Application of Technology Ethics in the Use of Electronic Library Resources among Undergraduates in Nigeria

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Abstract

This study examined the application of technology ethics in the use of electronic library resources (ELR) among undergraduates in Nigeria. Four research purposes guided the study which sought to determine the awareness of undergraduates in the application of technology ethics in the use of electronic library resources (ELR), ascertain the level of application of technology ethics in the use of ELR, ascertain the challenges faced by undergraduates in adhering to technology ethics and Suggest strategies to tackle the challenges associated in the application of technology ethics while using ELR. Descriptive survey research design was adopted for this study. The target population of the study comprised 20,103 undergraduates in COOU, Igbariam in Anambra State. The sample size of 392 was derived from the population of the undergraduates who are registered library users in COOU Library using Taro Yamane's formula and convenience sampling techniques. A validated self-designed questionnaire was the instrument used for data collection. Data were analysed using mean ratings and simple percentages. Findings of the study revealed that majority of the students were not aware of the technology ethics and did not apply them when using electronic library resources. Challenges included lack of awareness of technology ethics principles and the pressure to prioritize convenience. The study concluded that most undergraduates are not aware of technology ethics and have not applied it while using the electronic library resources. The study recommended the integration of a comprehensive technology ethics education into the LIS curriculum to increase awareness and promote adherence to ethical behaviours when using electronic library resources and the establishment of clear policies and guidelines for ethical use of ELR.

Keywords: Application, Library, Electronic Library Resources, Technology Ethics, University, Undergraduates.

Introduction

University libraries serve as integral components of educational institutions, facilitating access to information resources that support teaching, learning and research endeavours. University libraries are libraries that serve the faculty, n on-teaching staff and students of a

particular university. They provide access to a rich assortment of resources, including books, journals, databases, multimedia materials, and other educational contents, to support teaching, learning, and research. University libraries have undergone a significant transformation in recent decades, transitioning from predominantly print-based collections to embracing digital technologies and electronic library resources (ELRs).

Electronic library resources (ELR) according to Obuezie and Echedom (2023) are any informational resources which require the use of computer before it can be accessed. It encompasses a wide range of digital materials, including electronic books, online journals, databases, and multimedia contents. ELR have become an integral item needed for satisfying the information needs of users especially the students as it forms a good substitute to traditional resources. These resources have transformed the way information is accessed and utilized in academic settings (Wagwu & Obuezie, 2018). ELR offer advantages such as convenience, immediate access and the ability to search across vast repositories of information. This shift from print to electronic resources has reshaped the landscape of information provision in university libraries, as noted by Tenopir, Volentine and Birch (2017). The foregoing implies that the use of electronic library resources must align with the adoption of technologies such as computer and internet facility. The widespread adoption of technology, particularly computers and mobile devices, has revolutionized the way students and researchers access and utilize ELRs. According to Nyrup (2015) online access platforms, remote access options, and mobile applications have made ELRs more accessible and convenient than ever before, allowing users to access information from anywhere and anytime ubiquitously. However, in the course of applying the electronic library resources, whether they are to be copied, stored, disseminated or converted into any other readable or usable form, certain standards and rules must be adhered to and these standards of use are called ethics.

Ethics encompasses the principles and standards that guide our behaviour and decision-making, distinguishing between right and wrong, good and bad (Danaher, 2020). It covers concepts such as fairness, honesty, respect, responsibility, and accountability which provides a framework for ethical conduct in various aspects of life. Ethics could span areas such as medical ethics, research ethics, bioethics, business ethics and applied ethics. In this context, the use of electronic library resources must follow certain ethics. Since electronic library resources is a technology driven process, there is the need to adopt technology ethics in the use of electronic library resources. Technology ethics, a branch of applied ethics, specifically focuses on the ethical implications of developing, using, and managing technology (Manyika, Chui & Osborne, 2019). It examines the potential benefits and harms of technological advancements, with consideration of the impact on individuals, society, and the environment. These technology ethics are the basic principles that promote healthy use of electronic library resources in University libraries.

The use of electronic library resources in University libraries raises a range of ethical considerations, particularly for undergraduates who are increasingly reliant on these resources for their academic pursuits. These ethical issues according to Khoo and Norwina (2020) include: plagiarism and copyright, information literacy and critical thinking, digital privacy and security as well as responsible use of technology. Notwithstanding the fact that electronic library resources help to serve the academic needs of the undergraduates**, t**here are issues associated with technology ethics in the use of electronic library resources. In fact, there is pressure for one to conform to prevailing social norms in online environments, such as in sharing copyrighted materials or engaging in unethical practices.Moreover,most undergraduates have inadequate

skills in evaluating online information, identifying reliable sources, and distinguishing between facts and opinions (Johnson & Nardi, 2018). Easy access to ELRs can lead to misuse, such as excessive screen time, procrastination, or neglecting other academic and personal responsibilities. The rapid pace of technological advancements can make it challenging to keep up with emerging ethical considerations and adapt to practices accordingly.

Based on the foregoing issues with technology ethics in using electronic library resources and the several challenges undergraduates face in applying technology ethics when using ELR, it is expected that university libraries will need to brace up and ensure that they educate these undergraduates on how to apply technology ethics while using electronic library resources. They will need to know these rules, standards and policy that guide the responsible usage of electronic library resources. Given the increasing reliance on electronic library resources by undergraduates in carrying out their academic and research tasks and the potential unacceptable conducts associated with the use of ELR , there is a critical need for research to explore the state of application of technology ethics in the use of ELRs among undergraduates, hence the need for this study.

Statement of the Problem

In an ideal situation, undergraduates are supposed to utilize electronic library resources (ELRs) responsibly and ethically, adhering to principles of honesty, integrity, and respect for intellectual property. Despite the importance of the need to apply technology ethics in using electronic library resources, the reality still remains that undergraduates face various challenges in applying technology ethics while using electronic library resources. The researcher observed that most undergraduates lack the knowledge of technology ethics and ethical practices such as avoiding plagiarism in using electronic information resources. Moreover, dissemination of misinformation also prevails amongst the undergraduates. These constitutes a major challenge as their impacts could be disastrous if not tackled.

Previous studies have explored the relevance of technology ethics and ELR. Studies often concentrate on specific ethical issues, such as plagiarism, without providing a comprehensive understanding of the broader ethical landscape and its application. These constitutes a gap, hence the need to examine the application of technology ethics in the use of electronic library resources among the undergraduates of Chukwuemeka Odumegwu Ojukwu University (COOU), Igbariam.

Purpose of the study

The general purpose of this study is to examine the application of technology ethics in the use of electronic library resources among the undergraduates of Chukwuemeka Odumegwu Ojukwu University (COOU), Igbariam. Specifically, the study intends to:

1. Determine the awareness of the application of technology ethics in the use of electronic library resources among undergraduates of Chukwuemeka Odumegwu Ojukwu University, Igbariam.
2. Determine the level of application of technology ethics in the use of electronic library resources among undergraduates of Chukwuemeka Odumegwu Ojukwu University, Igbariam.

3. 3. Ascertain the challenges faced in adhering to technology ethics in the use of electronic library resources among undergraduates of Chukwuemeka O dumegwu Ojukwu University, Igbariam.
4. Suggest strategies for tackling the challenges associated with the application of technology ethics while using the electronic library resources among undergraduates of Chukwuemeka Odumegwu Ojukwu University, Igbariam.

Research Question

The following research questions guided this study.

1. What is the awareness of application of technology ethics in the use of electronic library resources among undergraduates in Chukwuemeka Odumegwu Ojukwu University, Igbariam?
2. What is the level of application of technology ethics in the use of electronic library resources among undergraduates of Chukwuemeka Odumegwu Ojukwu University, Igbariam?
3. What are the challenges faced in adhering to technology ethics in the use of electronic library resources among undergraduates in Chukwuemeka Odumegwu Ojukwu University, Igbariam?
4. What are the strategies for tackling the challenges associated with applying technology ethics in the use of electronic library resources among undergraduates of Chukwuemeka Odumegwu Ojukwu University, Igbariam?

Review of Related Literature

Technological ethics, also known as ethics of technology, encompasses the ethical considerations and moral principles that govern the development, deployment, and use of technology in society. It involves examining the impact of technological innovations on individuals, communities, and the environment, and evaluating the ethical implications of technological choices (Brey, 2012). In the realm of technological ethics, one of the central concerns is ensuring that technological advancements align with ethical principles and contribute to human well-being. This involves critically assessing the potential risks and benefits of new technologies and considering their implications for various stakeholders (Moor, 2018). For instance, in the development of artificial intelligence and autonomous systems, ethical considerations such as accountability, transparency, and fairness are paramount to mitigate potential harms and ensure responsible innovation (Floridi et al., 2020). Moreover, technological ethics involves addressing issues of equity, access, and inclusion in the design and implementation of technology. The digital divide, for example, highlights disparities in access to technology and digital literacy skills, which can exacerbate existing socio-economic inequalities (DiMaggio & Hargittai, 2021). Ethical approaches to technology seek to bridge these divides by promoting universal access to information and communication technologies and ensuring that technological solutions are inclusive and accessible to all members of society.

Electronic library resources are digital resources that facilitate collaborative research and knowledge sharing among scholars, students, and practitioners (Lorimer & Britz, 2013). Electronic library resources refer to online platforms for academic publishing and scholarly communication enable researchers to disseminate their findings rapidly and reach a global audience (Lorimer & Britz, 2013). Electronic library resources can also be collaborative tools

and social networking features integrated into electronic library platforms to promote interaction and collaboration among users, fostering a sense of community and facilitating interdisciplinary exchange (Suber, 2015). Furthermore, Tenopir et al. (2012) remarked that electronic library resources are online resources that support initiatives for open access and digital inclusion, democratizing access to information and promoting equitable opportunities for learning and research. Electronic library resources support digital inclusion efforts aim to bridge the digital divide by providing access to electronic resources and digital literacy training to underserved populations, thereby promoting digital equity and empowerment.

The application of technology ethics in using electronic library resources has been a subject of investigation in scholarly research. Studies have delved into various dimensions of technology ethics to assess their implementation and impact within the context of electronic library environments (Hsieh & Lin, 2016; Ruppert, 2014). Privacy concerns represent a significant aspect of technology ethics in electronic library usage. Research indicates that users may encounter privacy risks related to the collection and handling of their personal data by library systems and databases (Pandey & Sharma, 2020). Without adequate safeguards and transparency regarding data practices, users' privacy may be compromised, raising ethical questions about information security and confidentiality. Intellectual property rights and copyright compliance are also central to technology ethics in electronic library resources. Studies have revealed instances where users unintentionally infringe upon copyright laws when accessing and sharing digital materials (Harris, Lenard & Ploman, 2013). Libraries play a crucial role in educating users about copyright regulations and promoting ethical practices to ensure lawful and responsible use of electronic resources. Moreover, equitable access and digital inclusion are ethical imperatives in the utilization of electronic library resources. Research highlights disparities in access to digital resources among different user groups, emphasizing the importance of addressing digital divide issues (Jaeger & Bertot, 2010). Ethical approaches advocate for initiatives to bridge these gaps, promoting equal opportunities for information access and participation in the digital environment. The ethical implications of technological infrastructures and platforms used in electronic libraries have also garnered attention. Scholars have explored concerns such as algorithmic bias and surveillance in library systems, emphasizing the need for ethical design and implementation (Crawford & Schultz, 2014). Ethical considerations in technology development ensure that electronic library resources are accessible, inclusive, and respectful of user rights.

From the reviewed literatures, there were studies by Bauer (2018) on the integration of ethics education into the academic curriculum; Riehle and Kolb (2019) studied technology and ethics in the digital age; Vallor (2016) analysed technology and the virtues: A philosophical guide to a future worth wanting; Dietz and Waldfogel (2019) examined privacy, data protection, and the ethical use of library data: A national study of privacy policies and practices in US libraries; Harris, Lenard and Ploman (2013) studied digital ethics and intellectual property: A framework for researchers and library professionals; Hsieh and Lin (2016) examined the relationship between digital ethics and online piracy: Mediating roles of attitudes and intentions; Ryan and Patterson (2016) analyzed digital libraries: Ethical issues and practice in organization and access; Ali, Almughamsi and Al-Mansour (2018) studied digital ethics awareness: A survey of Saudi students' ethical perceptions of computer use; and Fernández-Barrera, Herrera-Viedma and López-Gijón (2020) evaluated the ethical perception of users in online social networks: An empirical analysis on privacy. It appears none of the studies concentrated on the application of technology ethics in the use of electronic library resources among undergraduates of

Chukwuemeka Odumegwu Ojukwu University Igbariam. This has provided a gap in the study. It is against this background that the present study is being carried out to fill the gap

Methodology

Descriptive survey research design was adopted for this study. The target population of the study comprised of the undergraduates of COOU, Igbariam in Anambra State, Nigeria. According to the data collected from the Academic and Planning Unit of the University, there are twenty thousand, one hundred and three (20,103) undergraduates in the university (COOU Students' Records, 2023). The sample size of 392 was derived from the population of the undergraduates who are registered library users in COOU Library using Taro Yamane's formula and convenience sampling techniques. To calculate the required sample size for a population of 20,103 using Taro Yamane's formula, we ascertained the desired margin of error ((e)) and the confidence level. The formula is: [n = \frac{N} {1 + N e^2}]. Where: (N) is the population size (20,103 in this case). (e) is the margin of error (commonly 0.05 for a 95% confidence level). Using = (e = 0.05): [n = \frac {20,103} {1 + 20103 \times (0.05) ^2}]. [n = \frac {20,103} {1 + 20103 \times 0.0025}]. [n = \frac {20, 103} {1 + 50.2575}]. [n = \frac {20, 103} {51.2575}]. [n \approx 392.3]. So, the required sample size for a population of 20,103 with a margin of error of 0.05 is approximately 392. In addition, convenience sampling was used to select 392 undergraduate library users who were available in the library and accessible to the researcher at the time of data collection. A total of 392 undergraduate library users participated in the study. A validated self-designed questionnaire was the instrument used for data collection. The distribution and collection of data took three working days with a 100% return rate. Data were analysed using mean ratings and simple percentages. Items to the value of 2.50 or 50% and above were given a positive interpretation (Agreed, Aware or Applicable) while items to the value below 2.50 or 50% and below were given a negative interpretation (Disagreed, Not aware or Not applicable). The midpoint for response in the four (4) point scale was 2.50 derived as follows: 4+3+2+1 = 10/4 = 2.50

Results

Research Question 1: What is the awareness of application of technology ethics in the use of electronic library resources among undergraduates in Chukwuemeka Odumegwu Ojukwu University, Igbariam?

Table 1: Percentages of awareness of the application of technology ethics in the use of electronic library resources

S/N	Items	Aware	Not Aware	Decision
1	Guidelines to ethics education	10%	90%	Not Aware
2	Disciplinary background on technology ethics	18%	82%	Not Aware
3	Personal experiences with technology	90%	10%	Aware
4	Ethical information on electronic library resources	5%	95%	Not Aware
5	Programs that incorporate technology ethics education	42%	68%	Not Aware
6	Courses that focus on digital ethics	20%	80%	Not Aware
7	Modules on privacy	15%	85%	Not Aware
8	Ethics on cyber security	30%	70%	Not Aware
9	Rules guiding intellectual property	5%	95%	Not Aware

10	How to use technology in the right way	70%	30%	Aware

Table 1 above shows that undergraduates of COOU are not aware of 8 items out of the 10 listed technological ethics applicable in the use of electronic library resources which includes; Ethical information on electronic resources (percentage = 95%), Rules guiding intellectual property (percentage = 95%), Guidelines to ethics education (percentage = 90%), Modules on privacy (percentage = 85%), Disciplinary background on technology ethics (percentage = 82%), Courses that focus on digital ethics (percentage = 80%), Ethics on cyber security (percentage = 70%) and Programs that incorporate technology ethics education (percentage = 68%) as against only 2 that they are aware of which includes; Personal experiences with technology (percentage = 90%) and how to use technology in the right way (percentage = 70%).

Research Question 2: What is the level of application of technology ethics in the use of electronic library resources among undergraduates of Chukwuemeka Odumegwu Ojukwu University, Igbariam?

Table 2: Percentages of the level of application of technology ethics in the use of electronic library resources

S/N	Undergraduates	AP	N/AP	Decision
1	Apply and stick to copyright laws when using electronic library resources	5%	95%	Not applicable
2	Apply and adhere to licensing agreements when using electronic library resources	5%	95%	Not applicable
3	Protect their privacy when accessing electronic library resources	86%	14%	Applicable
4	Protect their personal data when accessing electronic library resources	90%	10%	Applicable
5	Apply ethical rules in the usage of electronic library resources	10%	90%	Not applicable
6	Practice good digital citizenship when using electronic library resources	20%	80%	Not applicable
7	Apply rules related to technology use	75%	25%	Applicable

(AP) = Applicable **(N/AP)** = Not applicable

Table 2 above shows that the undergraduates do not really apply the technology ethics while using the electronic library resources as 4 out of the 7 items listed were not applicable to the undergraduates while using the resources. These includes; undergraduates apply and stick to copyright laws when using electronic library resources (Percentage = 95%), Apply and adhere to licensing agreements when using electronic library resources (Percentage = 95%), Apply ethical rules in the usage of electronic library resources (Percentage = 90%), and Practice good digital citizenship when using electronic library resources (Percentage = 80%) as against the remaining 3 items that are applicable to the undergraduates which include; Protect their personal data when

accessing electronic library resources (Percentage = 90%), Protect their privacy when accessing electronic library resources (Percentage = 86%) and Apply rules related to technology use (Percentage = 75%).

Research Question 3: What are the challenges faced by undergraduates in adhering to technology ethics when using electronic library resources in Chukwuemeka Odumegwu Ojukwu University Igbariam?

Table 3: Mean ratings on the challenges faced by undergraduates in adhering to technology ethics in the use of electronic library resources

S/N	Items	Mean	Decision
1	Lack of awareness of technology ethics principles	2.87	Agreed
2	Undergraduates may face pressure to prioritize convenience when using electronic library resources	3.13	Agreed
3	Undergraduates may face pressure to prioritize efficiency over ethical considerations when using electronic library resources	2.97	Agreed
4	Universities may not always provide adequate guidance to help undergraduates navigate technology ethics issues.	3.09	Agreed
5	Technical limitations may impede undergraduates' ability to adhere to technology ethics when accessing electronic library resources	3.10	Agreed
6	Peer influence can influence undergraduates' adherence to technology ethics	2.92	Agreed
7	Ethical issues related to technology use may sometimes be ambiguous	3.12	Agreed
8	Social norms within academic communities influence undergraduates' adherence to technology ethics	3.19	Agreed
9	Ethical issues related to use of electronic library resources may sometimes be unclear	3.01	Agreed
	Grand Mean	**3.04**	**Agreed**

Table 3 above shows the mean ratings of the challenges faced by undergraduates in adhering to technology ethics in the use of electronic library resources. Majority of the undergraduates agreed to the social norms within academic communities influencing the undergraduates in adhering to technology ethics with the mean rating of (3.19), Undergraduates facing pressure to prioritize convenience when using electronic library resources (mean = 3.13), Ethical issues related to technology use may sometimes be ambiguous and constitute a challenge (mean = 3.12), Technical limitations may also impede undergraduates' ability to adhere to technology ethics when accessing electronic library resources (mean =3.10), Universities may not always provide adequate guidance to help undergraduates navigate technology ethics issues (mean = 3.09), Ethical issues related to use of electronic library resources may sometimes be unclear (mean = 3.01), Undergraduates may face pressure to prioritize efficiency over ethical considerations when using electronic library resources (mean = 2.97), Peer influence can influence undergraduates' adherence to technology ethics (mean = 2.82) and lack of awareness of technology ethics principles also constitutes a challenge (mean =2.87).

Research Question 4: What are the strategies for tackling the challenges associated with application of technology ethics in the use of electronic library resources in Chukwuemeka Odumegwu Ojukwu University, Igbariam?

Table 4: Mean rating on the strategies for tackling the challenges associated with application of technology ethics in the use of electronic library resources

S/N	Items	Mean	Decision
1	Incorporating technology ethics education into the curriculum helps students develop a deeper understanding of ethical principles related to electronic library resource and creates needed awareness	2.82	Agreed
2	Establishing clear policies and guidelines for the ethical use of electronic library resources helps set observable expectations for users	3.10	Agreed
3	Launching awareness campaigns and outreach initiatives can help raise awareness among users about technology ethics issues	2.93	Agreed
4	Establishing ethics committees or review boards within academic institutions can provide oversight and guidance on technology ethics issues	3.01	Agreed
5	Incorporating ethical design principles into the development of electronic library resources promotes user privacy	3.09	Agreed
6	Incorporating ethical design principles into the implementation of electronic library resources promotes user security	2.92	Agreed
7	Incorporating ethical design standards into the development and implementation of electronic library resources promotes user autonomy	3.15	Agreed
8	Collaborating with technology vendors and service providers can help ensure that electronic library resources adhere to ethical standards and best practices	3.20	Agreed
9	Ongoing assessment and evaluation of technology ethics initiatives can identify gaps and address challenges	3.07	Agreed
	Grand Mean	**3.11**	**Agreed**

Table 4 above shows the mean ratings on the strategies for tackling the challenges associated in application of technology ethics in the use of electronic library resources. All the undergraduates agreed on all the strategies listed for tackling the challenges with many that agree to collaborating with technology vendors and service providers to help ensure that electronic library resources adhere to ethical standards and best practices (mean = 3.20), Incorporating ethical design standards into the development and implementation of electronic library resources promotes user autonomy (mean =3.15), Establishing clear policies and guidelines for the ethical use of electronic library resources helps set expectations for users (mean = 3.10), Incorporating ethical design principles into the development of electronic library resources promotes user privacy (mean =3.09), Ongoing assessment and evaluation of technology ethics initiatives can identify gaps and address challenges (mean = 3.07), Launching awareness campaigns and outreach initiatives can help raise awareness among users about technology ethics issues (mean = 2.93), Incorporating ethical design principles into the implementation of electronic library resources promotes user security (mean = 2.92), and incorporating technology ethics education into the curriculum helps students develop a deeper understanding of ethical principles related to

electronic library resource was least accepted from the list with the mean rating of (2.82) which is equally high.

Discussion of Findings

The study at Chukwuemeka Odumegwu Ojukwu University, Igbariam demonstrated that the undergraduates are neither aware of the technology ethics nor the application of same in the use of electronic library resources They were unfamiliar with the ethical guidelines and rules as well as unaware of the ethical information for electronic resources. This finding also identified a lack of awareness among the students regarding ethical issues related to ICT use and intellectual property rights. Similarly, Khoo and Norwina (2020) found that many university students engage in unethical behaviours due to insufficient understanding of technology ethics. These findings underscore the need to address gaps in technology ethics education to foster responsible and ethical use of electronic library resources among undergraduates.

The result also, shows that undergraduates at Chukwuemeka Odumegwu Ojukwu University, Igbariam do not adhere to the application of the technology ethics when using electronic library resources, as evidenced by their disregard for copyright laws, licensing agreements, and responsible digital citizenship. This trend is consistent with multiple empirical studies. Pandey and Sharma (2020); Johnson and Fritschi (2018) noted that students often neglect principles such as respecting intellectual property rights and proper source acknowledgment. Similarly, Haris, Lerord and Poman (2013) observed a lack of ethical consideration, particularly regarding issues like plagiarism and copyright infringement. In addition, Bauer (2018) highlighted the prevalence of unauthorized sharing of copyrighted content among university students. Moreover, Dietz and Waldfogel (2019) found that many undergraduates failed to recognize the ethical implications of actions like downloading pirated materials. These findings underscore the urgent need for interventions to promote technology ethics awareness and its application among undergraduates to encourage responsible digital citizenship.

The study also, illustrates that undergraduates at Chukwuemeka Odumegwu Ojukwu University, Igbariam encounter various challenges associated with adhering to technology ethics in the use of electronic library resources. These challenges include: a lack of awareness of technology ethics principles, pressure to prioritize convenience and efficiency over ethical considerations, inadequate guidance, technical limitations, peer influence, ambiguous ethical issues, and unclear social norms within academic communities. These findings align with that of previous research by Tenopir et al (2012); Ali, Almughamsi and Ai-Mansour (2018), who noted a lack of awareness among college students regarding technology ethics principles, contributing to unethical behaviours such as plagiarism and unauthorized sharing of copyrighted materials. Similarly, DiMaggio and Hargittai (2021); Johnson and Nardi (2018) observed that undergraduates often prioritize convenience over ethics due to time constraints, while Manyika, Chui and Osborne (2019) identified peer pressure and societal norms as influencing factors in unethical behaviours related to digital content sharing. Additionally, Crawford and Schultz (2014) highlighted challenges in recognizing the ethical implications of online actions among undergraduates. These findings emphasize the complexity of challenges faced by students in adhering to technology ethics and the importance of targeted interventions and educational initiatives to address these issues.

Lastly,the result also, reveals that undergraduates at Chukwuemeka Odumegwu Ojukwu University, Igbariam agreed on various strategies to address challenges associated with applying

technology ethics in the use of electronic library resources. These strategies include incorporating technology ethics education into the curriculum, establishing clear policies and guidelines for ethical use, launching awareness campaigns, establishing ethics committees, incorporating ethical design principles into resource development and implementation, collaborating with technology vendors, and conducting ongoing assessment and evaluation of ethics initiatives. These findings align with the research by Johnson and Fritschi (2018), who emphasized integrating technology ethics education into the curriculum. Similarly, Smith et al. (2019) advocated for explicit policies to guide ethical resource use. Bauer (2018) highlighted the effectiveness of educational interventions, while Manyinka, Chui and Osborne (2019) stressed institutional support in enforcing ethical guidelines. These findings underscore the importance of proactive measures, including education and policy enforcement, in addressing technology ethics challenges encountered in the use of electronic library resource.

Conclusion

Based on the findings, the study concludes that a significant majority of undergraduates lack awareness of technology ethics and do not apply them in the use of electronic library resources. Similarly, the study revealed challenges such as the pressure to prioritize convenience over ethical considerations as significant barriers to adhering to technology ethics as well as potential strategies to tackle these challenges effectively.

Recommendations

Based on the findings, the following recommendations are made:

1. Management of the university should implement comprehensive technology ethics education program in the university curriculum. These programs should aim at increased awareness of technology ethics principles among undergraduates and provide them with the knowledge and skills to apply these principles effectively in the use of electronic library resources.
2. Management of university libraries should device means of creating special training for the undergraduates to enhance their application of technology ethics in the use of electronic library resources
3. Due to the problems of unclear policies and guidelines on utilization of technology ethics in university libraries, the management should institutionalize workable guidelines that will enhance the undergraduates' ethical use of electronic library resources.
4. As part of the solutions, management of universities should implement comprehensive technology ethics education programs into the university curriculum to solve the challenges of technology ethics in the use of electronic library resources.

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