Journal of Cybersecurity Education, Research and Practice

Volume 2024 | Number 1 Article 8

2023

A Developed Framework for Studying Cyberethical Behaviour in North Central Nigeria

Aderinola Ololade Dunmade
University of Ilorin, Nigeria, derin_d@unilorin.edu.ng

Adeyinka Tella
University of Ilorin, Nigeria, tella.a@unilorin.edu.ng

Uloma Doris Onuoha
Adeleke University, Ede, Nigeria, ud_onu@yahoo.com

Recommended Citation

Dunmade, Aderinola Ololade; Tella, Adeyinka; and Onuoha, Uloma Doris (2023) "A Developed Framework for Studying Cyberethical Behaviour in North Central Nigeria," *Journal of Cybersecurity Education, Research and Practice*: Vol. 2024: No. 1, Article 8.
DOI: https://doi.org/10.32727/8.2023.27
Available at: https://digitalcommons.kennesaw.edu/jcerp/vol2024/iss1/8

A Developed Framework for Studying Cyberethical Behaviour in North Central Nigeria

Abstract

ICT advancements have enabled more online activities, resulting in several cyberethical behaviours. Literature documents prevalence of plagiarism, and online fraud, among other misbehaviours. While behaviour has been explained by several theories, as scholarship and research advances, frameworks are modified to include more constructs. The researchers modified Fishbein and Ajzen (2011)'s Reasoned Action Approach to study female postgraduate students' perspectives toward cyberethical behaviour in North Central Nigerian universities.

The study focused on four variables, which were adequately captured by the model: perception, awareness, and attitude.

An adapted questionnaire collected quantitative data. This study used multistage sampling. A sample size of 989 north central Nigerian female university postgraduate students were selected from a population of 9,000. The majority of respondents reported not using copyrighted materials without permission (X = 3.48, N = 834, SD = 0.68) and using student emails for academic purposes (X = 3.36, N = 834, SD = 0.673). Perception and attitude toward cyberethical behaviour were positively correlated (r =0.17; P < 0.05). Perception, awareness, and attitude toward cyberethical behaviour correlated (R2 =0.22). Perception and awareness significantly affected cyberethical behaviour (R2 = 0.09). We recommend that university administrators implement intentional cyberethics policies and curricula to promote ethical internet use.

Keywords

Attitude, Awareness, Cyberethical Behaviour, Cyberethics, Gender, modified Reasoned Action Approach model, Reasoned Action Approach, Perception

A Developed Framework for Studying Cyberethical Behaviour in North Central Nigeria

Aderinola Ololade Dunmade
Centre for Open and Distance Learning
University of Ilorin
Ilorin, Nigeria
derin_d@unilorin.edu.ng

Adeyinka Tella
Department of Library & Information Science
University of Ilorin
Ilorin, Nigeria
tella.a@unilorin.edu.ng

Uloma Doris Onuoha
University Library
Adeleke University
Ede, Nigeria
onuoha.uloma@adelekeuniversity.edu.ng

***Abstract*—ICT advancements have enabled more online activities, resulting in several cyberethical behaviours. The literature documents the prevalence of plagiarism and online fraud, among others. While behaviour has been explained by several theories, as scholarship and research advance, frameworks are modified to include more constructs. This paper proposes a developed framework for studying cyberethical behaviour in North Central Nigeria, with a focus on exploring the factors that influence individuals' attitudes, awareness, and perception of cyberethics. The framework is based on a modified reasoned action approach model and incorporates key constructs such as attitude, subjective norm, perceived behavioral control, and awareness of cyber ethics. An adapted questionnaire was used as an instrument for collecting quantitative data. This study used multistage sampling. A sample size of 989 north-central Nigerian female university postgraduate students was selected from a population of 9,000. Perception and attitude toward cyberethical behaviour were positively correlated. Perception, awareness, and attitude toward cyberethical behaviour correlated. Perception and awareness significantly affected cyberethical behaviour. The study aims to provide insights into the factors that shape individuals' decision-making processes regarding cyberethics and to identify potential areas for intervention and education. The paper also discusses the importance of promoting cyberethics in Nigeria, given the increasing use of technology and the growing threat of cybercrime. The proposed framework offers a valuable tool for researchers and policymakers seeking to understand and address cyberethical behaviour in North Central Nigeria.**

Keywords— Attitude, Awareness, Cyberethical Behaviour, Cyberethics, Gender, modified Reasoned Action Approach model, Reasoned Action Approach, Perception

I. Introduction

As a result of advances in technology and the proliferation of the internet, the globe has been transformed into something resembling a global village . This has made it possible for people who have never met before in different regions of the world to communicate with one another and exchange ideas. While this is of immense benefit to postgraduate students because several academic activities can now be carried out online: the literature suggests that students are engaging in unethical cyberbehaviours such as plagiarism, copyright and software theft, phishing, and hacking. While this is of immense benefit to postgraduate students, it is important to note that most academic activities can now be carried out online. Other types of inappropriate online behaviour include cyberbullying, spamming, internet libel, identity theft, child pornography, cybersex, cyber-squatting, domain-squatting, cyber-espionage, copyright infringement, financial theft, cyberstalking, and revenge pornography, amongst others. Even though there are certain postgraduate students who participate in unethical cyberbehaviour, this could be due to ignorance or purposeful animosity on their part [1].

This apparent propensity of female postgraduate students to engage in unethical cyber practices and commit cyberethical misbehaviours has been attributed to several factors. These factors include a lack of awareness of ethical guidelines regarding the appropriate use of cyberspace; a tendency among users to focus solely on the benefits of legal and illegal use of cyberspace; and increased dependence on cyberspace, among others. The belief that there is a gap between personal and institutional rights, the apparent ethical blandness or neutrality of cyberspace, and notions such as the perceived lack of victims, situational and personal factors, and anonymity are all additional factors that can be attributed to unethical engagement in cyberspace. Even though instances of unethical behaviour in cyberspace are very widespread, there is not a lot of research done in this area in Africa, according to the literature that is currently available. Similarly, the framework that has existed did not factor in several new constructs that have arisen. However, as a result of the ongoing development of scholarship and research, there is an increasing desire to make modifications to the currently accepted framework to incorporate a greater number of social psychology constructs. A revised version of the Reasoned Action model of Fishbein and Ajzen [2] was proposed to research perception, levels of awareness, and attitudes about cyberethical behaviour held by female postgraduate students in universities located in North Central Nigeria.

A. Objectives

The following objectives are to guide the study:

1. identify the relationship between perception and attitude towards cyber ethical behaviour among female postgraduate students in universities in North Central Nigeria;

2. identify the relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria;

3. determine the relationship between perception, awareness, and attitude towards cyberethical behaviour among

female postgraduate students in universities in North Central Nigeria and;

4. find out the relative contribution of perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

II. Literature Review

A. Ethics

Ethics is based on the upbringing and value system of free moral actors. It regulates human behaviour. It determines if a person acts rightly in a certain situation. These choices can be defined as the implicit ethos in an individual based on their sense of right or wrong, arrived at as a result of both internal and external factors that control their thought processes and actions, which is called ethics: a trait inherent in every human being as an innate desire to exhibit a set of behaviours when faced with a particular situation from a pre-determined available and socially acceptable list of choices [1]. Ethics, the inner struggle for good to triumph over evil, or the conflict between right and wrong, has been explored by ancient philosophers such as Pliny, Aristotle, and Socrates, among others, and their arguments continue to this day [1]. Human societies have grappled with ethics since Plato and Aristotle wrote about social duty and the individual's position in society. Within 500 years, the Judeo-Christian influence in the West replaced this ethical paradigm. Both ethical theories provided the cornerstone of Western social growth over the centuries, but changing social realities required re-imagining what they signify for each century.

Similarly, ethical questions are relevant in this era of internet-generated information explosion. Researchers, scholars, and students can now access online materials via the Internet or digital media. The internet also makes teamwork and idea cross-fertilization simpler. Individuals in various regions of the world who may never have met physically pre-internet may now discuss, communicate, and exchange ideas in real-time via blogs, emails, chat platforms, bulletin boards, and social media engagement platforms. The downside of this is that in searching for collaboration and information, netizens are exposed to threats like hacking, obstructing others' computer use, and professional concerns. Email abuse, copying software, copyright issues, cyberstalking, cyberbullying, cyberloafing, hate speech, copyright and privacy breaches, identity theft, and plagiarism are others. Ethics becomes relevant as guidance against misbehaviour in all listed activities.

B. Cyberethics and Cyberethical Behaviour

The pervasiveness of technology has created several obstacles, despite its many benefits. Civil society cannot make rules fast enough to protect netizens (cyberspace users). Social responsibility involves respecting others' rights and property, but in a forum driven by mediated communication, the ease with which data can be accessed and manipulated often justifies ignoring certain social standards that people would not dare violate in face-to-face environments. Cyberethics is part of the societal responsibilities of the digital era. Cyberethics is the way many motives and thought processes come into play when an individual is in an online environment and can interact with known and unknown individuals due to advances in Information and Communications Technology (ICT) [3]; [4]. Cyberethics is the study of computer ethics, including user behaviour and how it affects individuals and society. Different governments have enacted cyberethics regulations for years. It is the moral and social framework on which individuals will base cybertechnology-related moral judgments. Cyberethics combines moral, legal, and social issues concerning cybertechnology. Cybertechnology includes stand-alone computers and networked computing+sg and communication equipment. "Smart" phones, iPods, (electronic) "tablets," and PCs (desktops and laptops) are among these technologies. Networked devices can connect directly to the Internet or through private computer networks.

The devices through which a netizen connects to the information superhighway are referred to as cybertechnology. While regulations exist in civil society to police appropriate behaviour, it is the responsibility of individual netizens to ensure that the realisation of their inner aspirations does not infringe on the rights of others [5]. Hence, the need to regularly check the behaviour of cyberspace users, irrespective of gender, so as to ensure that their motives and indeed actions, while online do not endanger the lives of others. This in itself is the core of cyberethics [6].

Literature document several types of cyberbehaviours. [7] documented improper, wrongful, and illegal use of online information, impersonation and identity theft, and the propagation of malware and viruses. [8] included fair and responsible ICT use, copyright concerns, online politeness and etiquette, and software violation issues as cyberethical issues. Social engineering attacks are the most important cybersecurity behavioural challenges including phishing, online impersonation (including automated helpdesk call lines), online document theft, and bogus software as cybersecurity threats. Other issues included DDoS attacks, malware and virus introduction, Zero-day, Brute force, and Man-in-the-middle attacks. Cybersecurity or behavioural challenges are gender-neutral. The dependent variable in this study is Cyberethics or cyberethical behaviour, measured with indicators such as hacking, digital plagiarism, information infringement, unauthorised access to other people's information, and phishing. Such behaviour violates cyberethics.

According to the research, numerous factors affect cyberethics. These factors include awareness, knowledge and understanding, motivation, emotion, human nature and relationship, individual ways of thinking and acting, community life, previous experience and perspectives of past and future, culturally accepted practises, the individual's social-economic situation, political inclinations, deep-seated religious beliefs, and socially accepted norms.

In measuring human behaviour, scientists have recognised three basic components: perception, awareness, and attitudes, which can either positive or negative. This study examines how these three characteristics affect cyberethical behaviour.

C. Conceptual Review of Variables

Perception

The Latin root term perceptionem or perceptio means understanding, comprehending, or taking note of. It means something is intrinsic, inborn, or intuitive. Perception is the processing of sensory signals to bring order and meaning to the world. Perception helps sort and organise complex and varied sensory input. Perception is non-conscious and fleeting, influenced by prior experiences. Perception includes three components: a perceiver, a target, and a situational environment. Each of these components affected the perceiver's impression or interpretation of the target depending on their experience, needs (motivational state), and feelings (emotional state) [9]. Our beliefs, background, upbringing, and preconceived notions influence our perspective, which may be truthful, erroneous, prejudiced, or otherwise. Cyberethics testing requires surface-level inquiries. Perception is an independent variable in this study that can be explained by socially accepted norms, understanding, experience, and socioeconomic factors.

Awareness

Awareness is the first-level of information about a phenomenon. It is initially inherently shallow. Awareness can be arrived at through various means, and this is especially so in an online environment. Strategies for creating awareness include the use of mass media enlightenment activities/programmes such as television, radio, and newspapers. Also, conventional pedagogical teaching methods such as parts of school/college coursework, seminars/ workshops/conferences, classes, lectures, orientation on awareness sessions, training programmes, and tutorials can be used. Individually acquired means such as reading books, visiting the library, and soliciting information from friends, parents, family, and other human sources are not left out. The added cyber component includes informational posts and advertisements on various social media platforms, blogs, bulletin boards, websites, and video platforms, among others. Awareness programmes are commonly set up by various bodies to inform the general populace about political, social, scientific, or cultural phenomena [1].

The main role played by awareness and literacy is to protect individuals from being unknowingly deceived, swayed, coerced, and manipulated. Awareness and acquiring knowledge provide input for building and changing attitudes [10]. Awareness and understanding help change attitudes. In this study, awareness indicates how well people understand cyberethics or cyberethical behaviour.

Attitude

Attitude is a set of emotions, beliefs, and behaviours toward a particular object, person, thing, or event. Attitudes are often the result of experience or upbringing, and they can have a powerful influence over behaviour. While attitudes are enduring, they can also change. [11] maintained that psychologists defined attitudes as a learned tendency to evaluate things in a certain way. This can include evaluations of individuals, issues, objects, or events. Such evaluations are often positive or negative, but they can also be uncertain at times. Attitudes are a mental or neural state of readiness, organised through experience, exerting a directive or dynamic influence on the individual's response to all objects and situations to which it is related. A simpler definition of attitude as a mind-set or a tendency to act in a particular way due to both an individual's experience and temperament [12]. Typically, when referring to a person's attitudes, the intention is to explain their behaviour. Attitudes are a complex combination of personality, beliefs, values, behaviours, and motivations. In this study, attitude is a characteristic that might impact cyberethical behaviour and can be described using positive or negative individual dispositions.

Gender and Cyberethical Behaviour

Attitude towards cyberethical behaviours is irrespective of gender. Ideological, historical, religious, ethnic, economic, and cultural influences from gender conceptions, translate into social, economic, and political inequality where men's actions and gender traits are viewed as superior to women [13]. Roudi-Society has been patriarchal or male-dominated, teaching females in different ways that they are designed for less scholarly tasks. This division of activities has been strengthened over time, with women only reaching their full educational and job progression potential in the last 50 years.

Colonisation perpetuated women's subordination, subjugation, and exploitation. Many national and international organisations promote women's and girls' education at all levels to reduce gender imbalance in education. They also advise boosting girl-child education in northern Nigeria. Patriarchal customs and prejudice have kept many girls out of educational, socioeconomic, and political activities, hindering national growth [14]. Child/early and forced marriages are widespread in Nigeria, hindering females' education. In a study on gender inequalities in tertiary admissions on female enrolment trends in Nigerian universities (1989-1997), the research showed a gender disparity in university enrolment generally, as well as in some disciplines and the country's geo-political zones [15].

This study targets postgraduate students because they are more mature and their reasoning is more reliable than that of undergraduates. Many undergraduates are still in their teens and formative years, thus their views on subjects may be weak. Anecdotal data suggests female students are more susceptible and disadvantaged in postsecondary education than males.

D. Theoretical Review of Reasoned Action Approach (Fishbein and Ajzen, 2011)

The Reasoned Action Approach (RAA), an extension of the Theory of Planned Behaviour (TPB) [16] was used as the theoretical framework for examining the extent to which perception and awareness have a relationship with female postgraduate students' attitude toward cyberethical behaviour in universities in North Central Nigeria. Fishbein and Ajzen [2] propounded the Reasoned Action Approach (RAA) as a behavioural theory and an integrated framework for examining prediction and changes in human behaviour. Following the earlier Theory of Reasoned Action proposed by Fishbein and Ajzen [17] and the Theory of Planned Behaviour proposed by Ajzen, RAA is the most recent version of Martin Fishbein and Icek Ajzen's theoretical theories [16]. According to the RAA, a people's intention is determined by their belief that engaging in the behaviour would be pleasurable (i.e. experiential attitude),

beneficial (i.e. instrumental attitude), that others would approve of them engaging in the behaviour (i.e. injunctive norm), that others engage in the behaviour (i.e. descriptive norm), and that they are confident that they could engage in the behaviour.

The Reasoned Action Approach [18] combines three frameworks: Theory of Reasoned Action, Theory of Planned Behaviour, and Integrative Behavioural Model. Ajzen [16] Theory of Planned Behaviour (TPB) is frequently used to analyse the nature of relationships between behaviours and attitudes. According to the theory, people's attitudes about certain behaviours, such as cyberethical behaviour, are shaped by their conviction that they will achieve a specific result. According to literature, the TPB is a very strong and predictive model for describing and predicting deliberate human behaviour. The Theory of Reasoned Action (TRA) attempts an explanation of the relationship between attitudes and behaviours within a range of human actions.

The primary purpose of the TRA is to understand an individual's voluntary behaviour by examining the underlying basic motivation to act. The RAA framework is of particular relevance in researching this area, because of the planned or reasoned aspect of cyberethical behaviour. It is important to note that individuals normally have reasons for carrying out whatever actions or behaviours they choose to, based on internal control. This theory proposes that intention to undertake a particular behaviour are the most immediate determinants of the said behaviour. In turn, intentions are influenced by attitudes, normative pressure, self-efficacy, and perceived behavioural control; and each of these constructs is formed by salient behavioural, normative, and control beliefs that should be elicited from the target population (Ajzen & Fishbein, [19]; [2]; [20].

Both the TRA and the TPB have limitations. According to the literature, the TPB has a fundamental limitation in this study since it does not account for other variables that influence behavioural intention and motivation, such as fear, danger, mood, or experience [21]. One of the key indicators of cyberethical perception is that motivation, understanding, emotion, and experience are key indicators that are used in measuring the perception of female postgraduate students. Since TPB does not take into cognisance these indicators of perception, it cannot be used for this study. The Theory of Reasoned Action also has its limitations. It investigates the factors that influence volitional behaviour, or behaviour that is under a person's control and is carried out with the individual's free will. One significant shortcoming of the Theory of Reasoned Action is that it ignores impeding and facilitating factors that may affect one's ability to engage in a behaviour. According to the theory, if a person is motivated to engage in a behaviour, that behaviour will be carried out. Many behaviours, on the other hand, necessitate certain skills, resources, opportunities, or the participation of others in order to be carried out. For instance, for this study, perhaps a female postgraduate wants to engage in online cheating or digital plagiarism, she may have sufficient motivation to carry out the action because she does not want to fail her examinations. However, there may be extrinsic constraints, such as a lack of expertise in downloading or even properly utilising a computer, or even having her own computer to use. These are factors that could have a significant effect on her capacity to adhere to certain behaviours. The impact of these determinants on behaviour is not investigated in the Theory of Reasoned Action, despite the fact that their existence or absence should influence how easy or difficult it is for individuals to carry out behaviour [22].

However, the RAA which subsumes both models under its approach allows for additional or extraneous influences due to whatever reason, was used.

The Reasoned Action Approach is of relevance to this study. This is because, when female postgraduate students find themselves in a cyber environment, there are several behaviours that they may engage in knowingly or unknowingly that will have implications on their activities. Despite the many documented studies on the disadvantages of unwholesome cyberethical behaviour, many individuals engage in it either intentionally or in ignorance. Internet users engage in all manners of cyber-enabled behaviours such as hacking, obstruction of others' use of computing equipment, pornography, internet addiction, e-mail abuse, and copying software, copyright violations and such behaviours, cyberstalking, cyberbullying, flaming, hate speech, privacy breaches, personal identity theft, plagiarism, among others. As a means of promoting cyberethical behaviour in female postgraduate students in universities in North Central Nigeria, it is of utmost importance to study those factors that influence, affect, or control their thought processes in doing such. Researchers have used various behavioural theories to understand personal, behavioural, and environmental factors related to ethical behaviour and activity. These include the use of RAA in studies about compulsive behaviour such as interest in sporting activities and exercising [23] and e-cigarette addiction [24]. Khan and Idris [25] also used RAA in their study on recognising and verifying information before sharing.

This study aimed to identify salient beliefs and practices about cyberethical behaviour among cohort participants in universities in North Central Nigeria. The researchers examined the associations of participants' perception, awareness, and attitude towards engaging in cyberethical behaviour. To the best of the knowledge of these researchers, there have been very few studies that attempted to investigate cyberethical behaviour focusing on female postgraduate students in universities in North Central Nigeria.

E. Conceptual Framework

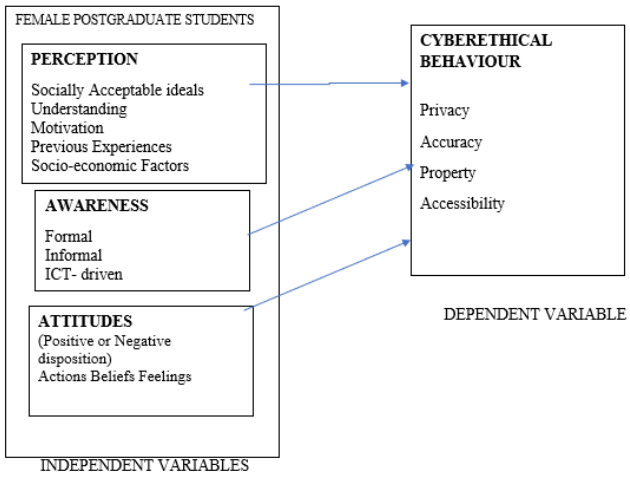

Fig. 1 Relationship between Variables

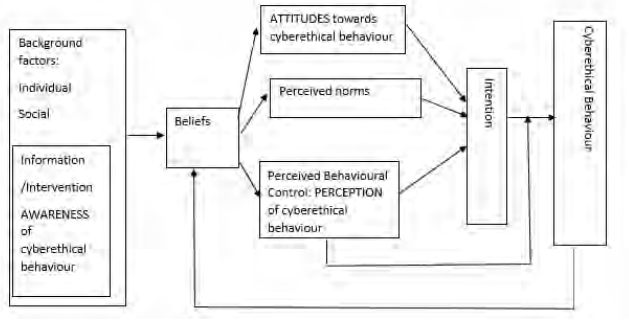

Fig. 2 A proposed/modified model for investigating cyberethical behaviour among female postgraduate students in universities in North-Central, Nigeria.

Figure 1 shows the researchers' thought process in conceptualising the variables. It depicts the relationship between the variables. It compares and contrasts perception, awareness, and attitudes. Perception was tested using scenario-type behavioural components. For cyberethical awareness, 21 behaviour indicators of female postgraduate students were studied. Attitudes were measured using scenario-based behavioural components.

Figure 2 shows the proposed RAA model modified for cyberethical behaviour developed by the researchers to explain how RAA can be used to understand the relationship between the variables, including the use of constructs and variables borrowed or used directly. Figure 2 shows the interrelationships between the indicators to be utilised in data gathering for each of the variables in the established model. Perception, awareness, and cyberethics attitudes are independent factors (Figure 1). Cyberethical behaviour is the dependent variable.

Perception of Cyberethical Behaviour

This variable came from Perceived Behavioural Control in the Reasoned Action Approach. Perceived Behavioural Control is the ease or difficulty of implementing the desired behaviour, according to Ajzen [16]. Perception is a bird's-eye view of cyberethical behaviour. Hagger [26] said the Theory of Planned Behaviour added Perceived Behavioural Control as an intention predictor. When people's perceptions of control closely match real control, Perceived Behavioural Control determines the Intention-Behaviour Relationship. When female postgraduate students feel adequate behavioural control, they're more inclined to conduct themselves cyberethically. When Perceived Behavioural Control closely matches real control, it can predict behaviour, according to Ajzen. Cyberethics will motivate postgraduate females to behave in a certain manner. Socially accepted standards, comprehension, motivation, prior experiences, and socio-economic variables affect an individual's perspective of an activity. Perception should impact cyberethical behaviour.

Awareness

Awareness is a well-defined Social Science construct. The Reasoned Action Approach borrowed the awareness variable. Awareness is about enlightenment through official or informal schooling or ICT-driven practises. These pedagogical and non-pedagogical methods include seminars, training, workshops, class sessions, and ICT-based methods such as online advertisements or exposés, social media enlightenment, and any means by which postgraduate students learn more knowledge. Informal sources include parents, friends, and relatives. Figure 2 depicts intervention as any external effect that increases an individual's enlightenment or consciousness. Awareness should encourage cyberethical behaviour.

Attitude

Attitude is the third variable, also well-defined in social psychology. Icek Ajzen's Reasoned Action Approach [2] defined attitudes as favourable or negative judgments of human behaviour. Ajzen [16] described it as a person's positive or negative opinion of a behaviour. Chiang and Lee [27] employed it in their study on Taiwanese Political Science undergraduates' ethical computer and ICT use. Aderibigbe [28] utilised it to research university students in South Africa and Nigeria. Attitudes affect a person's intention, which leads to behaviour. This study expects attitudes to affect cyberethical behaviour.

Cyberethical Behaviour

Cyberethical behaviour is the dependent variable. Cyberethics can be defined as the appropriate moral conduct to be observed when functioning in cyberspace. Various behaviours and factors come into play when an individual is in an online environment and has the opportunity of interacting with other individuals both known and unknown as a result of the advancement in Information and Communications Technology which allows remote communication with others in real-time. The expression of these behaviours could be deemed positive or negative, based on so many pre-determined factors. While [6] posited that there is a need to check moral behaviour while in cyberspace, technology has no inbuilt or inherent mechanism with which it can insist on compliance of suitable behaviour from those who partake of it, thus inferring that the onus is on the end-user to ensure responsible usage. Also, technology is developing at a faster rate than civil society can

make laws to ensure that netizens (users of cyberspace) are protected.

Various researchers have identified different cyberethical behaviours. These include hacking, fraud, internet libel, identity theft, child pornography, cyber-sex, cyber-squatting, domain-squatting, espionage, copyright infringement, financial theft, cyberstalking, cyberbullying, spamming, copyright, online harassment, and software theft as well as digital plagiarism, internet addiction, online sales of human beings and body fluids, among others, including cyber piracy, cyber plagiarism, computer crime and abuses, and cyber privacy infringement as cyberethical behaviours[1].

Similarly, some have classified ethical behaviours in the use of Information and Communication Technologies (ICTs), into four categories: general ethical behaviour, software piracy, plagiarism and cheating, and computer security. Property rights, freedom of expression, freedom of association, equal access to information, confidentiality, and intellectual property were included in the list of general ethical behaviours. Hacking, all sorts of illicit downloading, and questionable online habits and activities are among the others - in other words, privacy, accuracy, property, and accessibility issues. For software piracy, they mentioned downloading or stealing copyright-protected software. These twenty-one behaviour constructs were generated from the most recent literature[1].

III. Methodology

This study used a descriptive survey of correlational type. Survey research is appropriate for investigations involving a large number of respondents and a geographically and demographically varied population. Correlational design exhibits varied relationships. Correlational research examines how phenomena, personalities, talents, or situations co-vary. The essence and strength of two or more variables help comprehend, understand, and identify relative features, events, circumstances, and behaviours [29].

A. The population of the study

This survey included all female postgraduate students at universities in North Central Nigeria enrolled in NUC-accredited programmes. In March 2021, these universities had 8,875 female postgraduate students , according to data supplied from the National Universities Commission, 2020. 15 universities in this region were studied. There are six federal, five state-owned, and four privately-owned universities.

B. Sample Size and Sampling Technique

A multistage sampling technique was adopted for this study. Stage one involved purposive sampling, where fifteen universities were selected from universities in the North Central zone. Stage two involved the use of proportionate stratified sampling technique to determine the sample population for each university. Stratification is used because the population is divided into a number of non-overlapping sub-populations or strata and sample items are now selected from each stratum. The strata in this case, are the universities which engage in postgraduate training. This was done by multiplying a factor of 0.0011 with the population of the study, the number was then rounded up to the nearest whole number. The factor of 0.0011 was selected to end up with a sample of around 1000 participants. Stage three involved the use of a random sampling technique to select respondents. This was achieved with the aid of Israel (2013) model. A confidence/ precision level of 95% and a margin of error of +/- 3% was used. The total population of female postgraduate students in universities in North Central Nigeria N= 9,000. By applying the Israel model to this study, if ± 3% (e) is taken for precision levels where the confidence level is 95% and P=.5, the sample (n)= 989.

The demographic information of respondents, such as the university ownership type, name of the university, the age range of the respondents, a postgraduate study being undertaken and the marital status of respondents were analysed using descriptive statistics of frequency counts and percentages. The University ownership type and Name of the university of the respondents relevant to the objectives of the study are presented in Table 1 provides a summary of the demographic characteristics of the female postgraduate students that were surveyed regarding their age range, category of postgraduate study being undertaken, and marital status.

C. Ethical Considerations

The role of ethics in research is to promote the integrity of research results and reduce researcher bias. By adhering to the fundamental ethical principles outlined in Belmont's Report of 1979, as documented by the U.S. Department of Health and Human Services, these ethical research standards were attained. These ethical principles include the need to respect respondents and the community, to do good (beneficence), and to avoid harming (non-malfeasance). REJUNOBE is an acronym for these principles of respect for the person and community, justice, non-malfeasance, and beneficence. Respect for persons implies that all research participants' dignity was upheld by keeping their responses confidential. Beneficence refers to the commitment of the study to minimise the risks associated with research, including psychological and social risks, while maximising the benefits for research participants.

The Adeleke University Ethical Review Committee (AUERC) was solicited for approval before conducting this study (AUERC), with strict adherence to the AUERC's ethical guidelines. Respect for the individual and autonomy, the study's first ethical principle, implies that respondents had the option to participate in the research. Participation of the respondents (graduate female students) was specifically voluntary. The researchers solicited the respondents' consent and permission without offering any monetary compensation or inducement. Respondents were informed of the nature of the study and the intended use of the results once the research was concluded. After introducing the topic and informing the respondents of the

purpose of the study (which was primarily for academic and research purposes), they were asked to indicate their interest and consent by raising their hands. In addition, they were instructed to read the letter of Introduction and Informed Consent that was attached to each questionnaire and to sign it if they wished. To protect the respondent's anonymity, the form purposefully lacked a section requiring their names. The respondents were assured that they were under no obligation to complete the questionnaire and that they had the option to withdraw from the study if they were no longer interested in participating.

In addition to the foregoing, the respondents were informed of the significance of the study for female postgraduate students so that they could comprehend its objectives. As a means of accomplishing this, a brief introduction explaining the purpose of the exercise and a promise of anonymity was attached to the instrument.

The second and third ethical principles of beneficence and justice were satisfied by the researcher's implementation of appropriate confidentiality measures. No name or division was associated with any response. The research report did not identify any respondents or departments, preserving the report's anonymity.

Similarly, the researchers ensured that respondents could consent and were qualified for the study. Therefore, all North Central Nigerian universities authorised by the NUC to conduct postgraduate studies were considered. There were no male graduate students involved. In addition, there was no data falsification or fabrication, as the researchers, with the assistance of research assistants, visited the North Central Nigerian universities under study. The researchers also ensured the study's originality; thus, the study's results were based on data collected from respondents and not a duplicate or copied work. All cited materials were appropriately cited.

The study collected information from female postgraduate students in North Central Nigerian universities. The instrument does not contain any components that could bring fault lines (ethnic and religious prejudice) to the forefront and thus pose a risk. In essence, the questionnaire does not include distracting items that respondents may avoid due to a perception of risk. As such, there are no risks associated with this research.

IV. RESULTS

TABLE I. DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Socio-demographic	Categories	Frequencies (N=834)	Percentage (%)
University ownership type	Private	12	1.43
	State-owned	515	61.75
	Federal	307	36.81
Name of your University	Al -Hikmah University, Ilorin	1	0.1
	Benue State University, Makurdi	65	7.8
	Federal University, Lafia	20	2.4
	Federal University of Agriculture, Makurdi	19	2.3
	Federal University of Technology, Minna	58	7
	Ibrahim Badamasi Babangida University, Lapai	7	0.8
	Kogi State University, Anyigba	23	2.8
	Kwara State University, Malete	16	1.8
	Landmark University, Omu-Aran	5	0.6
	Nasarawa State University, Keffi	404	48.4
	Salem University, Lokoja	1	0.1
	University of Ilorin, Ilorin	131	15.7
	University of Jos	79	9.5
	University of Mkar, Mkar	5	0.6
Age Range	20-30	451	54.1
	31-40	268	32.1
	41-50	85	10.2
	51-60	27	3.2
	61 and above	3	0.4
The postgraduate study being undertaken	Ph.D.	144	17.3
	MPhil	87	27.2
	Master (all categories)	603	55.5
Marital status	Married	361	43.3
	Single	452	54.2
	Divorced	12	1.4

The age range of the respondents showed that 451(54.1%) of the respondents were between ages 20-30 years, 268(32.1%) of the respondents were between the age range of 31-40 years, 85(10.2%) of the respondents were aged between 41-50 years, 27(3.2%) of the respondents were between ages 51-60 years, and 3(0.4%) of the respondents were in the age range of 61 years and above. The findings show further that 603(72.3%) of the respondents were pursuing Master's Degrees, 87(10.43%) were M.Phil. students, and 144(17.3%) PhD students. Similarly, the results as shown in Table 4.2 reveals that the majority of the respondents 452(54.4%) were single, 361(43.3%) were married, 12(1.4%) of the respondents were divorced and 9(1.1%) the respondents were widowed. The results as shown in Table 1

reveals that the majority of the respondents were from state-owned universities 515 (61.8%). The smallest proportion of the respondents were from private universities 12(1.4%), while 307(36.8%) of the respondents were from federal universities. One (1) respondent each (0.1%) was from both Al-Hikmah University, Ilorin and Salem University, Lokoja, while the highest number of 404(48.4%) respondents were from Nasarawa State University Keffi.

Test of Hypotheses

The following null hypotheses were tested at a 0.05 level of significance:

1. There is no significant relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

2. There is no significant relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

3. There is no significant relationship between perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

4. There is no joint, significant relationship between perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

Hypothesis 1: There is no significant relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in universities in North-Central Nigeria

The corresponding objective was to identify the relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. In testing this hypothesis, and to achieve the corresponding set objectives, the researchers correlated respondents' scores on perception items in the questionnaire with the scores on attitude towards cyberethical behaviour items in the questionnaire. The respondents were provided with options of Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD) in the questionnaire and they were requested to indicate their attitude towards various situational-type items, based on cognitive, affective and behavioural categorisations. The frequency, percentage (%), mean, and standard deviation values of their responses were calculated and provided in Table 2:

TABLE II. PPMC SHOWING A SIGNIFICANT RELATIONSHIP BETWEEN PERCEPTION AND ATTITUDE TOWARDS CYBERETHICAL BEHAVIOUR AMONG FEMALE POSTGRADUATE STUDENTS IN UNIV. IN NORTH CENTRAL NIGERIA

** Correlation is significant at the 0.01 level (2-tailed)

Table 2 shows the correlation between perception and attitude towards cyberethical behaviour based on 834 respondents. The data suggest an absolute value of .02 which is considered positive. This means that the two variables have a strong tendency to cohere. This indicates that there is a significant correlation or relationship between perception and attitude towards cyberethical behaviour. From the table, the Pearson Product Moment Correlation coefficient (PPMC) indicates a strong linear relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria, with a 17.0% correlation. The P-value was found to be statistically significant at a 0.00 level of significance with a P-value <0.05. ($r = 0.17^{**}$, $N = 834$, $P < 0.05$), therefore the finding is not consistent with the stated null hypothesis. The finding from hypothesis 1 showed that there was a significant positive relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. Thus, there is enough evidence to reject the null hypothesis (H0) and accept the alternative hypothesis (H1), therefore concluding that there is a relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in North Central Nigeria universities.

Hypothesis 2: The hypothesis states that there is no significant relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

The corresponding objective was to identify the relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. In testing this hypothesis, and achieving corresponding set objectives, the researchers correlated respondents' scores on awareness items in the questionnaire with the scores on attitude towards cyberethical behaviour items in the questionnaire. The respondents were provided with options of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) in the questionnaire and they were requested to indicate their attitude towards various situational types of items. The frequency, percentage (%), mean, and standard deviation values of their responses were calculated. The result of the test of a significant relationship between awareness and attitude towards female postgraduate students' cyberethical behaviour in universities in North Central Nigeria is presented in Table 3.

TABLE III.

Variable	N	Mean	SD	Df	r.-value	P	Decision
Perception	834	24.7	84.63				
Attitude towards Cyberethical Behaviour	834	52.4	5.84	832	0.17**	0.00	Ho rejected

PPMC showing a Significant Relationship between awareness and Attitude towards Cyberethical Behaviour among Female Postgraduate Students in Univ. in North Central NIGERIA

Variable	N	Mean	SD	Df	r.-value	P	Decision
Awareness	834	64.71	10.23				
Attitude towards Cyberethical Behaviour	834	52.4	5.84	832	0.14**	0.00	Ho rejected

*Correlation is significant at the 0.01 level (2tailed)

Table 3 shows the significant relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. The Pearson Product Moment Correlation coefficient (PPMC) indicates a strong linear relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria, with a 14.1% correlation. The P-value was found to be statistically significant at a 0.00 level of significance with a P-value <0.05. The mean score of perception is Mean = 64.71, SD = 10.23 while the mean score of attitude towards cyberethical behaviour (Mean = 52.40, SD = 5.84) of female postgraduate students in universities in North Central Nigeria is found to be significant at P <0.05. Thus, the means of awareness (r = 0.14**, N = 834, P < 0.05) has a significant relationship with attitude towards cyberethical behaviour.

The results showed that there was a significant relationship between awareness and attitude towards cyberethical behaviour of female postgraduate students in North Central Nigeria. Thus, there is enough evidence to reject the null hypothesis (H0) and accept the alternative hypothesis (H1), therefore, concluding that there is a relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

Hypothesis 3: There is no significant relationship between perception, awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

The corresponding objective was to determine the relationship between perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria; in testing this hypothesis, and achieving corresponding set objectives, to determine if any significant relationship exists between perception, awareness, and attitude towards cyberethical behaviour of female postgraduate students in universities in North Central Nigeria, hypothesis three was tested using multiple regression analysis.

TABLE IV.

Model Summary						
Model 1	R 0.47[a]	R Square 0.22 ANOVA	Adjusted R Square 0.22	Std. Error of the Estimate 4.45		
Model	834	Sum of Squares	Df	Mean Square	F	P (sig)
1	Regression Residual Total	4639.63 16424.37 21064.00	3 830 833	1456.54 19.79	78.15	.00[a]
	Unstandardised Coefficients			Standardised Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant) Perception Awareness Attitude towards cyberethical behaviour	12.36 .44 -.07 .10	1.78 .03 .02 .03	 .40 -.16 .12	6.96 12.84 -4.99 3.80	.00 .00 .00 .00

a. Predictors: (Constant): Perception, Awareness, Attitude towards cyberethical behaviour

The results of the multiple regression analysis, as shown in Table 4, R determines the correlation between the independent variables and the dependent variable. It shows a positive correlation of 0.22 of the predictors of perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria, with regression coefficient R2 = 0.22. The correlation among the variables 0.22 explained a positive significant relationship. It shows that the variability of the predictors is explained by 22.0% while the remaining 78.0% is explained by other variables not measured by the model. These values are statistically significant at the 0.05 probability level. The coefficient of relationship R2 that predicted the relationship between the independent variables and the dependent variable is 0.22. This means that 22 per cent of the total variance in the dependent variable attitude towards cyberethical behaviour accounted for the independent variables: perception and awareness. This result affirmed that all the constructs of independent variables are significantly related to the cyberethical behaviour of female postgraduate students in the universities in North Central Nigeria.

The results of the F-ratio, as shown in Table 4, confirmed that the regression model is significant at P < 0.05. It can be ascertained that the regression model predicted the relationship of cyberethical behaviour. In other words, there is a significant relationship between independent variables constructs (perception and awareness) and attitude to cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

The Anova portion indicates that there is a significant relationship between perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria since the f-value of 78.15 is greater than the critical value of 3.00 at 0.05 level of significance. Therefore, the null hypothesis is rejected. This implies that there is a significant relationship between perception, awareness, and attitude towards cyberethical

behaviour among female postgraduate students in universities in North Central Nigeria.

Hypothesis 4: The hypothesis states that there is no joint, significant relationship between perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

The corresponding objective was to find out the relative contribution of perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. In testing this hypothesis, and to achieve corresponding set objectives, to determine if any joint, significant relationship exists among perception, awareness, and attitude towards cyberethical behaviour of female postgraduate students in universities in North Central Nigeria, hypothesis four was tested using multiple regression analysis.

TABLE V. TABLE TYPE STYLES

Model	**Coefficients[a]**					
	Unstandardised Coefficients		Standardised Coefficients			
	B	Std Error	Beta	t	Sig.	
	12.36 .44 -.07 .10	1.78 .03 .02 .03	 .40 -.16 .12	6.96 12.84 -4.99 3.80	.000 .000 .000	
ANOVA[b]						
		Sum of Squares	Df	Mean Square	F	Sig
Model	Regression Residual Total	167.23 20896.76 21064.00	1 832 833	167.23 25.12	6.66	0.10[a]
Coefficients[a]						
Model	Unstandardised Coefficients		Standardised Coefficients			
		B	Std Error	Beta	T	Sig.
	Constant (Joint perception, awareness and attitude)	18.08 .03	1.92 .01	.09	9.43 2.58	.000 .010

V. DISCUSSION OF FINDINGS

The findings on the demographic variables of the respondents indicated a wide diversity of population distribution across ownership types of universities. Public universities, which are composed of federal and state-owned universities had significantly more population of students than privately owned institutions.

The findings also revealed that female postgraduate students in universities in Nigeria are dominated by generally young individuals, who are in the active and prime stage of their lives. This aligns with the findings of Amaefule and Ogwueleka [30] who documented that majority of postgraduate students in their institution were between 20 and 40 years old, and also in tandem with [31] in a study of Higher Education in Malaysia who reported the majority of their students being in 21-30 years age gap. Also, the study found out that the majority of female postgraduate students in North Central Nigeria are undergoing Master's degree programmes, showing that they are interested in further developing themselves academically.

Results from the table showed that there is a significant relationship between perception and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

This finding is consistent with the findings of [32] who stated that Internet users should follow Internet ethics and take responsibility when using the Internet, particularly in light of technological advancement. Alsafadi et al. [32] opined that a positive attitude towards cyberethics was beneficial to all users of cyberspace. Similarly, the findings of this study align with the findings of Khan et al. [33] who maintain that introduction of ethics courses among university students as a result of recent advances in technology have brought about positively changing perception and attitude over the years, with more students showing readiness to change their belief systems and become more responsible netizens.

The result of this study revealed that there is a relationship between awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. This aligns with the findings of [8] and [5] who posited that awareness of cyberethical behaviours will result in students who are conscious of the fact that the Internet needs to be a safe medium for collaboration and day-to-day activities for all participants. As a result of the findings, the researchers proposed that librarians and ICT faculty provide training activities, extensive and regular awareness, and cyberethics education to these students, to ensure continuous adherence to cyberethics even after graduation; university administrators should ensure the development of policies and deterrents dealing specifically with cyber ethics and the responsible use of cyber technology; and developing appropriate methodology to educate these students, as well as deploying messages on the university website, radio jingles, library promotion techniques among others.

The analysis of the findings shows that there is a significant relationship between perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. This is in agreement with a study by Gudmundsdottir et al. [34],[35] who recommended that both the school system and parents had a role to play in ensuring proper education and awareness of cyberethics to forestall the ills of cyberethical misbehaviour. They maintained that students generally engaged in unwholesome practices, without understanding the underlying disadvantages and risks therein, resulting in them carrying out these behaviours. The results of the study equally tally with the findings of Dambrossio [36] who posited that the incorporation of short digital citizenship lessons into teaching practice was

necessary for ensuring an appropriate attitude to cyberethical behaviour.

Results from the table reveal that there is a joint, significant relationship between the joint perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. From the review of empirical studies, the findings of this study corroborate the findings of earlier research undertaken by Hasan et al. [37] who maintained that there was a need to protect young internet users through the deployment of context-relevant information by policymakers to reduce and eventually stop the menace of cybercrime. Similarly, the research of [38] proffered practical suggestions on how all specialisations of academic staff may go about teaching their students about ethical and unethical ICT-driven behaviours at the beginning of each academic semester. Likewise [39] and [40] harped on the need to identify, develop and research more behavioural constructs to enhance improved cyber behaviour.

The findings revealed that perception and awareness jointly predict attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. The findings show that perception and awareness jointly account for an 18.08% variance in attitude towards cyberethical behaviour of female postgraduate students in universities in North Central Nigeria.

Table 5 shows a positive correlation of 0.09 of the predictors of joint perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria, with regression coefficient R2 = 0.09. It shows that the variability of the predictors is explained by 0.9% while the remaining 99.1% is explained by other variables not measured by the model. The relative contribution of the joint perception awareness and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria, as shown in Table 4.10, has significant contributions at 0.05 level of significance, since the level of significance 0.00 is less than 0.05 of the significance level. These values are statistically significant at the 0.05 probability level. The Anova portion of the table indicates that there is a significant relationship between the joint perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria since the f-value of 6.66 is greater than the critical value of 3.00 at 0.05 level of significance. Therefore, the null hypothesis is rejected. This implies that there is a joint, significant relationship between the joint perception, awareness, and attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria.

VI. Recommendations

Based on the findings of this study, the following recommendations are made to ensure appropriate cyberethical behaviour among female postgraduate students in universities in Nigeria:

1. Educational programs: Educational programs should be developed to raise awareness of cyberethics among individuals in North Central Nigeria. These programs should target different age groups and should be delivered in schools, universities, and workplaces.

2. Enforcement of Cyber Laws: The government should enforce cyber laws to deter individuals from engaging in cybercrime. Penalties should be clearly defined, and law enforcement agencies should be trained to investigate and prosecute cybercriminals.

3. Awareness Campaigns: Public awareness campaigns should be launched to educate individuals about the dangers of cybercrime and the importance of cyberethics. These campaigns should be targeted at all segments of society, including vulnerable groups such as children and the elderly.

4. Collaboration: Collaboration between government agencies, law enforcement agencies, educational institutions, and the private sector is crucial to promoting cyberethics in North Central Nigeria. Such collaborations can help to develop comprehensive approaches to addressing cybercrime and promoting cyberethics.

VII. Contributions to Knowledge

The study has contributed to knowledge in the following ways:

1. The outcomes of this study validated in entirety each variable of the modified theory, as all indicators and variables were found to be significant, thus proving beyond doubt that the model can be used in predicting cyberethical behaviour among female postgraduate students in North Central Nigeria.

2. From a theoretical framework viewpoint, the study contributed to discourse about RAA.

3. The study contributed by providing empirical data and information to the existing literature for the researchers on relationships that exist among the variables of the study. Limited studies have considered research in this direction; therefore, this study is one of the pioneer studies on female attitudes towards cyberethical behaviour in Nigeria. In essence, the data provided could serve as the benchmark for future studies on cyberethics within and outside Nigeria.

4. Similarly, the result of the study would serve as a prelude to further studies on the creation and promotion of cyberethical policies and awareness in universities, both locally and globally. The study developed a conceptual model and identified several indicators of cyberethical behaviour of postgraduate students, which are of immense benefit to other researchers.

5. It is anticipated that the outcome of this study would be of immense benefit to female postgraduate students at all levels, universities, researchers on cyberethics, university administration researchers and society at large, as the findings of the study highlight the need for increased focus into the study of cyberethical behaviour to ensure safer cyberspace. Documenting and publishing literature from the outcomes of this study through attendance at related workshops, conferences and seminars, as well as publishing in reputable journals would be of great importance in the extension of knowledge in the field of cyberethics and cyberethical behaviour, the effect of which will lead to an expansion of the frontiers of knowledge and scholarship in the discipline of Library and Information Science.

VIII. Implications of the Study

The results of this study have provided useful information on the cyberethical behaviour of female postgraduate students in North Central Nigeria. These results have implications for female postgraduate students at all levels, university administrators and policy-makers, researchers on cyberethics, and society at large.

1. The outcomes from this study have highlighted the need for increased awareness of appropriate cyberethical behaviour, which is of immense benefit to female postgraduate students, regardless of the level of their studies. By disseminating the outcomes of this study through established channels of reputable academic publications, related conferences, workshops seminars and scientific meetings, university administrators and higher education policymakers are now better informed about the implications of correct and appropriate cyberethical behaviour. Their awareness will result in appropriate policies being put in place to ensure a safer online experience for all users of ICT on campus.

2. There are limited studies in Nigeria that focused on cyberethical behaviour. As a newly emerging discipline, the dynamic nature of cyberethics necessitates that more local research and scholarship should be engaged, to situate Nigeria as a trailblazer in cyberethics research. This study has succeeded in increasing and adding to the literature in the field of cyberethics and cyberethical behaviour. The results of this study may spark further discourse and research on cyber-behaviour and social issues in contemporary society.

3. The study's findings have practical implications for promoting cyberethics in North Central Nigeria. Educational programs, enforcement of cyber laws, awareness campaigns, and collaboration are recommended to promote cyberethics in the region. It is hoped that the proposed framework and recommendations will provide valuable insights for researchers and policymakers seeking to address cybercrime and promote cyberethics in Nigeria.

IX. Conclusion

This study has developed a framework for studying cyberethical behaviour in North Central Nigeria. The findings of this study revealed that both perception and awareness have a significant relationship with attitude towards cyberethical behaviour among female postgraduate students in universities in North Central Nigeria. Furthermore, the study ascertained that there was a significant joint relationship between perception and awareness of cyberethical behaviour among postgraduate students in universities in North Central Nigeria. The modified reasoned action approach model was used to identify the factors that influence individuals' attitudes, awareness, and perception of cyberethics. The study found that awareness of cyberethics, perceived behavioural control, and subjective norms were significant predictors of cyberethical behaviour. The study also found that attitudes towards cyberethics were influenced by moral values, personal beliefs, and social norms. By using these constructs and indicators, the modified RAA model was validated successfully, as it predicted and explained the study of cyberethical behaviour, among female postgraduate students in North Central Nigeria. The study concluded that ideal cyberethical behaviour is essential for enabling female postgraduate students in the universities to source information resources in the library for learning and research activities, and also in carrying out all online activities.

Acknowledgment

A.O.D thanks the following:

- Head, all members of staff, and the Pioneer PhD Class Cohort of the Department of Library and Information Science, Adeleke University Ede Osun State, Nigeria.
- Supervisors, for a job well done.
- Management and Staff of University of Ilorin.
- Dr. A.R. Tomori for Statistical Analysis

References

[1] A. O. Dunmade, "Perception, awareness and Attitude of female postgraduate students towards cyberethical behaviour in North-Central Nigeria Universities," Ph.D. dissertation, Adeleke University, Ede, 2022.

[2] M. Fishbein and I. Ajzen, Predicting and changing behaviour: The reasoned action approach. Taylor & Francis, 2011.

[3] K. L. Blanchette and L. Ellington, "Strategic leadership in a global virtual reality," Strategic Leadership, pp. 99-124, 2018.

[4] E. Liywalii, "Analyzing the impact of ethical issues in e-government implementation: A case of Zambia," Ph.D. dissertation, The University of Zambia, 2020. [Online]. Available: http://dspace.unza.zm/bitstream/handle/123456789/6724/Main%20Document.pdf?sequence=1

[5] N. A. Aderibigbe and D. N. Ocholla, "Insight into ethical cyber behaviour of undergraduate students at selected African universities," South African Journal of Information Management, vol. 22, no. 1, pp. 1-8, 2020. [Online]. Available: https://doi.org/10.4102/sajim.v22i1.1131

[6] A. O. Dunmade et al., "Cybercrime in Nigeria: An overview of laws and ethics from the Information Technology (IT) professionals perspective," in Proceedings of the 22nd iSTEAMS Multidisciplinary SPRING Conference, Aurora Conference Centre, Osogbo, Nigeria, Dec. 2019, pp. 13-20. [Online]. Available: https://doi.org/10.22624/AIMS/iSTEAMS-2019/V22N1P2

[7] V. Kavitha and S. Preetha, "Cyber security issues and challenges: A review," International Journal of Computer Science and Mobile Computing, vol. 8, no. 11, pp. 1-6, 2019.

[8] A. Adetimirin, "Awareness and knowledge of cyberethics by the library and information science doctoral students in two Nigerian universities," International Journal of Technology Policy and Law, vol. 3,

no. 1, pp. 43-55, 2017. [Online]. Available: https://doi.org/10.1504/IJTPL.2017.085231

[9] S. Alan and J. Gary, "Perception, attribution, and judgment of others," Organizational behaviour: Understanding and managing life at work, vol. 7, pp. 1-20, 2011.

[10] D. J. Chalmers and S. Wolf, "The conscious mind: in search of a fundamental theory," Integrative Physiological and Behavioral Science, vol. 32, no. 3, pp. 291-292, 1997.

[11] J. A. Krosnick et al., "The measurement of attitudes," in The handbook of attitudes, Routledge, 2018, pp. 45-105.

[12] A. H. Eagly and S. Chaiken, "Attitude structure and function," in The handbook of social psychology, vol. 1, no. 2, 1998, pp. 269-322.

[13] E. A. Bature and G. D. Edoeje, "Globalization and women in governance in Nigeria: 2015-2022," Nigerian Journal of Social Development, vol. 11, no. 1, pp. 57-69, 2023.

[14] F. A. Ezekwe and E. Uchechukwu, "Gender Inequality in Education, ICT Industry and Employment: The Socio-Economic Effects in Nigeria," Library Philosophy and Practice, 2019.

[15] K. Adeyemi and N. Akpotu, "Gender analysis of student enrolment in Nigerian universities," Higher education, vol. 48, no. 3, pp. 361-378, 2004.

[16] I. Ajzen, "The theory of planned behaviour," Organizational Behaviour and Human Decision Processes, vol. 50, no. 2, pp. 179-211, 1991. [Online]. Available: https://doi.org/10.1016/0749-5978(91)90020-t

[17] M. Fishbein and I. Ajzen, "Belief, attitude, intention and behaviour: An introduction to theory and research," Addison Wesley, 1975.

[18] D. E. Montaño and D. Kasprzyk, "Theory of reasoned action, theory of planned behaviour, and the integrated behavioural model," Health behaviour: Theory, research and practice, vol. 70, no. 4, pp. 231-252, 2015. [Online]. Available: https://doi.org/10.1007/978-981-16-0882-7_1

[19] I. Ajzen and M. Fishbein, Understanding attitudes and predicting social behaviour. Prentice-Hall, 1980.

[20] J. Francis et al., "Constructing questionnaires based on the theory of planned behaviour: a manual for health services researchers," University of Newcastle upon Tyne: Centre for Health Services Research, 2004. [Online]. Available: https://openaccess.city.ac.uk/id/eprint/1735/

[21] W. W. Lamorte, "Cyberethics in action: Copyright, privacy, and media awareness teachers' Guides," Ph.D. dissertation, Queens University, Canada, 2019. [Online]. Available: qspace.library.queensu.ca

[22] S. Kim and H. Park, "Intrinsic and extrinsic factors impacting individual cyber ethics awareness and behaviour intention," The Journal of Information Systems, vol. 23, no. 1, pp. 111-138, 2014. [Online]. Available: https://doi.org/10.5859/KAIS.2014.23.1.111

[23] M. Arevalo and L. D. Brown, "Using a reasoned action approach to identify determinants of organized exercise among Hispanics: a mixed-methods study," BMC public health, vol. 19, no. 1, pp. 1181-1210, 2019. [Online]. Available: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7527-1

[24] P. D. Dobbs et al., "College student e-cigarette use: A reasoned action approach to measure development," American journal of health, vol. 43, no. 4, pp. 753-766, 2019. [Online]. Available: https://doi.org/10.5993/AJHB.43.4.9

[25] M. L. Khan and I. K. Idris, "Recognise misinformation and verify before sharing: A reasoned action and information literacy perspective," Behaviour & Information Technology, vol. 38, no. 12, pp. 1194-1212, 2019. [Online]. Available: https://doi.org/10.1080/10508422.2011.622181

[26] M. S. Hagger, "The reasoned action approach and the theories of reasoned action and planned behaviour," in D. S. Dunn, Ed., Oxford Bibliographies in Psychology, Oxford University Press, 2019. [Online]. Available: https://doi.org/10.1093/OBO/9780199828340- 0240

[27] L. Chiang and B. Lee, "Ethical attitude and behaviours regarding computer use," Ethics & Behaviour, vol. 21, no. 6, pp. 481-497, 2011. [Online]. Available: https://doi.org/10.1080/10508422.2011.622181

[28] N. A. Aderibigbe, "Cyber ethical behaviour of university students: An overview of University of Zululand, South Africa and Federal University of Agriculture, Abeokuta, Ogun State, Nigeria," Journal of Applied Information Science and Technology, vol. 13, no. 1, pp. 86-106, 2020. [Online]. Available: https://www.academia.edu/download/67557298/Aderibigbe_and_Owolabi_2020.pdf

[29] J. Bloomfield and M. J. Fisher, "Quantitative research design," Journal of the Australasian Rehabilitation Nurses Association, vol. 22, no. 2, pp. 27-30, 2019. [Online]. Available: doi/pdf/10.3316/informit.738299924514584?download=true

[30] A. A. Amaefule and F. N. Ogwueleka, "An assessment of internet services usage among postgraduate students in the Nigerian Defence Academy," in Information and Communication Technology for Competitive Strategies (ICTCS 2020), Springer, 2021, pp. 1-33. [Online]. Available: https://doi.org/10.1007/978-981-16-0882-7_1

[31] F. B. Fatokun et al., "Relating Factors of Tertiary Institution Students' Cybersecurity Behaviour," 2020. [Online]. Available: www.researchgate.net/profile/Faith_Fatokun/publication/340968611_Relating_Factors_of_Tertiary_Institution_Students'_Cybersecurity_Behavior/links/5fcdc116299bf188d4fd8020/Relating-Factors-of-Tertiary-Institution-Students-Cybersecurity_Behavior.pdf

[32] Y. Alsafadi, S. Altahat, and D. Caglar, "Cyber ethics, entrepreneurship and the mediating role of knowledge sharing," Gazi University Journal of Science, vol. 34, no. 3, pp. 33-49, 2021. [Online]. Available: http://doi.org/10.35378/gujs.691714

[33] Z. R. Khan, S. Venugopal, and F. Oroumchian, "Tracking changing perceptions of students through a cyber ethics course on artificial intelligence," in Advances in Software Engineering, Education, and e-Learning, Springer, 2021, pp. 287-302. [Online]. Available: https://doi.org/10.1007/978-3-030-70873-3_20

[34]G. B. Gudmundsdottir et al., "Student teachers' responsible use of ICT: Examining two samples in Spain and Norway," Computers & Education, p. 103877, 2020. [Online]. Available: https://doi.org/10.1016/j.compedu.2020.103877

[35] G. B. Gudmundsdottir and O. E. Hatlevik, ""I just Google it"-Developing professional digital competence and preparing student teachers to exercise responsible ICT use," Nordic Journal of Comparative and International Education (NJCIE), vol. 4, no. 3, pp. 39-55, 2020. [Online]. Available: https://doi.org/10.7577/njcie.3752

[36] R. Dambrosio, "Student online safety and security: Middle school teacher perspectives concerning safe internet use in the classroom," Ph.D. dissertation, California State University, Stanislaus, 2021.

[37] M. S. Hasan et al., "Perception and awareness of young internet users towards cybercrime: Evidence from Malaysia," Journal of Social Sciences, vol. 11, no. 4, pp. 395, 2015.

[38] I. Boghian, "Raising students' awareness of unethical Information Technology use," in Ethical Use of Information Technology in Higher Education, Springer, 2022, pp. 51-63. [Online]. Available: https://doi.org/10.1007/978-981-16-1951-9_4

[39] T. Mashiane and E. Kritzinger, "Identifying behavioral constructs in relation to user cybersecurity behavior," Eurasian Journal of Social Sciences, vol. 9, no. 2, pp. 98-122, 2021. [Online]. Available: https:doi.org/10.15604/ejss.2021.09.02.004

[40] J. K. Alhassan et al., "A framework for cyber ethics and professional responsibility in computing," in Advances in Electrical and Computer Technologies, Springer, 2020, pp. 299-307. [Online]. Available: https://doi.org/10.1007/978-981-15-5558-9_28