

Equipping Teachers for Instructional Effectiveness through Educational Technology Ethics in the Teaching and Learning of Basic Science and Technology in Ekiti State, Nigeria

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Abstract: *In an era characterized by the rapid advancement of educational technology, the role of teachers in ethically and effectively integrating these tools into their teaching practices is crucial. This study examines the intersection of educational technology and ethics, emphasizing the importance of equipping teachers with the knowledge and skills needed to navigate this evolving landscape responsibly. As digital tools become increasingly widespread, educators are confronted with a variety of ethical challenges, including the protection of student privacy and ensuring equitable access to technological resources. This study explores the ethical dilemma teachers' face when utilizing educational technology and offers strategies for addressing them. The study uses a descriptive research design of the survey type. The population of the study comprises all Basic Science and technology teachers in Ekiti State secondary schools. One hundred and twenty Basic Science and technology teachers were used as sample size which was selected using multi-stage sampling techniques. Three research questions were raised and answered descriptively using simple frequency counts, percentage and mean. Also two corresponding hypotheses were formulated to guide the study. Data for the study were collected using structured questionnaire developed by the researcher and validated by experts in test and measurement and two educational technology experts. The results showed that most teachers of Basic Science and technology were not fully aware of educational technology ethics and therefore possess little or no knowledge in the application of educational technology ethics in their teaching and learning process. Recommendations were made that teachers should undergo professional training in the utilization of educational technology ethics which will promote student achievement, equity and ethical integrity.*

Keywords: instructional effectiveness, educational technology ethics, basic science technology, teaching and learning

INTRODUCTION

In the ever-evolving landscape of education, the integration of technology has become increasingly widespread, promising enriched learning experiences and improved educational outcomes. Teachers play a key role in utilizing these technological tools to create dynamic and engaging instructional environments. As their role shifts from traditional teaching to facilitating learning through digital means, critical questions about the ethical use of educational technologies have emerged. Effective teaching practices now require not only technological proficiency but also a deep understanding of the ethical guidelines that govern their use (Foulger et al., 2020).

The ethics of educational technology involve the responsible use of digital tools in a manner that respects students' privacy, ensures data security, and promotes equitable access to learning resources (Ertmer et al., 2015). As teachers leverage technology to enhance learning, they must confront issues related to fairness, transparency, and the ethical application of these tools. Furthermore, the rapid pace of technological innovation often surpasses the development of ethical frameworks, leaving educators to navigate uncharted territories with minimal guidance (Livingstone et al., 2022).

Educational technology ethics refers to the ethical principles and considerations that guide the use of technology in educational settings (Mishra & Kereluik, 2011). It encompasses a broad spectrum of issues related to the fair, responsible, and equitable integration of technology in teaching and learning. Livingstone & Sefton-Green (2022) highlighted several fundamental components of educational technology ethics, which include:

i. Student Privacy and Data Security: Ensuring the protection of students' personal information and data collected through educational technology tools and platforms. This includes obtaining informed consent for data collection, implementing robust security measures, and adhering to relevant privacy laws and regulations.

ii. Digital Equity and Access: Addressing disparities in access to technology and digital resources among students from different socioeconomic backgrounds. Educational technology should be implemented in a way that promotes equal opportunities for learning and minimizes the digital divide.

iii. Fairness and Transparency in Algorithms: Ensuring that algorithms used in educational technology applications are free from biases and discrimination. This involves scrutinizing algorithms for potential biases based on factors such as race, gender, or socioeconomic status, and taking steps to mitigate these biases.

iv. Responsible Use of Technology: Promoting responsible and ethical behavior among students and educators in their use of technology. This includes teaching digital citizenship skills, such as online etiquette, responsible use of social media, and critical evaluation of online information.

v. Intellectual Property Rights: Respecting copyright laws and intellectual property rights when using digital resources and materials in educational contexts. Educators should be aware of licensing agreements and permissions when using third-party content in their teaching materials.

vi. Ethical Use of Student Data: Ensuring that student data is used responsibly and ethically, with clear guidelines for how it is collected, stored, and analyzed. This includes protecting student confidentiality, using data for educational purposes only, and obtaining consent when necessary.

vii. Equitable Access to Technology Tools: Ensuring that all students have access to the technology tools and resources needed to support their learning. This may involve providing devices, internet access, and technical support to students who may otherwise be disadvantaged.

Educational technology ethics provides a framework for educators, policymakers, and other stakeholders to critically examine the ethical implications of technology use in education and make decisions that prioritize the well-being and rights of students. By considering these ethical dimensions, educators can ensure that technology is used in a way that enhance learning outcomes while also upholding principles of fairness, transparency, and respect for individual rights and dignity.

In recent years, concerns have been raised about the potential of educational technology to worsen existing inequalities in education. While technology holds the promise of leveling the playing field by offering access to resources and opportunities that were previously out of reach for certain students and populations, It also runs the risk of widening the digital divide (Busar et al., 2021). Furthermore, issues such as algorithmic bias and the commodification of student data have ignited debates regarding the ethical limits of educational technology.

Moreover, the COVID-19 pandemic further accelerated the adoption of technology in education, bringing with the adoption of technology in education, bringing with it new ethical considerations. During the pandemic, many schools used online platforms and digital resources to maintain continuity in classroom instruction. However, this shift highlighted the digital divide as students from disadvantaged background often lacked access to the necessary devices or stable internet connections [Selwyn, 2021]. Teachers therefore must not only be proficient in using educational technology but also must be accustomed to its ethical challenges to ensure no student is left behind

Against this backdrop, there is a pressing need to equip teachers with the knowledge, skills, and resources to navigate the complex terrain of educational technology ethics, by fostering a deeper understanding of ethical implication of technology use in education, teacher can make informed decisions, that prioritize the well-being and learning outcomes of their students, they can also ensure that technology is used in a way that enhance learning outcomes while upholding principles of fairness, transparency, and respect for individual rights and dignity. This study therefore seeks to explore the intersection of educational technology and ethics with a specific focus on equipping teachers for instructional effectiveness in Basic Science and technology.

Statement of the Problem

In the fast-changing landscape of education, the integration of educational technology has become widespread, offering the promise of enhanced teaching practices and improved learning outcomes. However, alongside the proliferation of digital tools and resources, there is a growing need to address the ethical implications of their use in instructional settings.

The central issue lies in the lack of adequate preparation and support for teachers to navigate the complex ethical landscape of educational technology. While technological advancements hold great potential to transform teaching and learning, they also introduce numerous ethical challenges that educators must confront.

Teachers frequently face dilemmas concerning student privacy and data security when using educational technology platforms, raising questions about the collection, storage, and usage of student data. Additionally, digital equity and access issues emerge, as disparities in technology availability among students can worsen existing inequalities in educational opportunities.

Furthermore, educators must address the ethical responsibilities of using technology wisely and fostering digital citizenship skills among students. This includes navigating concerns such as online privacy, cyberbullying, and intellectual property rights, all of which present significant ethical challenges in the modern classroom.

Despite the critical importance of addressing these ethical considerations, teachers of Basic science and technology seems to lack the necessary training, resources, and support to effectively navigate the ethical dimensions of educational technology. This gap in preparation not only undermines instructional effectiveness but also raises concerns about the potential risks and harms associated with the indiscriminate use of technology in the classroom instruction. Therefore, this study sought to investigate and address the critical needs towards equipping Basic Science and technology teachers with necessary knowledge, skill and resources to enhance instructional effectiveness through the use of educational technology ethics.

Purpose of the Study

The purpose of this study is to investigate and address the critical need for equipping teachers of Basic Science and Technology with the necessary knowledge, skills and resources to enhance instructional effectiveness through the use of Educational Technology Ethics. The study specifically wants to;

- i. Access the level of awareness of Educational Technology Ethics among the Basic Science and Technology in Ekiti-State Secondary School
- ii. Examine the perception of Basic Science and Technology teachers toward the integration of Educational Technology Ethics in the classroom instruction.

- iii. Examine the barriers faced by Basic Science and Technology teachers toward integrating Educational Technology Ethics in process of teaching and learning of Basic Science and Technology in Ekiti-State Secondary Schools.

Research Questions

The following research questions were raised for the study;

1. What is the level of Awareness of Educational Technology ethics among Basic Science and Technology in Ekiti-State Secondary Schools
2. What is the perceptions of Basic Science and Technology towards integration of Educational Technology Ethics in their classroom instruction in Ekiti-State Secondary Schools
3. What are the barriers faced by Basic Science and Technology toward the integration of Educational Technology Ethics in the classroom instruction in Ekiti State Secondary Schools.

Research Hypotheses

The following hypotheses were formulated to guide the study;

1. There is no significant difference between teachers' perception of Educational Technology Ethics and their level of use in the teaching and learning of Basic Science and technology in Ekiti-State Secondary Schools
2. There is no significant relationship between the level of Awareness of Educational Technology Ethics and the perceived problems encountered by Basic Science and Technology in Ekiti State Secondary School.

RESEARCH METHOD

The research design is descriptive and of the survey type which sought to investigate and address critical need for equipping teachers of Basic Science and Technology with the necessary knowledge, skills and resources to enhance instructional effectiveness through the lens of educational technology ethics in Ekiti-State secondary schools.

The target population consist all the Basic Science and Technology teachers in Ekiti State Secondary School. The sample size was 120 Basic Science and Technology which were selected using multi-state sampling techniques. A self-designed questionnaire titled "Teachers' Instructional Effectiveness and Educational Technology Ethics in Basic Science and Technology" (TIE-ETEBST) was used to elicit relevant information from respondent. The questionnaire was designed with relevant sections A and B. Section A consists of relevant personal Data of the respondent while section B was designed to elicit relevant information with respect to the following areas;

- i. The level of awareness of educational technology ethics among teachers of basic science and technology in Ekiti State secondary schools
- ii. Perceptions of Basic Science and Technology towards the use of educational technology ethics in the classroom instruction in Ekiti-State secondary schools
- iii. Problems faced by Basic Science and Technology in adopting educational technology ethics in their classroom instruction in Ekiti-State secondary schools.

The instrument was validated by experts from test and measurement and three experienced educational technology experts. The reliability of the instrument was established through test-retest method. The reliability co-efficient was calculated using Pearson product moment correlation analysis in which a reliability co-efficient of 0.75 was obtained. This value was considered high enough and suitable for gathering data. Data gathered were analyzed using frequency counts, percentage, mean and standard deviation while the hypotheses formulated were tested at 0.05 level of significant using t-test.

Research Question 1: What is the level of awareness of educational technology ethics among Basic Science and Technology teachers in Ekiti State Secondary Schools.

Table 1: Level of awareness of Educational Technology Ethics among Basic Science and Technology teachers in Ekiti-State secondary schools.

S/N	ITEMS	STRONGLY AWARE	FAIRLY AWARE	NEUTRAL	NOT AWARE	X	DECISION
1	Student privacy and data security	20 16.67%	30 25%	5 4.17%	65 54.17%	2.04	N.A
2	Digital equity and access among student	35 29.17%	20 16.67%	6 5%	59 49.17%	2.26	N.A
3	Fairness and transparency in algorithms used by BST	25 20.83%	35 29.17%	04 3.33%	56 46.67%	2.24	N.A
4	Responsible use of technology among students and educators	75 62.50%	30 25%	02 1.67%	13 10.83%	3.39	Aware

5	Intellectual property rights when using digital resources among educators	23 19.17%	25 20.83%	03 2.5%	69 57.50%	2.02	N.A
6	Ethical use of students data	18 15.0%	13 10.83%	5 4.17%	84 70.0%	1.71	N.A
7	Equitable access to technology tools	70 58.33%	28 23.33%	01 0.83%	21 17.5%	3.25	Aware

Table 1 above shows the level of awareness of educational technology ethics by basic science technology teachers in Ekiti State secondary schools. From the table, it was shown that 65% of the basic science and technology teachers were not aware of student's privacy and data security as one of the key component of educational technology ethics with a mean score of 2.04. This is not a good idea as the awareness of this tool encourages fair and equitable integration of technology in the teaching and learning process. Student privacy and data security are critical components of ethical practices in educational technology because they directly impact the safety, autonomy, and well-being of the students, and in fact, students privacy, and data security helps to protect personal information, prevention of exploitation by inscription communication body, maintaining trust and autonomy of educational technology platform used by the students, prevention of discrimination and biasness in the protection of student privacy and data security in issue but a fundamental ethical responsibility that teachers need to be aware of. It ensures compliance with legal requirement protect students from exploitation and bias foster and preserve them long-term opportunities and well-being.

Also from table 1, it was revealed that teachers of basic science and technology were not aware of digital equity and access among students as one of the major component in the use of Educational technology ethics. Digital equity and access are critical factors in modern education as it ensures that all students, regardless if their socioeconomic background or location, have the opportunity to succeed in a digital world. Teachers that are not aware of this tool will rub the student of this great opportunity. Digital equity and access equally promote inclusive learning, develop digital literacy among learners, reduces socioeconomic disparities, foster innovation and creativity and encourage long-term economic impact. Hence digital equity and access is not about providing devices and internet access but about creating an environment where every student can develop the skills,

knowledge, and confidence needed to thrive in an increasingly digital world. Teachers therefore need to increase or double the aware of this educational technology ethics tool.

Similarly, it was indicated from table 1 that 56% of basic science and technology are not aware of algorithms when integrating educational technology ethics. The table shows an average mean score of 2.24 by the respondents. Fairness and transparency in the use of algorithms are essential in the practice of educational technology because they directly impact the quality, equity and accountability of educational experiences. As educational technology increasingly relies on algorithms for decisions such as student assessments, personalized learning, and even admissions, ensuring these algorithms are fair and transparent is critical to maintaining trust, promoting equity and supporting ethical practices.

However, it was revealed from table 1 that basic science and technology teachers are quite aware of responsible use of technology among students and educators. The table 1 indicates that 75% of the teachers with a mean score of 3.39 are aware of this component of educational technology ethics. This is a good idea as responsible use of technology among students and educators is vital for fostering a productive, safe, and ethical learning environment. On the contrary, it was revealed from table 2 that 69% of basic science and technology teacher with a mean score of 2.02 are not aware of intellectual property rights when using digital resources among educators. Intellectual property rights are crucial when using digital resources because they protect the creators of original content and promote innovation, creativity, and ethical use of materials. In the digital age, where content is easily accessible and shared, respecting intellectual property rights ensure that creators receive credit and compensation for them while maintaining the integrity of the information ecosystem. By respecting intellectual property, users can ensure they are contributing to a culture that values creativity, fairness and legality while benefiting from the wide range of digital resources available.

Research Question 2: What is the perception of basic science and technology teachers toward the use of educational technology ethics in the classroom situation.

Table 2: Basic Science and Technology Teacher’s Perception Of The Use Of Educational Technology Ethics In The Classroom Settings.

S/N	STATEMENT	SA	A	D	SD	MEAN	DECISION
1	It is a good idea to use educational technology ethics responsibly for teaching and learning process other than just application of ICT tools	80 66.67%	20 16.67%	05 4.17%	15 12.30%	3.38	Agreed
2	Educational technology ethics makes teaching	20 16.67%	15 12.50%	83 69.17%	02 1.67%	2.44	Disagreed

	and learning process easier						
3	The teacher-student relationship is lost while using educational technology ethics in the classroom setting	20 16.67%	05 4.17%	85 70.83%	10 8.33%	2.29	Disagreed
4	The use of educational technology ethics in the classroom settings is time consuming	85 70.83%	15 12.50%	15 12.50%	05 4.17%	3.50	Agreed
5	If I had some training in respect of educational technology ethics I would like to use it during my instructional delivery in the classroom	87 72.50%	15 12.50%	16 13.33%	02 1.67%	3.56	Agreed
6	I can monitor the progress made by students during teaching and learning in the classroom when I make use of educational technology ethics	75 62.50%	20 16.67%	15 12.50%	10 8.33%	3.33	Agreed

Table 2 above shows the perception of basic science and technology teachers toward the use of educational technology ethics in Ekiti State secondary school. It was revealed from the table that 66.67% of the basic science and technology teachers agreed that the use of educational technology ethics responsibly in the classroom settings other than just application of ICT tools can improve the teaching and learning in the classroom setting. Responsible use of educational technology ethics ensure that technology is used to enhance learning, promote equity, protect privacy and prepare students for the future success while avoiding the negative effect of misuse. By practicing responsible technology use, educators and students can maximize the benefits of digital tools and ensure they contribute positively to personal academic and professional growth.

However, 69% of basic science and technology teacher disagree that educational technology ethic can totally make teaching and learning process easier due to some hitches that can occur may be as the result of lack of professional training of the teachers.

Also, about 69.17% basic and technology teachers with a mean score of 2.29 equally disagreed that the use of educational technology ethics in the classroom setting can result to loss of student-teacher relationship in the classroom.

Again, from table 2, 72.80% of the basic science and technology teacher with a mean score of 3.56 agreed that if they undergo a regular training on the use of educational technology ethics they would like to use it during instructional delivery in the classroom. Similarly from table 2, it was revealed that 65.50% of basic science and technology teachers with a mean score of 3.33 agreed that they can monitor the progress made by the student with the use of educational technology ethics when given adequate training.

Research Question 3: What are the barriers encountered by Basic Science and Technology teachers in adopting or integrating educational technology ethics in their classroom instruction in Ekiti State secondary schools.

Table 3: mean response of problems encountered by Basic Science and Technology teachers in integrating educational technology ethics in Ekiti State secondary schools.

S/N	STATEMENT	SA	A	D	SD	\bar{X}	DECISION
1	Lack of awareness of educational technology ethics by Basic Science and Technology teachers	89	20	15	16	3.85	Agreed
2	Limited time and resources on the part of the teachers to applying educational technology ethics in their instructional process	79	30	05	06	3.52	Agreed
3	Lack of institutional support and fragile policies	85	25	06	04	3.59	Agreed
4	Ambiguity in ethical guidelines	75	20	15	10	3.33	Agreed
5	Students resistance or lack of understanding of educational technology ethics	70	15	20	15	3.17	Agreed
6	Digital equity and access problems on the part of the students	80	10	20	10	3.33	Agreed
7	Balancing technology use and pedagogy	20	05	85	10	2.33	Disagreed
8	Cyber security problems	78	20	10	12	3.37	Agreed
9	Cultural and social differences on the parts of the leaders	70	30	15	05	3.38	Agreed
10	Constantly changing in technology	75	20	10	15	3.29	Agreed

Table 3 shows the problems encountered by Basic Science and Technology teachers in applying educational technology ethics in the instructional process. It was shown from table 3 that one of the greatest problems confronting basic science and technology teachers in applying educational technology ethics is lack of awareness of educational technology ethics by the teachers with a

mean score of 3.85. Many of the teachers were not aware and adequately trained in the ethical use of educational technology. Without adequate training, it is very difficult for the teachers to address ethical issues such as data privacy, cyber bullying, and intellectual property rights cannot be address without adequate training.

Another problem encountered by basic science and technology teachers in applying educational technology ethics in the classroom instruction as shown in table 3 was limited time and resources on the part of basic science and technology teachers with a mean score of 3.52. Teachers often have tight schedule of duty and a large amount of content areas to cover therefore integrating discussions about ethical issues related to the use of technology tools may look like an additional burden especially where sufficient instructional resources are not available.

Also from table 3, the respondent agreed that lack of institutional support and fragile policies with a mean score of 3.59 was one of the challenges confronting basic science and technology teachers from adopting educational technology ethics in the classroom instruction. Some educational institutions have not prioritize ethical training in technology use and apart from this there is no comprehensive policies on the ethical consideration into their lesson plans. Similarly, the respondent agreed that ambiguity in ethical guidelines is one of the problems confronting basic science and technology teachers in adopting educational technology ethics in their classroom instruction. This was shown in table 3 with a mean score of 3.33. Ethical issues in technology use such as digital privacy, copyrights and data security often lack clear-cut rules. Hence, teachers find it difficult to interpret ambiguity involved in the guidelines and apply this effectively in their classroom situation.

It was equally shown from table 3 that students' resistance and lack of understanding of educational technology ethics is one of the major problems confronting the teachers in adopting educational technology ethics in the classroom instruction. Students often resist learning about ethics viewing it as irrelevant and boring compared to ordinary use of technology tools. Other challenges faced by basic science and technology teachers in adopting educational technology ethics in the classroom instruction includes digital equity and access, cyber security problems, cultural and social differences and constant changing in prevailing technology with a mean score of 3.33, 3.37, 3.38, and 3.29 respectively as indicated in table 3. However, the respondent disagreed that balancing educational technology use and pedagogy with a mean score of 2.33 is a serious problem confronting basic science and technology teachers in adopting educational technology ethics in classroom instruction.

Research Hypotheses

Hypotheses 1: There is no significant difference between teachers' perception of educational technology ethics and their level of use in the teaching and learning basic science and technology in Ekiti-state secondary schools.

Table 4: t-test summary showing differences between teachers' perception of educational technology ethics and their level of use in the teaching and learning basic science and technology in Ekiti-State secondary schools.

VARIABLES	N	MEAN	SD	DF	T	t-test
Teachers' perception	120	49.97	12.49	118	41.81	1.98
Level of use of educational teachers ethics	120	5.20	0.82			

P < 0.05

Table 4 above shows that computed t-calculated value in 41.81 greater than t-table value (1.98) with degree of freedom 118. This shows that the result is significant and have the null hypotheses rejected. This shows that there is significant difference between teachers' perception of educational technology ethics and their level by basic science and technology teachers in their classroom instructions.

Hypotheses 2: There is no significant relationship between the level of awareness of educational technology ethics and the perceived problems encountered by basic science and technology teachers in Ekiti State secondary schools.

Table 5: Summary of Pearson Product Moment Curriculum Analysis showing relationship between ethics and the perceived problems encountered by basic science and technology teachers in Ekiti State secondary schools.

VARIABLES	N	MEAN	SD	r-calculated	r-table
Level of awareness	120	1.79	0.78	0.812	0.195
Perceived constraints	120	1.24	0.429		

P < 0.05

Table 5 above revealed that r-calculated is 0.812 greater than r-table value (0.195). Since r-calculated is greater than the r-table value, it shows that the result is statistically significant. This implies that there is a significant relationship between the level of awareness and the perceived problems encountered by basic science and technology teachers in their classroom instruction hence, the null hypothesis was rejected.

DISCUSSION

The finding of the study was revealed in table 1 with regard to the awareness of educational technology ethics by basic science and technology teachers show that teachers of basic science and technology teachers are not aware of most educational technology ethics component such as student privacy and data security, digital security, digital equity, and access among students, fairness and transparency in algorithms use, intellectual property rights, and ethical use of students data with an average mean scores of 2.04, 2.26, 2.24, 2.02, and 1.71 respectively. These findings agreed with the view of Ertmer, et al. (2015) whose studies affirmed that teachers' awareness and responsible use of educational technology tools can lead to improved student academic

achievement. Schools and educational platforms often collect a wide range of personal data including names, addresses, academic records, behavioral data, and even biometric information, ensuring privacy means of protecting this data from unauthorized access, which could lead to identity theft, harassment or misuse. Hence, protection of student privacy and data security in the process of use of educational technology tools is not just a technical issue but a fundamental ethical responsibility. It ensures compliance with legal requirement, protects students from exploitation and bias, fosters trust, and preserves their long term opportunities and well-being.

Similarly, with regard to the teachers' perceptions of the use of educational technology ethics in the classroom as indicated in table 2, it was shown that some of the basic science and technology teachers did not have negative perceptions toward educational technology ethics as they are of the opinion that they would have liked to integrate it in their classroom instructions but could not do this due to lack of regular professional training on ethical use of technology tools.

However, some of the basic science and technology teachers give the opinion that student-teacher relationship may be lost in the process of using educational technology during classroom instruction. Table 2 indicated a mean score of 2.29 with regards to this point, this finding agreed with the submission of Onyemo, (2019) who was of the opinion that the professional training of the responsible use of digital tools can improve the positive attitude of teachers toward the ethical use of technology tools.

In the same vein, it was revealed from table 3 that basic science and technology teachers are faced with a lot of constraints in integrating educational technology ethics in their classroom instructions. This constraint includes lack of awareness of educational technology ethics, limited time and resources on the part of teachers, lack of institutional support and unstable government policies, ambiguity in ethical guidelines, students' resistance and lack of understanding of educational technology ethics, and cyber security problems with mean scores of 3.85, 3.52, 3.59, 3.33, 3.17, and 3.37 respectively. Teachers often have tight schedules and a large amount of content to cover. Integrating discussion about ethical use of technology tools may look like an additional burden to the work load especially where there is insufficient digital resource. This finding also agreed with the assertions of Afolabi and Aragbaye,(2022) who affirms that limited time and resources hindered teachers' effective utilization of digital resources in the classroom instruction.

Finally, the findings of this study as shown in table 4 indicate that there is a significant difference between teachers' perceptions of educational technology ethics and their level of use by basic science and technology teachers in Ekiti State secondary schools. With a computed t-calculated value of 41.82 greater than the t-value (1.98). Table 5 equally shows that there is a significant relationship between the level of awareness of educational technology ethics and the perceived problems encountered by basic science and technology teachers in Ekiti State secondary schools with r-calculated values (0.812) greater than the r-table value (0.195).

Hence, in today's educational landscape, the integrating of educational technology has become increasingly prevalent. However, the effective utilization of technology in the classroom instruction requires more than just technical proficiency it necessitates a deep understanding of ethical consideration. Teachers play a pivotal role not only in implementing educational technology but also in guiding students on how to responsibly and ethically engage with digital tools.

CONCLUSION

In conclusion this study indicated that integration of educational technology ethics has a great influence on the effective teaching and learning of basic science and technology in classroom instruction. Equipping teachers with the knowledge and skills necessary for instructional effectiveness through educational technology ethics is therefore crucial in today's digital use. By fostering an understanding of ethical consideration surrounding technology use, educators can create safer, more inclusive and more engaging learning environment for their students. It is therefore very imperative for educational institutions and stakeholders to prioritize the integration of educational technology ethics into teachers training and professional development.

Recommendations

Based on the findings of this study the following recommendations were made:

1. Professional training and development on the use of educational technology ethics should be provided for basic science teachers in order to promote their instructional effectiveness.
2. The training should cover not only the theoretical aspect of educational technology ethics but also practical strategies for implementing ethical practices in the classroom instruction.
3. Aligning digital resources with ethical practices should be incorporated into the basic science and technology curriculum planning and development.
4. There should be collaboration between educators, policy makers, technology developers and other stakeholders in order to develop comprehensive guidelines and resources for ethical technology use in education.
5. Access to technological resources in educational institution should be improved.

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