020) reported that nurses' perceptions of ease of use, and perceived usefulness of the NITs had significantly positive effects on their BI intention to use them.

CONCLUSION AND RECOMMENDATIONS

The acceptance and use of NI among nurses depends on their readiness to accept the use of the technology. It means there must be positive relationship between their BI to use and usage behaviour to NI tools. Both PE and EE are the two constructs that influence BI to use NI. To increase the use of NITs, it is recommended that teaching hospitals adopt a model that measures nurses' perceptions of NIT use to identify their reasons for acceptance or rejection. Hospital managements should also make funds available so that the nurses will have access to various NI

tools due to their great benefits to effective healthcare delivery. In addition, training and re-training for nurses on how to use user-friendly NI tools effectively is expedient.

REFERENCES

- Abayomi, O. K., Nduka, N. C., Bosede, A. T., Odunola, A. I., & David, O. B. (2022). Adoption and use of nursing informatics among nurses in Nigeria. *Library Herald*, 60(3), 25-38.
- Adekunle, Y. (2016). Evolving usage and access to ICTs in the Nigerian health care sector: Challenges and prospects. (PhD thesis University of Westminister). <https://doi.org/10.34737/9z7wq>
- Al-Rawashdeh, M., Keikhosrokiani, P., Belaton, B., Alawida, M., & Zwiri, A. (2024). Effective factors for the adoption of IoT applications in nursing care: A theoretical framework for smart healthcare. *Journal of Building Engineering*, 89, 109012. <https://doi.org/10.1016/j.job.2024.109012>
- Auta, T. T. (2019). Development of nursing education and practice in Nigeria. *Health Notions*, 3(3), 149-159.
- Banke-Thomas, A., Wong, K. L., Collins, L., Olaniran, A., Balogun, M., Wright, O., & Benova, L. (2021). An assessment of geographical access and factors influencing travel time to emergency obstetric care in the urban state of Lagos, Nigeria. *Health Policy and Planning*, 36(9), 1384-1396.
- Barchielli, C., Marullo, C., Bonciani, M., & Vainieri, M. (2021). Nurses and the acceptance of innovations in technology-intensive contexts: The need for tailored management strategies. *BMC Health Services Research*, 21, 1-11.
- Booth, R., Strudwick, G., McMurray, J., Chan, R., Cotton, K., & Cooke, S. (2021). The future of nursing informatics in a digitally-enabled world. *Introduction to Nursing Informatics*, 395-417.

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewwasas.owwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



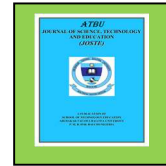
- Chiang, M. F. (2021). *Biomedical informatics: Computer applications in health care and biomedicine*. (Eds: Shortliffe, E. H., & Cimin, J. J.). Springer Nature, Berlin, Germany.
- Chipps, J., Le Roux, L., Agabus, J., & Bimerew, M. (2022). Nursing informatics skills relevance and competence for final year nursing students. *Curationis*, 45(1), 2277-2278.
- Cho, Y., Kim, M., & Choi, M. (2021). Factors associated with nurses' user resistance to change of electronic health record systems. *BMC Medical Informatics and Decision Making*, 21, 1-12.
- Cucciniello, M., Lapley, I., Nasi, G., & Paglari, C. (2015). Understanding key factors affecting electronic medical records implementation: A socio technical approach. *BMC Health Service Research*, 15(268), 1-14.
- Darvish, A., Bahramnezhad, F., Kevhanian, S., & Navidhamidi, M. (2014). The role of nursing informatics on promoting quality of health care and the need for appropriate education. *Global Journal of Health Science*, 6(6), 11-18.
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M.D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 21, 719-734.
- Esmaelizadeh, P., Sambasivan, M., Kumar, N., & Nezakati, H. (2015). Adoption of clinical decision support systems in a developing country: Antecedents and outcomes of physician's threat to perceived professional autonomy. *International Journal of Medical Informatics*, 84(8), 548-560.
- Evans, N. D., & Le Roux, J. (2015). Modelling the acceptance and use of electronic learning at the University of Zululand. *South African Journal of Libraries and Information Science*, 81(2), 26-38.
- Ferdousi, R., Arab-Zozani, M., Tahamtan, I., Rezaei-Hachesu, P., & Dehghani, M. (2021). Attitudes of nurses towards clinical information systems: a systematic review and meta-analysis. *International Nursing Review*, 68(1), 59-66.
- Friday, J. E., Ovwasa, D. E., & Nwosu, G. I. (2024). Adoption of social media in teaching library and information science in public universities in South-south Nigeria. *Journal of Applied Information Science*, 12(1).
- Gates, P. J., Hardie, R. A., Raban, M. Z., Li, L., & Westbrook, J. I. (2021). How effective are electronic medication systems in reducing medication error rates and associated harm among hospital inpatients? A systematic review and meta-analysis. *Journal of the American Medical Informatics Association*, 28(1), 167-176.
- Harerimana, A., Wicking, K., Biedermann, N., & Yates, K. (2021). Integrating nursing informatics into undergraduate nursing education in Africa: A scoping review. *International Nursing Review*, 68(3), 420-433.
- Ho, K. F., Chang, P. C., Kurniasari, M. D., Susanty, S., & Chung, M. H. (2020). Determining factors affecting nurses' acceptance of a care plan system using a modified technology acceptance model 3: structural equation model with cross-sectional data. *JMIR Medical Informatics*, 8(5), e15686. <https://doi.org/10.2196/15686>
- Jimma, B. L., & Enyew, D. B. (2022). Barriers to the acceptance of electronic medical records from the perspective of physicians and nurses: A scoping review. *Informatics in Medicine Unlocked*, 31, 100991.
- Kelly, J. T., Campbell, K. L., Gong, E., & Scuffham, P. (2020). The Internet of Things: Impact and implications for health care delivery. *Journal of Medical*

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewwasas.owwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



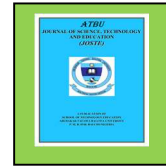
- Internet Research*, 22(11), e20135.
<https://doi.org/10.2196/20135>
- Kim, S., Lee, K.H., Hwang, H., & Yoo, S. (2016). Analysis of the factors influencing healthcare professionals' adoption of mobile electronic medical record (EMR) using the unified theory of acceptance and use of technology (UTAUT) in a tertiary hospital. *BMC Medical Informatics Decision Making*, 16, 12-22.
- Lulin, Z., Owusu-Marfo, J., Antwi, H. A., & Xu, X. (2020). The contributing factors to nurses' behavioral intention to use hospital information technologies in Ghana. *SAGE Open Nursing*, 6, 2377960820922024.
<https://doi.org/10.1177/2377960820922024>
- Mantello, P., Ho, M. T., Nguyen, M. H., & Vuong, Q. H. (2023). Machines that feel: Behavioral determinants of attitude towards affect recognition technology-upgrading technology acceptance theory with the mind sponge model. *Humanities and Social Sciences Communications*, 10(1), 1-16.
- McGonigle, D., & Mastrian, K. (2024). *Nursing informatics and the foundation of knowledge*. Jones & Bartlett Learning, Massachusetts, USA.
- Meléndez, E. (2018). The economics of PROMESA. *Centro Journal*, 30(3), 72-103.
- Ojo, I. O., Titilope, K. A., Odinaka, A. B., & Timothy, O. O. (2023). Nigerian nursing students' readiness to use electronic health records in clinical practice. *International Journal of Nursing Student Scholarship*, 10.
- Oluwakemi, O. Y. (2020). *Health Information Systems and Healthcare Service Delivery in Public Health Facilities in Southwest, Nigeria* (Doctoral dissertation, Ritsumeikan Asia Pacific University).
- Owasa, D. E. (2019). An appraisal of nursing informatics research and the influence of the unified theory of acceptance and use of technology. In *Proceedings of 20th Annual IS Conference* (Vol. 18, p. 322).
- Owasa, D. E. (2024). Nursing Informatics in Health Care. A Global View. In *Information, Knowledge, and Technology for Teaching and Research in Africa: Human Machine Interaction and User Interfaces* (pp. 97-130). Cham: Springer Nature Switzerland.
- Owolabi, K. A. (2016). Access and use of clinical informatics among medical doctors in selected teaching hospitals in Nigeria and South Africa. (PhD thesis, University of Zululand, South Africa).
- Owolabi, K. A., Evans, N. D., & Ocholla, D. N. (2017). Factors that influence medical doctors' behavioural intention to use clinical informatics. *Journal of Library and Information Science*, 36 (1), 130-154.
- Owolabi, K., Evans, N., & Ocholla, D. (2018). Use of clinical informatics tools among medical doctors in selected teaching hospitals in Nigeria and South Africa. *Journal of Appropriate Librarianship and Information Work in Southern Africa*, 57, 4-25.
- Owolabi, K. A. (2024). Clinical informatics adoption, use and challenges among doctors in teaching hospitals. In *Information, Knowledge, and Technology for Teaching and Research in Africa* (pp. 73-95). Springer, Cham.
- Pan, M., & Gao, W. (2021). Determinants of the behavioral intention to use a mobile nursing application by nurses in China. *BMC Health Services Research*, 21, 1-11.
- Robinson-Bassey, G. C., & Edet, O. B. (2015). Nursing informatics education and use: Challenges and prospects in Nigeria. *Global Journal of Pure and Applied Sciences*, 21(2), 171-179.
- Saigi-Rubió, F., Borges do Nascimento, I. J., Robles, N., Ivanovska, K., Katz, C., Azzopardi-Muscat, N., & Novillo Ortiz,

Corresponding Author: Diodemise Ese Owasa

✉ ese.ewwasaras@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved



- D. (2022). The current status of telemedicine technology use across the World Health Organization European region: an overview of systematic reviews. *Journal of Medical Internet Research*, 24(10), e40877. <https://doi.org/10.2196/40877>
- Vaismoradi, M., Tella, S., A. Logan, P., Khakurel, J., & Vizcaya-Moreno, F. (2020). Nurses' adherence to patient safety principles: A systematic review. *International Journal of Environmental Research and Public Health*, 17(6), 2028-2038.
- Venkatesh, V., Morris, G., Michael, G., Davis, G., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27, 425-478
- Yamane, T. (1967). *Statistics: An Introductory Analysis*. 2nd Edition, Harper and Row, New York, USA.

Corresponding Author: Diodemise Ese Ovwasa

✉ ese.ewwasar.owwasa@gmail.com

Department of Library and Information Science, Faculty of Social Sciences, Delta State University, Abraka.

© 2024. Faculty of Technology Education. ATBU Bauchi. All rights reserved