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RESEARCH ARTICLE

Digital Competence as Predictor for the Motivation to Use Artificial Intelligence Technologies among Librarians in Edo and Delta States, Nigeria

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Abstract

Motivation to use artificial intelligence (AI) technologies are those factors that influenced users' drive to actually use AI technologies. There are various AI technologies that librarians can adopt to improve their service functions. However, studies have shown that the use of AI among librarians is low. It is in the light of this that this study therefore investigated the motivation to use AI technologies among librarians in Edo and Delta States. Descriptive survey research design was adopted. The population consist of 125 librarians selected from 18 Universities in Edo and Delta States, Nigeria. Total enumeration technique was adopted because of the manageable size of the population. A validated questionnaire was used to collect data from the respondents. Data collected was analysed using both inferential and descriptive statistics. Finding revealed that digital competence (Adj. $R^2 = 0.195$, $p = 0.000^b$) has significant but weak influence on motivation to use AI technologies among librarians. The study concluded that digital competence influenced motivation to use AI technologies. The study recommended that there should be more awareness of AI among librarians. At the same time, librarians should improve their digital skill through regular training programs so that they can effectively use AI tools.

Keywords: Digital Competence, Artificial Intelligence Technologies, Perceived usefulness, Perceived ease of use.

Introduction

Motivation to use new technological innovation is a key factor to consider when examining the use and implementation of new technological systems especially within the library space. In this regard, researchers have made attempts to identify various factors that influence users' perceptions, motivations and behaviour towards technological innovations particularly digital technologies like Artificial Intelligence (AI) technologies (Tunmibi and Okuonghae, 2023). These efforts have resulted in developments of theories, models and frameworks which have outlined different popular motivational constructs such as perceived benefits, perceived usefulness, resources availability, and organizational objectives. Since the turn of the 21st century the library landscape has witnessed a significant improvement in the use and adoption of different varieties of technologies (Olayode, 2022). As a result, librarian have learned to integrate various technological innovation such as the internet, CD ROM, Online Public Access Catalogue System (OPAC), Library Management Systems (LMS) Cloud Computing (Okuonghae and Bakare, 2023), to provide seamless service functions to users.

However, the need for improved mechanization of human process, greater speed, social network and utilization of big data are some factors which have given rise to a more intelligence technology like AI (Farag, Mahfouz, and Alhajri, 2021). Motivation as a concept, is an essential element in determining individual's attitude and disposition toward AI systems. From individual perspective, scholars have tried to study the factors that motivates the use of technological innovation. Specifically, factors such perceived benefits, ease of use, and the level of support and training provided have been highlighted as factors that motivates users (Aregbesola, Idiegbeyan-ose., Botu and Emmanuel, 2019). However, for this study, the researchers from theoretical point of view have decided to use perceived ease of use and perceived usefulness as a motivating factor for the use of AI technologies among librarians.

Digital competence is becoming increasing important in our present world, as technology continues to shape every aspect of life, from work, to education, to socializing and entertainment (Rasskazova, Alexandrov, Burmistrov, Siniavina, and Cornelis, 2020). It is essential for individuals to develop digital competence to participate fully in society and to succeed in various range of professional fields. A major aspect of digital transformation is the development of artificial intelligence technologies to improve human and organization output. AI technologies are becoming increasingly important in the digital landscape, as they enable automation, analysis, and decision-making based on vast amounts of data. AI can help individuals and organizations make better decisions, automate routine tasks, and optimize processes (Echedom and Okuonghae, 2021). To use AI technologies effectively, individuals must possess a certain level of digital capability. In order words, they should be able to understand how to use AI tools, analyse and interpret the output of these tools and make informed decisions based on the data they generate. Thus, this study aims to investigate the influence digital competence on motivation to use artificial intelligence technologies among librarians in Edo and Delta States, Nigeria. This study also provides answers to the following two research questions: First, what is the level of motivation to use artificial intelligence technologies by librarians? Second, what is the level of digital competency among librarians?

In this paper, the authors tested the hypothesis stated below:

i. There is no significant influence of digital competency on the motivation to use artificial intelligence technologies among librarians in Edo and Delta States, Nigeria.

The rest of this paper is divided into four sections and is organized as follows: the literature review is presented in section 2; section 3 discusses the methodology; section 4 focuses on the Results and discussions; and section 5 presents the conclusion and recommendations.

Literature Review

The term motivation denotes the inner or outward influences that drive and propel individuals to take actions, set and achieve desired goals (Saed and Zyngier, 2012). It is the force that induce, directs, and sustains behaviour and is often influenced by various issues such as personal values, principles, needs, and external rewards or incentives (Tohidi and Jabbari, 2012). Etymologically, the term finds its root in the Latin word "movere" which means "to move" or "movement" (Mclnerney, 2019; Seven, 2020). Motivation is therefore that thing within or without man that cause him to make adjustment to thing around him. In fact, it is that force that causes activity within living organism. In everyday language, motivation is used to explain the reasons behind a person's action (Seven, 2020). Conceptually, motivation refers to the process that sets in motion, directs, and sustains goal-oriented behaviour in people. It serves as the driving force behind our actions (Hawthorn, 2017). The concept of involve a blend of psychological, biological, emotional, social and cognitive factors that triggers behaviour[7]. Motivation triggers certain behaviour in people based on their needs.

Motivation to use artificial intelligence technologies in this context refers to the drive or willingness of librarians to accept and use of AI technologies in their personal or professional duties. This motivation can stem from various factor such as recognizing the potential benefits of AI in improving efficiency, enhancing user experiences, and staying relevant in the digital. It can also be motivated by external factors such as library policy. However, popular theory on use and adoption of new technology averred that such drive may depend on the perception of the user Almaiah, Alhumaid, Aldhuhoori, Alnazzawi, Aburayya, Alfaisal, Salloum, Lutfi, Mulhem, Alkhdour, 2022). Consequently, if the user perceive that the technology is useful and that it is easy to use, it may serve as motivation to actually use that technology. In that case, if librarian perceive that AI is useful to them and there is less stress in learning and using it. They might likely be motivated to use AI technologies. The drive to use AI technologies can also be influenced by users' adoption. If users express a strong interest or demand for AI technologies, librarians may be motivated to adopt same. AI technologies is essential for modern library practice because of its unique quality in ensuring speed, efficiency and productivity (Echedom and Okuonghae, 2021).

Recent study on user acceptance and use of AI, has shown that acceptance was motivated by the behavioural intention. It was equally shown that extended Technology Acceptance Model (TAM) was commonly used model to explain user adoption of technological innovation. More importantly, the study revealed that perceived usefulness, perceived expectancy, effort expectancy, trust and attitude had positive influence on willingness to use, use, and behavioural intention across various industries (Kelly, Kaye, and Oviedo-trespalacios,2023). However, in the past, studies have relied on popular constructs such as perceived usefulness and perceived ease of use as factors that motivate users to use technological innovation (Purva, Kar, Janssen, and Ilavarasan, 2019; Imam, Megadini, and Kusriandini, 2019). Perceived usefulness is a crucial concept that explains how people perceive and assume the value of using a particular technology to enhance their performance.

Perceived usefulness refers to the subjective belief held by individuals about the extent to which a particular technology will improve their performance or perform their tasks. This belief stems from users' assessment of the technology's potential to offer tangible benefits and meet their specific needs. When a user perceives a technology to be useful, they tend to be more motivated to adopt and embrace it, leading to higher rates of technology usage and user satisfaction (Nguyen, 2022). The adoption of technological innovations is primarily driven by people's perception of the benefits they will gain from using the technology. If individuals believe that a technology will significantly enhance their productivity, efficiency, or overall well-being, they are more likely to embrace it (Toufaily, Zalan, and Dhaou, 2021).

In addition, perceived ease of use is also significant factor that influences user's propensity to adopt a new technology. It refers to the level of simplicity and effortlessness users associate with operating a given technology. It is that individual subjective assessment of how easy or difficult it is to use a product, system, application or system. A technology that is perceived to be easy to learn, understand, and use is more likely to be widely adopted. The ease of use can be assessed through various indicators, such as the frequency and quality of user interactions with the technology. It is based on user perception of the effort required to understand, learn, and operate the technological innovation. If users can quickly learn and efficiently operate the technology without encountering significant challenges, it indicates a high level of perceived ease of use. Feedback mechanism, usability testing, and user experience research play a crucial role in evaluating and enhancing the ease of use of technological innovations (Christos, Troussas, Krouska, and Sgouropoulou, 2021)

This study also, considers digital competence as a major predictor of motivation to use AI technologies. Digital competence is a crucial skillset required for all citizens, including librarians and information professionals, to thrive in the digital age. It enables individuals to effectively and responsibly navigate the digitalized information and knowledge society of today. The European Union recognized the significance of digital competence by identifying it as one of the eight important competencies for lifetime learning (European Commission, 2006).

Digital competence can be understood as the combination of several skill set, attitudes, and behaviours that empower individuals to positively and critically engage with digital technologies (Falloon, 2020). It encompasses the capacity to use, understand, and evaluate digital systems, devices, and information effectively. A digitally competent person should be capable of adapting to and leveraging various digital machineries to complete tasks, access information, communicate, and resolve problems in a digital environment. Digital competence has been described by the European Union digital competence framework (known as the DIGCOMP framework) consist of 21 competencies grouped under six constructs. The specific constructs included in this framework are: information and data literacy, communication and collaboration, digital content creation, safety, problem solving and digital citizenship. These constructs are often interrelated, and a comprehensive digital competence framework will address each of them in some way.

Methodology

The descriptive research survey methods were adopted for this study. The population for the study consists of all librarians in libraries of universities in Edo and Delta States, Nigeria. A total of one hundred and twenty-five (125) copies of questionnaire were administered. However, one hundred and seven (107) responses were received duly filled. The usable questionnaire represented 82% response rate. The instrument for data collection was a questionnaire and was adapted from various validated and tested studies. Data was analysed using SPSS software and the hypothesis was tested using linear regression analysis. The benchmark for data analysis is 3.0.

Results and Discussions

Demographic analysis showed that majority of the respondents 61, making (57%) were female. Majority of the age group were between “18-30” accounting for (40.2%). Majority of the staff were under the “Assistant Librarian” cadre with 45.8%. This was followed by "Librarian II," "Librarian I," and "Senior Librarian" 11.2%, 21. 5% and 9.3%. As for the education qualifications, "B.sc/BLIS" is the most dominant qualification among the librarians, with 62.6%. This BSc degree was followed by "MSc/MLIS" which is the second most common qualification with 27.1%.

Research Question One: What is the level of motivation to use artificial intelligence technologies by librarians in Edo and Delta States, Nigeria?

Table 1. Motivation to use Artificial Intelligence Technologies

Perceived Usefulness	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean
Using AI technologies would enable me to accomplish my task quickly	36 (33.6%)	61 (57.0%)	10 (9.3%)		3.69
Using AI technologies would make it easier to do my job	76 (71.0%)	30 (28.0%)	1 (.9%)		3.61
Using AI technologies is useful in my job	56 (52.3%)	50 (46.7%)	1	(.9%)	3.56

Using AI technologies improve my job performance	46 (43.0%)	52 (48.6%)	9 (8.4%)	3.51
Weighted Mean				**3.6**
Perceived Ease of Use				
I believe that interaction with AI technologies would be clear and understandable	66 (61.7%)	40 (37.4%)	1 (.9%)	3.42
It would be easy for me to become skilful at using AI technologies	47 (43.9%)	56 (52.3%)	4 (3.7%)	3.40
Learning to use AI technologies would be easy for me	47 (43.9%)	58 (54.2%)	2 (1.9%)	3.35
I believe navigation of AI technologies would be easy for me.	62 (57.9%)	43 (40.2%)	2 (1.9%)	3.24
Weighted Mean				3.4
Grand Mean				**3.5**

The Decision rule: 1.0.-1.49 = very low, 1.50-2.49 – low, 2.50 -3.49 = High, 3.50-4.00 = Very high.

Table 1: above revealed the motivation to use artificial intelligence technologies among librarians was measured by perceived usefulness and perceived ease of use. From the table, it was revealed a high level of perceived ease of use of artificial intelligence technologies by librarians surveyed. The high level of perceived ease of use is a pointer to positive motivation towards the use of Artificial Intelligence by the librarians. Overall, the "Grand Mean" for all items related to perceived usefulness and ease of use is 3.5, indicating a generally high motivation of AI technologies among respondents. The responses to the first research question showed that the motivation to use artificial intelligence by librarians is high. The motivation is decided by the perceived usefulness and perceived ease of use. The two constructs of perceived usefulness and perceived ease of use were found to be high. That means they are veritable and viable predictors of the motivation to use artificial intelligence among librarians. This finding is in line with previous study which show that both Perceived Usefulness (PU)and Perceive Ease of Use (PEOU) have significant contribution to AI technologies adoption (Sudaryanto, Hendrawan, and Andrian, 2023). In fact, this study further shows that respondents perceive AI technologies as able to improve their performance in the future. In the case of Perceive Ease of Use (PEOU), studies have equally shown that respondents who perceive that they could learn and operate AI technologies very well, will be motivated to adopt the technology. This was corroborated with other studies which indicated that there is positive relationship between the construct of Perceive Usefulness (PU) and Perceived Ease of Use (PEOU) and the use of technology (Damerji and Salimi, 2021; Joo, Park and Shin, 2017).

Research Question Two: What is the level of digital competence among librarians in Edo and Delta States, Nigeria?

Table 2: Level of Digital Competence of Librarians

Options Information and Data Literacy	Very High Extent	High Extent	Low Extent	Very Low Extent	Mean
I can locate and retrieve digital data, information and content	48 (44.9%)	54 (50.5%)	4 (3.7%)	1 (.9%)	3.39
I can articulate my information need	46 (43.0%)	56 (52.3%)	5 (4.7%)		3.38
I can store, manage, and organise digital data, information and content	47 (43.9%)	54 (50.5%)	5 (4.7%)	1 (.9%)	3.37
I can judge the relevance of the source and its content	40 (37.4%)	58 (54.2%)	8 (7.5%)	1 (.9%)	3.28
Weighted Mean					**3.4**
Communication and Collaboration					
I can manage my digital presence, identity and reputation	45 (42.1%)	57 (53.3%)	5 (4.7%)		3.37
I can share data, information and digital content with others through appropriate digital technologies	45 (42.1%)	55 (51.4%)	7 (6.5%)		3.36
I can participate in society through the use of public and private digital services	40 (37.4%)	61 (57.0%)	5 (4.7%)	1 (.9%)	3.31
I can communicate and collaborate through digital technologies while being aware of cultural and generational diversity	45 (42.1%)	51 (53.3%)	9 (4.7%)	2 (1.9%)	3.30
Weighted Mean					**3.3**
Digital Content Creation					

I know how to give understandable instructions for a computer system	36 (33.6%)	57 (53.3%)	13 (12.1%)	1 (.9%)	3.20
I can create and edit digital content in different formats, to express myself through digital means	40 (30.8%)	47 (43.9%)	19 (17.8%)	1 (.9%)	3.18
I understand how copyright and licences apply to data, information and digital content	33 (30.8%)	54 (50.5%)	19 (17.8%)	1 (.9%)	3.11
I can modify, refine, improve and integrate information content into an existing body of knowledge to create new, original and relevant content and knowledge	31 (29.0%)	55 (51.4%)	18 (16.8%)	3 (2.8%)	3.07
Weighted Mean					**3.14**
Problem Solving					
I can use digital technologies to create knowledge and to innovate process and product	35 (32.7%)	60 (56.1%)	11 (10.3%)	1 (.9%)	3.21
I can identify needs, evaluate, select and use digital tools and possible technological responses to solve them	32 (29.9%)	61 (57.0%)	12 (11.2%)	2 (1.9%)	3.15
I can support others with their digital competence development	29 (27.1%)	57 (53.3%)	20 (18.7%)	1 (.9%)	3.07
I can identify technical problems when operating devices and to solve	27 (25.2%)	57 (53.3%)	21 (19.6%)	2 (1.9%)	3.02
Weighted Mean					**3.1**
Safety and Security					
I am aware of the environmental impact of digital technologies and their use	39 (36.4%)	55 (51.4%)	12 (11.2%)	1 (.9%)	3.23
I can protect my devices and digital content in digital environment	38 (35.5%)	47 (43.9%)	22 (20.6%)		3.15

I can protect my personal data and privacy in digital environment	33 (30.8%)	58 (54.2%)	15 (14.0%)	1 (.9%)	3.15
I am able to protect myself and others from possible dangers in digital environment	36 (33.6%)	47 (43.9%)	23 (21.5%)	1 (.9%)	3.10
Weighted Mean					**3.16**
Grand Mean					**3.3**

The Decision rule: 1.0.-1.49 = very low, 1.50-2.49 – low, 2.50 -3.49 = High, 3.50-4.00 = Very high.

Table 2. provided survey responses related to information and data literacy, communication and collaboration, digital content creation, problem solving, safety and security in digital environment. The result from Table 4.4 revealed a high level of information and data literacy ($\bar{x}$ =3.40) among librarians in Edo and Delta States, Nigeria. The "Grand Mean" for all items is 3.3, indicating a generally high level of digital competence and confidence among respondents. Respondents feel confident in their ability to articulate information needs, locate digital data, judge source relevance, and manage digital content. They also exhibit competence in communication, collaboration, digital content creation, problem-solving, safety, and security in digital environments. The survey suggests that respondents possess a well-rounded set of digital literacy skills and are aware of digital responsibilities and ethical considerations.

$H_0$1: There will be no significant influence of digital competency on the motivation to use artificial intelligence technologies among librarians in Edo and Delta State, Nigeria.

Table 3a-c: Significant influence of digital competence on motivation to use artificial intelligence.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.450[a]	.202	.195	.35509

a. Predictors: (Constant), Digital Competence

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.355	1	3.355	26.610	.000[b]
	Residual	13.239	105	.126		
	Total	16.595	106			

a. Dependent Variable: Motivation to Use AI

b. Predictors: (Constant), Digital Competence

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.272	.235		9.654	.000
	Digital Competence	.373	.072	.450	5.158	.000
a. Dependent Variable: Motivation to Use AI						

Table 2.a-c presents the results of the simple regression analysis for the relationship between digital competence on motivation to use artificial intelligence among librarians in university libraries in Edo and Delta States Nigeria. From the results in Table 4.6a, digital competence has a significant but weak relationship on the motivation to use artificial intelligence among librarians in university libraries, Edo and Delta States Nigeria (R = 0. .450[a], p<0.05). The coefficient of determination (Adj. R^2) of 0.195 also shows that digital competence explains 19.5% of the motivation to use artificial intelligence among librarians in university libraries, Edo and Delta States, Nigeria while the remaining 79.5% discrepancy in the motivation to use artificial intelligence among librarians in university libraries in Edo and Delta States, Nigeria is explained by other variables which are not considered in this study.

Table 2.b presents the results of ANOVA (Overall Model Significance) of regression test which revealed that digital competence has significant relationship with motivation to use artificial intelligence among librarians in university libraries, Edo and Delta States, Nigeria. This can be explained by the F-value (26.610) and low p-value (0.000[b]) which is statistically significant at 95% confidence interval. Hence, the result posited that situation awareness has a strong significance influence on the motivation to use artificial intelligence among librarians in university libraries, Edo and Delta States, Nigeria. Furthermore, the results of regression coefficients in table 2.c revealed that at 95% confidence level, a unit change in digital competence will lead to 0.373 increases in the motivation to use artificial intelligence among librarians in university libraries, Edo and Delta States, Nigeria, given that all other factors are held constant. On the strength of this result (Adj. $R^2 = 0.195$, F (1,105) = 26.610, p = 0.000[b]), this study therefore rejects the null hypothesis one ($H_0$1) which states that there is no significant influence of digital competence on motivation to use artificial intelligence among librarians in university libraries, Edo and Delta States, Nigeria.

This finding negates previous study which state that having high level of digital competence does not necessarily translate to motivation to use artificial intelligence technologies. But only indicated that the respondents will be able use AI technologies well if they choose to do so (Sudaryanto, Hendrawan andAndrian, 2023)

Conclusion

There are several motivations for using artificial intelligence technologies by librarians. relative perceived usefulness and perceive ease of use are motivating factors which affect librarians' decision to use AI technologies. This study shows that motivation may be as a result of the perceived usefulness and perceived ease of use inherent in AI technologies. The two constructs of perceived usefulness and perceived ease of use were found to be high. That means they are veritable and viable predictors of the motivation to use artificial intelligence among librarians. In addition, being digitally literate is another factor that may influence the decision to use AI technologies among librarian. In the light of the findings, the following are recommended:

i. Library administrators should promote the adoption of AI technologies among librarians. Since Librarians have positive perception toward the technologies. This would enhance their productivity.

ii. There should be regular workshops and training programs to help librarians acquire the necessary skills to interact with AI technologies. These skills will motivate them to use AI technologies.

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