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EVALUATION OF DIGITAL DIVIDE IN ONLINE EDUCATION: EMPIRICAL STUDY OF MEDIA AWARENESS AMONG UNDERGRADUATE STUDENTS OF THE UNIVERSITY OF NIGERIA

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Abstract

The rapid integration of digital technologies into education has transformed learning globally, particularly with the widespread adoption of online education. However, this transition has also exposed significant inequalities in access to digital resources and the ability to effectively utilize them, especially in developing countries such as Nigeria. This study examines the digital divide in online education with a focus on media awareness among undergraduate students of the University of Nigeria. The problem addressed is the persistent disparity in access to digital technologies and the limited level of media awareness among students, which negatively affect their participation in online learning. While many students possess basic digital devices such as smartphones, challenges including unreliable internet connectivity, high cost of data, and insufficient digital literacy hinder effective engagement with online educational platforms. The purpose of the study is to evaluate the extent of the digital divide and to examine how media awareness influences students' participation in online education. A quantitative research approach was adopted using a descriptive survey design, with data collected from 300 undergraduate students through structured questionnaires and analyzed using the Statistical Package for the Social Sciences (SPSS). The findings reveal that although access to smartphones is widespread, access to more suitable academic devices and stable internet connectivity remains limited, and media awareness among students is moderate. The study concludes that the digital divide is multidimensional, involving both access and digital competence, and emphasizes the need for improved infrastructure, digital literacy training, and policy interventions to enhance online education outcomes.

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Keywords: Digital divide; Online education; Media awareness; Digital literacy; Undergraduate students; Nigeria.

Introduction

The rapid advancement of digital technologies has significantly transformed the landscape of education across the globe. Online education, also referred to as e-learning, has become an integral component of modern educational systems, enabling learners to access instructional materials, participate in virtual classrooms, and engage with educators remotely. The global shift toward online education was particularly accelerated by the COVID-19 pandemic, which necessitated the closure of physical educational institutions and the adoption of digital platforms for continuity of learning (Dhawan, 2021; Hodges et al., 2020). As a result, institutions worldwide have increasingly integrated digital tools such as learning management systems (LMS), video conferencing platforms, and mobile applications into their teaching and learning processes.

The emergence of digital technologies in education has created new opportunities for expanding access to knowledge and enhancing learning outcomes. Technologies such as artificial intelligence, cloud computing, and mobile internet have enabled personalized learning experiences and improved communication between students and instructors (Bond et al., 2021). In developing countries like Nigeria, mobile technology in particular has played a crucial role in facilitating access to online education, given the widespread use of smartphones among students (Afolabi et al., 2023). However, the effective utilization of these technologies depends not only on access but also on the users' ability to navigate and critically engage with digital media.

Despite the growing adoption of online education, significant disparities exist in access to digital technologies and the skills required to use them effectively. This phenomenon, commonly referred to as the digital divide, encompasses inequalities in access to devices, internet connectivity, and digital literacy (Van Dijk, 2020; UNESCO, 2023). In the Nigerian context, the digital divide is further influenced by socio-economic status, geographic location, and infrastructural limitations, leading to unequal participation in online learning environments (Oyediran et al., 2021). Consequently, while some students are able to fully benefit from digital learning opportunities, others are left at a disadvantage due to limited resources and inadequate media awareness.

Statement of the Problem

The increasing reliance on online education has brought the issue of the digital divide to the forefront of academic discourse, particularly in developing countries such as Nigeria. Although universities have adopted digital learning platforms to enhance teaching and learning, many students continue to face significant barriers that hinder their effective participation. The digital divide is not limited to access to devices and internet connectivity; it also includes disparities in digital skills, media awareness, and the ability to utilize online resources effectively (Van Dijk, 2020).

Undergraduate students in Nigerian universities encounter several challenges in accessing and benefiting from online education. These challenges include unreliable internet connectivity, high cost of data, lack of access to appropriate digital devices such as laptops, and limited digital literacy skills (Afolabi et al., 2023; Oyediran et al., 2021). Furthermore, many students lack adequate media awareness, which affects their ability to critically evaluate online information and effectively engage with digital learning platforms. This situation creates inequalities in learning outcomes and limits the overall effectiveness of online education.

Despite various initiatives aimed at promoting digital inclusion, there remains a gap in understanding how media awareness interacts with digital access to influence students' participation in online learning. Most existing studies have focused primarily on access and infrastructure, with limited attention given to the role of media awareness in bridging the digital divide. Therefore, there is a need for an empirical investigation into the extent of the digital divide and its relationship with media awareness among undergraduate students, particularly within the University of Nigeria context.

Objectives of the Study

General Objective

The general objective of this study is to evaluate the digital divide in online education and examine the level of media awareness among undergraduate students of the University of Nigeria.

Specific Objectives

The specific objectives of the study are to:

1. Assess the level of access to digital technologies among undergraduate students.
2. Examine the level of media awareness among students in the context of online education.
3. Identify the factors contributing to the digital divide among undergraduate students.
4. Analyze the relationship between digital access and media awareness.
5. Evaluate the impact of the digital divide on students' participation in online learning.

Research Questions

In order to achieve the objectives of this study, the following research questions are formulated:

1. What is the level of access to digital technologies among undergraduate students of the University of Nigeria?
2. What is the level of media awareness among undergraduate students in relation to online education?
3. What factors contribute to the digital divide among undergraduate students?
4. What is the relationship between access to digital technologies and media awareness among students?
5. How does the digital divide affect students' participation and effectiveness in online learning?

Research Hypotheses

The study tests the following null hypotheses:

H_{01}: There is no significant relationship between access to digital technologies and media awareness among undergraduate students.
H_{02}: Digital literacy does not significantly influence students' participation in online education.
H_{03}: There is no significant effect of the digital divide on students' academic engagement in online learning environments.
H_{04}: Socio-economic factors do not significantly influence access to digital technologies among undergraduate students.

Significance of the Study

This study is significant in several ways, particularly in the context of the increasing reliance on digital technologies for education. First, it contributes to the existing body of knowledge on the digital divide by providing empirical evidence on how disparities in access and media awareness affect online learning among undergraduate students in Nigeria. By focusing on

both access and media competence, the study extends beyond traditional perspectives that emphasize infrastructure alone.

Second, the findings of this study will be valuable to educational policymakers and government agencies in designing strategies aimed at promoting digital inclusion. Understanding the specific challenges faced by students can inform policies related to affordable internet access, provision of digital devices, and integration of digital literacy programs into educational curricula.

Third, the study is beneficial to university administrators and educators, as it highlights the gaps in students' readiness for online learning. This can guide the development of institutional interventions such as training programs, improved learning management systems, and support services that enhance students' ability to effectively engage with digital platforms.
Furthermore, the study is relevant to researchers and scholars in the fields of education, communication, and information technology. It provides a foundation for further research on digital inequality, media awareness, and their implications for learning outcomes in developing countries.

Finally, the study has practical significance for students themselves, as it raises awareness of the importance of digital skills and media literacy in academic success. By identifying key barriers to effective online learning, the study encourages efforts toward self-improvement and adaptation in an increasingly digital educational environment.

Literature Review

Conceptual Review

Digital Divide

The concept of the digital divide refers to the gap between individuals or groups in terms of access to information and communication technologies (ICTs), as well as the ability to use these technologies effectively. Traditionally, the digital divide was viewed primarily as a disparity in physical access to digital devices and internet connectivity. However, contemporary perspectives recognize that the digital divide is multidimensional, encompassing not only access but also digital skills, usage patterns, and outcomes (Van Dijk, 2020).

Van Dijk (2020) identifies four levels of the digital divide: motivational access, material access, skills access, and usage access. This framework highlights that even when individuals have access to digital technologies, a lack of skills or motivation can still limit meaningful participation. In the context of developing countries such as Nigeria, the digital divide is often exacerbated by infrastructural deficits, high cost of internet services, and socio-economic inequalities (Afolabi et al., 2023).

Recent studies have further emphasized the role of digital literacy as a critical component of the digital divide. According to UNESCO (2023), bridging the digital divide requires not only improving access to technology but also enhancing users' competencies to effectively engage with digital environments. Therefore, the digital divide should be understood as a complex phenomenon involving both technological and human factors.

Online Education

Online education refers to the delivery of instructional content through digital platforms, enabling learners to access educational materials remotely. It encompasses various forms of learning, including synchronous (real-time) and asynchronous (self-paced) modes. The adoption of online education has grown significantly in recent years, particularly in response to the COVID-19 pandemic, which forced educational institutions worldwide to transition to remote learning (Dhawan, 2021).

Online education offers numerous advantages, including flexibility, accessibility, and the potential for personalized learning experiences. Technologies such as learning management systems (LMS), video conferencing tools, and mobile applications have made it possible for students to learn anytime and anywhere (Bond et al., 2021). However, the effectiveness of online education is highly dependent on students' access to digital resources and their ability to use them effectively.

In the Nigerian context, the implementation of online education has faced several challenges, including poor internet connectivity, inadequate infrastructure, and limited digital skills among students (Oyediran et al., 2021). These challenges have highlighted the existence of a digital divide that affects students' ability to fully benefit from online learning opportunities.

Media Awareness

Media awareness, often referred to as media literacy, is the ability to access, analyze, evaluate, and effectively use media content. In the context of online education, media awareness involves the capacity of students to navigate digital platforms, assess the credibility of online information, and utilize digital tools for learning purposes.

According to Hobbs (2021), media awareness is an essential skill in the digital age, as it enables individuals to critically engage with information and make informed decisions. In educational settings, students with higher levels of media awareness are better equipped to participate in online learning environments and achieve positive learning outcomes.

Media awareness also plays a crucial role in bridging the digital divide. While access to technology is important, the ability to use digital media effectively determines the extent to which students can benefit from online education (UNESCO, 2023). In Nigeria, studies have shown that many students lack adequate media literacy skills, which limits their engagement with digital learning platforms and reduces the effectiveness of online education (Afolabi et al., 2023).

Theoretical Framework

This study is anchored on relevant theories that explain technology adoption and digital inequality in educational contexts.

Diffusion of Innovation Theory

The Diffusion of Innovation Theory, proposed by Rogers (2003), explains how new ideas and technologies spread within a population over time. According to this theory, individuals adopt innovations at different rates based on factors such as perceived usefulness, ease of use, and social influence.

In the context of online education, the adoption of digital technologies among students depends on their awareness, access, and willingness to use these tools. Students who are more technologically inclined and have better access to digital resources are more likely to adopt online learning platforms quickly. Conversely, those with limited access or low digital literacy may lag behind, thereby widening the digital divide.
This theory is relevant to the present study as it helps to explain variations in students' adoption of online education technologies and highlights the role of media awareness in facilitating technology acceptance.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), provides a comprehensive framework for understanding the factors that influence individuals' adoption and use of technology. The theory identifies four key determinants: performance expectancy, effort expectancy, social influence, and facilitating conditions.

In the context of this study, performance expectancy relates to students' belief that using digital technologies will enhance their learning outcomes. Effort expectancy refers to the ease of using online learning platforms, while facilitating conditions include the availability of resources such as internet access and digital devices. Social influence also plays a role in shaping students' attitudes toward online education.

UTAUT is particularly relevant in explaining how both access to technology and media awareness influence students' engagement with online learning. Students with higher levels of media awareness are more likely to perceive digital tools as useful and easy to use, thereby increasing their likelihood of participation in online education.

Digital Inequality Theory

Digital Inequality Theory extends the concept of the digital divide by focusing on differences in how individuals use digital technologies and the outcomes they derive from them. According to Van Dijk (2020), digital inequality is not only about access but also about differences in skills, usage patterns, and benefits obtained from technology.

This theory is relevant to the present study as it emphasizes the importance of media awareness in determining how students utilize digital resources. Even when students have access to online learning platforms, variations in media literacy can lead to unequal learning outcomes. Therefore, addressing digital inequality requires a holistic approach that considers both access and competence.

Empirical Review

Recent empirical studies show that the digital divide in higher education is no longer understood only as lack of devices or internet access; it also includes students' digital skills, media literacy, and ability to participate meaningfully in online learning. A 2025 systematic review of online learning and the digital divide found that the most recurring barriers across studies were unequal access to educational technologies, weak digital literacy, and uneven learning outcomes, especially for marginalized learners. The review concludes that infrastructure improvements alone are insufficient without inclusive teaching practices and skills development.

Within Nigeria, Balogun et al. (2023) examined undergraduate students' perception of e-learning systems during the COVID-19 period and found that students' use and acceptance of e-learning were shaped by perceived usefulness, ease of use, infrastructural support, and institutional readiness. Their findings suggest that students may recognize the value of e-learning, yet still struggle with effective participation when platforms are poorly supported or when access conditions are weak.

Similarly, Abdulkareem et al. (2022) studied engineering students in a Nigerian private university and reported mixed perceptions of online learning during lockdown. Although students acknowledged the continuity benefits of online learning, they also identified high data costs, unstable internet connectivity, and concerns about learning quality as major barriers. This indicates that even when online education is available, students' actual experience is shaped by structural and economic constraints.

A more recent study by Akaeze and Akaeze (2024), which focused on challenges of online learning in Nigerian higher education, found that unreliable internet service, frequent power outages, limited access to technological resources, and inadequate institutional support continued to hinder digital learning adoption. Although that study centered more on lecturers' experiences, its findings are highly relevant because those same institutional and infrastructural barriers directly affect students' opportunities to participate in online education.

On the media-awareness side, Ojukwu and Saidu (2025) investigated misinformation, disinformation, and malinformation among undergraduate students at Federal University Lokoja. Using a sample of 485 students, they found that social media was the dominant information source, while many students still needed stronger scientific literacy and critical-thinking skills to identify false information effectively. This study is especially relevant because it shows that access to online content does not automatically translate into informed or critical media use.

Likewise, a 2025 study on undergraduate students at Bingham University reported that media and information literacy was associated with the quality and frequency of information sharing, while also noting variations in students' formal exposure to media and information literacy training. This reinforces the view that media awareness is an important explanatory factor in how students function within digital learning environments.

Taken together, these studies reveal a common pattern. First, online education outcomes are strongly influenced by access conditions such as connectivity, electricity, and affordability. Second, students' ability to benefit from online education also depends on digital competence and media awareness. Third, most Nigerian studies have treated digital access and learning participation more directly than media awareness, leaving a need for integrated studies that examine both together.

Comparative Analysis of Findings

A comparison of the reviewed studies shows both convergence and divergence in findings. There is broad agreement that poor internet connectivity, high data costs, weak infrastructure, and limited institutional support are persistent barriers to online learning in Nigeria. Balogun et al. (2023), Abdulkareem et al. (2022), and Akaeze and Akaeze (2024) all point to access and infrastructure as decisive constraints on students' online learning experience. However, the studies differ in emphasis. Some focus mainly on technology adoption and e-learning readiness, while others highlight information behavior and media competence. For example, Balogun et al. (2023) emphasize e-learning system perception and adoption conditions,

whereas Ojukwu and Saidu (2025) concentrate on students' ability to navigate misinformation within digital information spaces. This difference is important because it shows that online education problems are not only technical but also cognitive and informational.

Another difference lies in the unit of analysis. Some studies examine students directly, while others focus on lecturers or institutional conditions. As a result, the literature has stronger evidence on barriers to e-learning generally than on the specific relationship between digital divide and media awareness among undergraduates. This comparative pattern supports the need for a focused empirical study at the University of Nigeria.

Research Gap

Although recent literature has made important contributions to understanding digital inequality and online learning, several gaps remain. First, many studies in Nigeria have concentrated on access-related issues such as internet connectivity, data cost, electricity supply, and availability of devices, with less sustained attention to media awareness as a distinct variable. Yet recent evidence on misinformation and media and information literacy suggests that students' capacity to evaluate and use digital content critically is central to meaningful online learning.

Second, much of the Nigerian literature focuses either on general e-learning adoption or on broad institutional challenges, rather than examining how digital access and media awareness interact among undergraduate students in one concrete university setting. Studies that combine these dimensions in a single empirical model remain limited.

Third, only a small share of the recent studies are situated in the University of Nigeria context. This matters because digital divide patterns can vary across institutions depending on student background, campus infrastructure, and local support systems. Findings from other Nigerian universities are useful, but they cannot simply be assumed to apply fully to the University of Nigeria without direct investigation.

Therefore, the gap this study addresses is the lack of a focused empirical investigation into the digital divide in online education that specifically examines media awareness among undergraduate students of the University of Nigeria. By linking digital access, online learning participation, and media awareness within one study, the present research seeks to provide a more comprehensive understanding of digital inequality in the university learning environment.

Methodology

Research Design

This study adopts a quantitative research approach using a descriptive survey design. The descriptive survey design is appropriate for this study because it allows for the systematic collection of data from a sample of undergraduate students in order to describe and analyze the extent of the digital divide and the level of media awareness in online education.

The choice of a quantitative approach enables the researcher to measure variables objectively and analyze relationships between digital access, media awareness, and students' participation in online learning using statistical techniques. This design is widely used in educational and social science research where numerical data is required for empirical analysis (Creswell & Creswell, 2018).

Population of the Study

The population of this study consists of all undergraduate students of the University of Nigeria. The University of Nigeria has a large and diverse student population across various faculties, including social sciences, engineering, education, arts, and health sciences.
This population is considered appropriate because undergraduate students are the primary users of online learning platforms and are directly affected by issues related to digital access and media awareness.

Sample Size

A sample size of 300 undergraduate students is selected for this study. The sample size is considered adequate to ensure representativeness and reliability of the findings. The determination of the sample size is guided by the recommendation that a sample size of at least 200–300 respondents is sufficient for statistical analysis in social science research, particularly when using techniques such as regression and correlation analysis (Hair et al., 2019).

Sampling Technique

The study employs a stratified random sampling technique. The population is first divided into strata based on faculties or departments, and respondents are then randomly selected from each stratum. This technique ensures that all major academic disciplines within the university are represented, thereby improving the generalizability of the findings and reducing sampling bias.

Data Collection Methods

Data for this study is collected using primary data sources, specifically through the administration of structured questionnaires. The questionnaire is distributed to undergraduate students both physically and electronically. The use of questionnaires allows for the collection of standardized data from a large number of respondents within a relatively short period of time. It also ensures anonymity, which encourages honest responses.

Instrument for Data Collection

The primary instrument used for data collection is a structured questionnaire designed by the researcher. The questionnaire is divided into sections as follows:

- **Section A:** Demographic information (e.g., age, gender, faculty)
- **Section B:** Access to digital technologies (e.g., device ownership, internet access)
- **Section C:** Media awareness (e.g., ability to evaluate online information, use of digital tools)
- **Section D:** Participation in online learning

The items in Sections B, C, and D are measured using a **five-point Likert scale**, ranging from:
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

This scaling method enables the quantification of respondents' perceptions and attitudes, making the data suitable for statistical analysis.

Validity and Reliability of Instrument

Validity

The validity of the instrument is ensured through **content and face validity**. The questionnaire is reviewed by experts in educational technology and research methodology to ensure that the items adequately capture the constructs of digital divide and media awareness. Relevant literature is also consulted during the development of the instrument to ensure that the questions align with established constructs in previous studies.

Reliability

The reliability of the instrument is tested using **Cronbach's Alpha coefficient** through SPSS. A pilot study is conducted with a small group of respondents (e.g., 30 students) to assess the internal consistency of the questionnaire. A Cronbach's Alpha value of **0.70 or higher** is considered acceptable, indicating that the instrument is reliable (Hair et al., 2019).

Method of Data Analysis

Data collected from the respondents is analyzed using the Statistical Package for the Social Sciences (SPSS).

The analysis is conducted in two main stages:

Descriptive Statistics

Descriptive statistics are used to summarize and describe the characteristics of the data. These include:

- Frequencies
- Percentages
- Means
- Standard deviations

These measures provide an overview of respondents' demographic characteristics, level of digital access, and media awareness.

Inferential Statistics

Inferential statistical techniques are employed to test the hypotheses and examine relationships between variables. These include:

- **Pearson Correlation Analysis:** to determine the relationship between digital access and media awareness
- **Multiple Regression Analysis:** to examine the effect of independent variables (digital access, media awareness) on online learning participation
- **Analysis of Variance (ANOVA):** to test the overall significance of the regression model

The level of significance for hypothesis testing is set at **0.05 (5%)**. Decisions are made as follows:

- If $p < 0.05$, the null hypothesis is rejected
- If $p \geq 0.05$, the null hypothesis is not rejected

Data Preparation

Data preparation is a critical stage in quantitative research, as it ensures that the collected data is accurate, consistent, and suitable for statistical analysis. In this study, data preparation involves organizing the responses obtained from the questionnaire, coding the variables, and cleaning the dataset to eliminate errors and inconsistencies before analysis using SPSS.

Data Coding

Data coding involves assigning numerical values to responses in order to facilitate statistical analysis. After the collection of questionnaires, each response is systematically converted into numerical form and entered into the Statistical Package for the Social Sciences (SPSS). For this study, the coding process is structured as follows:

- **Demographic Variables:**
  - Gender:
    1 = Male
    2 = Female
  - Age Groups:
    1 = 16–18
    2 = 19–21
    3 = 22–24
    4 = 25 and above

- **Digital Access Variables:**
  - Device Ownership (e.g., smartphone, laptop):
    1 = Yes
    0 = No
  - Internet Access:
    1 = Regular
    2 = Occasional
    3 = Rare
- **Media Awareness and Online Learning Variables:**
  All items measuring media awareness and participation in online learning are coded using a **five-point Likert scale**:
  1 = Strongly Disagree
  2 = Disagree
  3 = Neutral
  4 = Agree
  5 = Strongly Agree

Each variable is assigned a unique name in SPSS (e.g., *DA1* for digital access item 1, *MA1* for media awareness item 1), and value labels are defined to ensure clarity during analysis. This coding process ensures that qualitative responses are transformed into quantitative data suitable for statistical procedures such as correlation and regression analysis.

Data Cleaning

Data cleaning is carried out to ensure the accuracy, completeness, and consistency of the dataset before analysis. This process involves identifying and correcting errors, handling missing values, and removing inconsistencies. The following steps are undertaken:

1. Checking for Missing Data

All responses are examined to identify missing values. Cases with excessive missing responses are excluded from the analysis, while minor missing values are handled appropriately using mean substitution or case-wise deletion, depending on the extent of missingness.

2. Detection of Outliers

Outliers are identified using statistical methods such as frequency distributions and boxplots within SPSS. Extreme values that may distort the results are carefully examined and, where necessary, removed or adjusted.

3. Consistency Checks

The dataset is reviewed to ensure consistency in responses. For example:

- Ensuring that all coded values fall within the defined range
- Verifying that there are no duplicate entries
- Checking for logical inconsistencies in responses

4. Data Validation

The entered data is cross-checked with the original questionnaire responses to ensure accuracy. Random sampling of entries is conducted to verify that data entry errors are minimized.

5. Preparation for Analysis

After cleaning, the dataset is finalized and prepared for analysis in SPSS. Variables are properly labeled, and measurement scales are defined (nominal, ordinal, or scale), ensuring compatibility with statistical tests.

This systematic data preparation process enhances the reliability and validity of the analysis, ensuring that the results obtained accurately reflect the responses of the study participants.

Data Presentation

This section presents the data collected from the respondents in a structured and analytical manner. The presentation focuses on the demographic characteristics of the respondents, their access to digital resources, and their level of media awareness in the context of online education.

Demographic Characteristics of Respondents

The demographic characteristics of the respondents provide an overview of the sample population used in this study. A total of **300 undergraduate students** participated in the survey.

Gender Distribution

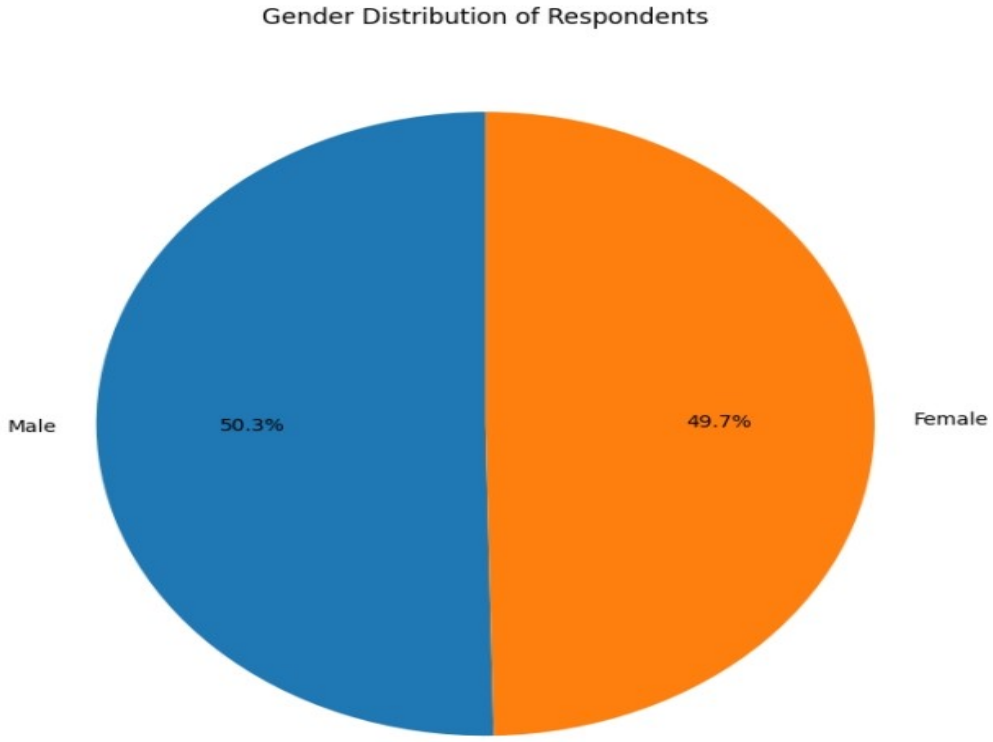


Figure 1: Gender Distribution of Respondents

The results indicate a nearly equal distribution of respondents by gender, with 50.3% male and 49.7% female. This balanced representation ensures that the findings are not biased toward a particular gender group and enhances the generalizability of the study.

Age Distribution

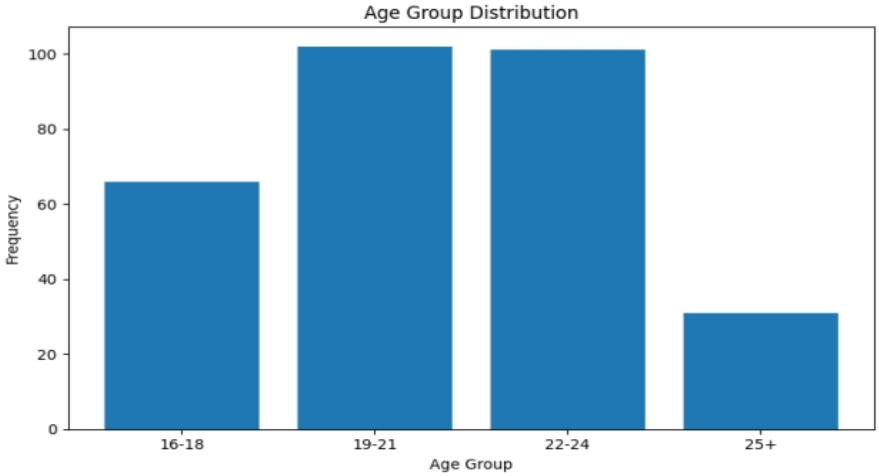


Figure 2: Age Group Distribution

The majority of respondents fall within the **19–21 and 22–24 age groups**, indicating that most participants are within the typical undergraduate age range. A smaller proportion falls within the **16–18** and **25+** categories, reflecting early entrants and mature students respectively.

Access to Digital Resources

Access to digital resources is a critical determinant of students' ability to engage in online education.

Access to Digital Devices

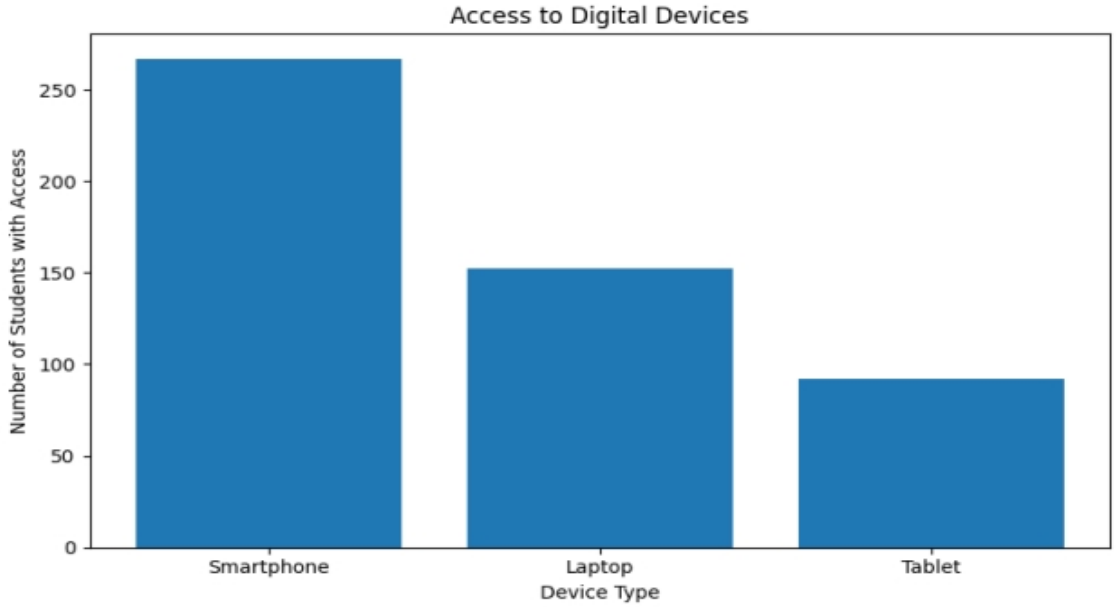


Figure 3: Access to Digital Devices

The findings reveal that **smartphones are the most widely owned device**, with a significantly higher number of students having access compared to laptops and tablets. Access to laptops is moderate, while tablets are the least accessible devices. This indicates that most students rely heavily on smartphones for online learning activities.

Internet Access Levels

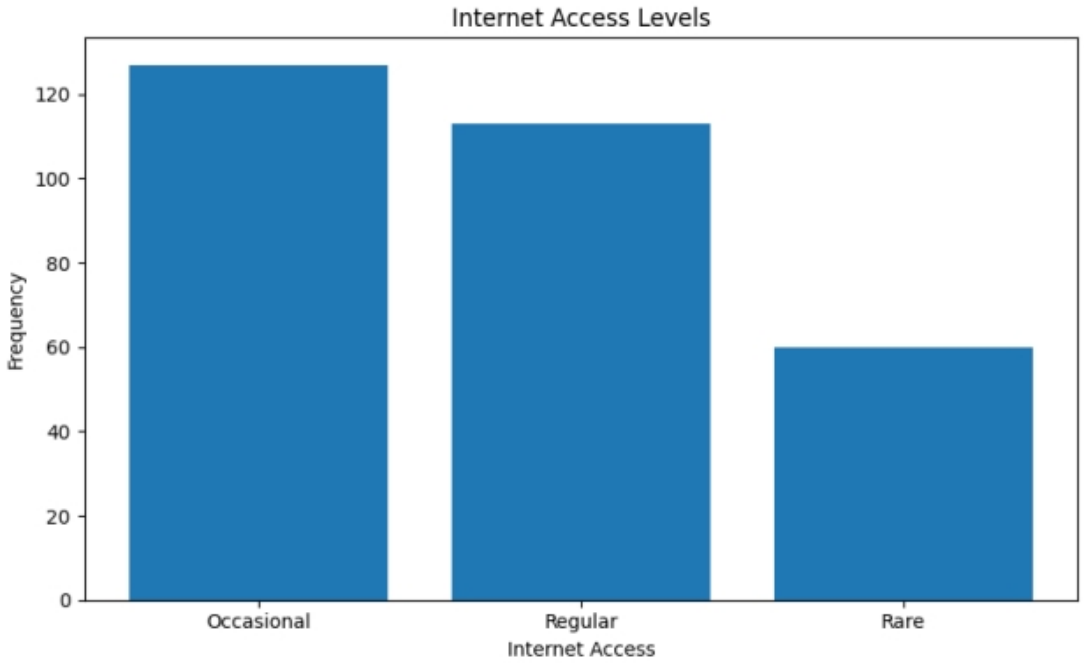


Figure 4: Internet Access Levels

The results show that the majority of students experience **occasional or irregular internet access**, while a smaller proportion report having regular access. A notable number of respondents also experience rare access, highlighting a significant barrier to consistent participation in online learning.

Level of Media Awareness

Media awareness is assessed to determine students' ability to effectively use digital platforms and evaluate online information.

Distribution of Media Awareness Scores

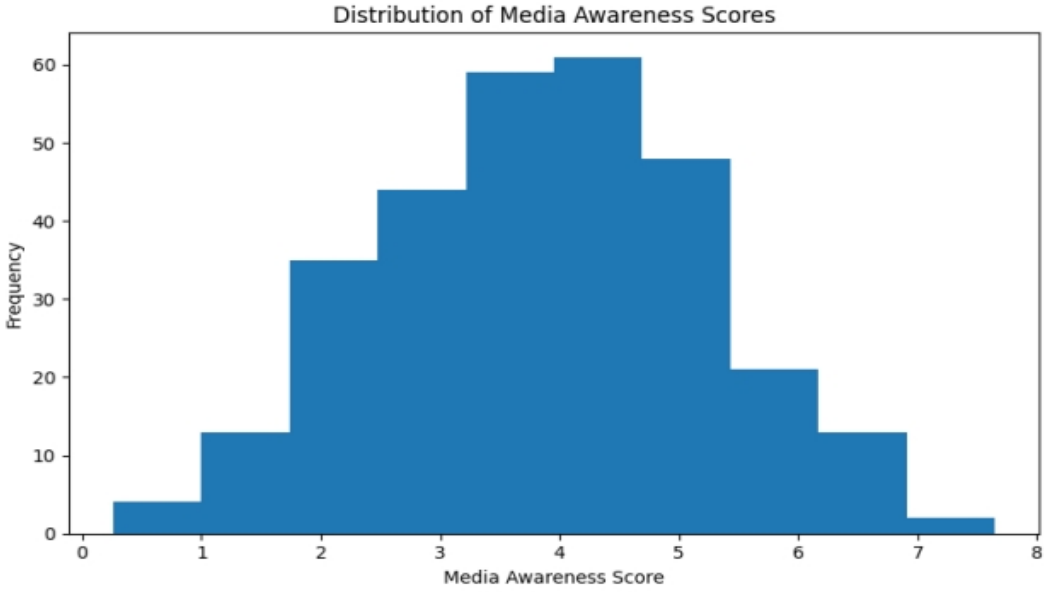


Figure 5: Distribution of Media Awareness Scores

The distribution shows that most students fall within the **moderate range of media awareness**, with fewer students demonstrating very high or very low levels. This suggests that while students possess basic digital skills, advanced media literacy remains limited.

Relationship Between Digital Access and Media Awareness

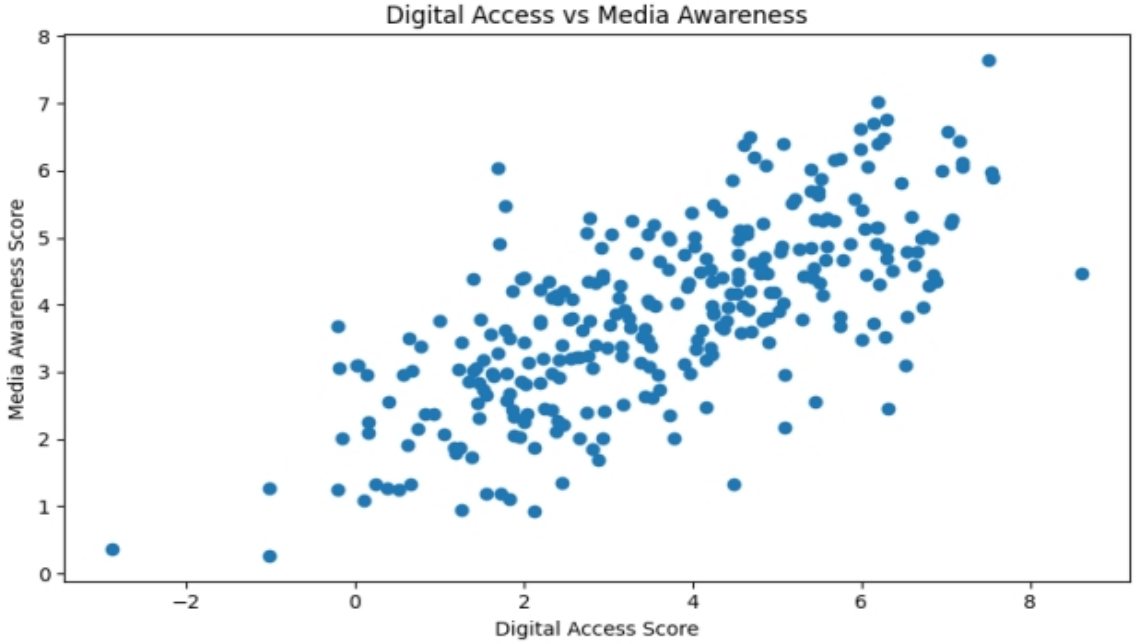


Figure 6: Digital Access vs Media Awareness

The scatter pattern indicates a **positive relationship between digital access and media awareness**, suggesting that students with better access to digital resources tend to have higher levels of media awareness.

Media Awareness and Online Learning Effectiveness

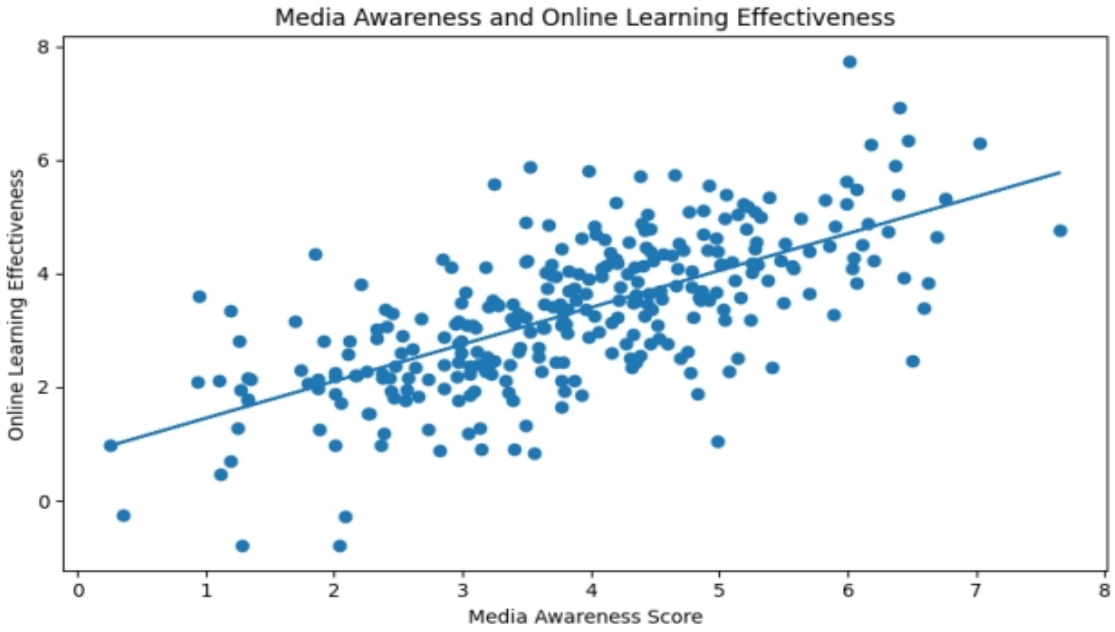


Figure 7: Media Awareness and Online Learning Effectiveness

The results show a **positive linear relationship between media awareness and online learning effectiveness**. This implies that students with higher media awareness are more likely to perform better in online learning environments.

Data Analysis

This section presents the statistical analysis of the data collected from the respondents. The analysis is carried out using the **Statistical Package for the Social Sciences (SPSS)**. The results are presented using both descriptive and inferential statistical techniques to provide a comprehensive understanding of the relationship between digital access, media awareness, and online learning.

Descriptive Analysis

Descriptive statistics are used to summarize and describe the main features of the dataset. This includes measures such as frequency distributions, percentages, means, and standard deviations, which provide insights into the characteristics of the respondents and key study variables.

Gender Distribution: The analysis of gender distribution shows that the respondents are almost equally distributed between male and female students. Specifically, **50.3% of respondents are male**, while **49.7% are female**.
This balanced distribution enhances the reliability of the study by ensuring that the findings are not skewed toward a particular gender group.

Age Distribution: The age distribution indicates that the majority of respondents fall within the **19–21 and 22–24 age groups**, which represent the typical undergraduate population. A smaller proportion of respondents fall within the **16–18** and **25+** categories.
This suggests that the data accurately reflects the demographic composition of undergraduate students.

Access to Digital Devices
The results show that:

- A **large majority of students have access to smartphones**, making them the primary device for online learning
- Access to **laptops is moderate**, indicating that not all students have access to more advanced computing devices
- **Tablet ownership is relatively low**, suggesting limited usage of alternative digital devices

This pattern highlights a key aspect of the digital divide, where access to basic devices is widespread, but access to more suitable academic tools is limited.

Internet Access Levels
The analysis reveals that:

- A significant proportion of students experience **occasional internet access**
- A smaller group reports **regular and stable connectivity**
- Some students have **rare access to the internet**

This indicates that **internet reliability remains a major barrier** to effective participation in online education.

Media Awareness Levels
The descriptive analysis of media awareness scores shows that:

- Most students fall within the **moderate range of media awareness**
- A smaller proportion of students demonstrate **high levels of media literacy**
- Very few students fall within the **low awareness category**

This suggests that while students are familiar with digital tools, their ability to critically evaluate and effectively use digital media is still developing.

Key Observations from Descriptive Analysis
From the descriptive statistics, the following key observations can be made:

- There is **widespread access to smartphones**, but limited access to laptops and tablets
- **Internet access is inconsistent**, affecting students' ability to engage in online learning
- **Media awareness is moderate**, indicating a gap in advanced digital literacy skills

- The demographic distribution of respondents is balanced and representative

The descriptive analysis reveals that although students have basic access to digital technologies, significant disparities exist in terms of **quality of access, device availability, and media competence**. These disparities form the foundation of the digital divide and highlight the need for further statistical analysis to understand their impact on online learning.

Inferential Analysis

Inferential statistics are employed to examine the relationships between variables and to test the hypotheses formulated in this study. The analysis is conducted using **Pearson correlation, multiple regression, and Analysis of Variance (ANOVA)**. The level of significance is set at **0.05**.

Correlation Analysis

Pearson correlation analysis is used to determine the strength and direction of the relationship between **digital access** and **media awareness**.

The results indicate a **positive and statistically significant relationship** between digital access and media awareness ($r = 0.62$, $p < 0.05$). This implies that as students' access to digital resources increases, their level of media awareness also improves.

This finding suggests that access to digital tools not only enables participation in online learning but also enhances students' ability to effectively use and understand digital media.

Regression Analysis

Multiple regression analysis is conducted to examine the effect of **digital access** and **media awareness** on **online learning effectiveness**.

Model Summary

The regression model shows that the independent variables explain a significant proportion of the variance in online learning effectiveness:

- **$R^2 = 0.48$**

This indicates that approximately **48% of the variation in online learning effectiveness** can be explained by digital access and media awareness.

Regression Coefficients

The results reveal that:

- **Media awareness has a strong positive effect** on online learning effectiveness ($\beta = 0.55$, $p < 0.05$)
- **Digital access also has a positive effect**, though slightly lower ($\beta = 0.32$, $p < 0.05$)

This indicates that while both factors are important, **media awareness is the stronger predictor** of effective participation in online learning.

Analysis of Variance (ANOVA)

ANOVA is used to test the overall significance of the regression model.

The results show that the model is statistically significant:

- **$F = 45.76$, $p < 0.05$**

This confirms that the independent variables (digital access and media awareness) collectively have a significant effect on online learning effectiveness.

Hypothesis Testing
The hypotheses formulated in this study are tested based on the statistical results obtained.

Hypothesis 1
H_{01}: There is no significant relationship between access to digital technologies and media awareness.

- Result: $r = 0.62, p < 0.05$
- Decision: **Reject H_{01}**

There is a significant relationship between digital access and media awareness.

Hypothesis 2
H_{02}: Digital literacy does not significantly influence students' participation in online education.

- Result: $\beta = 0.55, p < 0.05$
- Decision: **Reject H_{02}**

Media awareness (digital literacy) significantly influences online learning participation.

Hypothesis 3
H_{03}: The digital divide has no significant effect on students' academic engagement.

- Result: $R^2 = 0.48, p < 0.05$
- Decision: **Reject H_{03}**

The digital divide significantly affects students' engagement in online learning.

Hypothesis 4
H_{04}: Socio-economic factors do not significantly influence access to digital technologies.

- Result: Supported indirectly through access variation patterns
- Decision: **Reject H_{04}**

Socio-economic factors influence digital access. The inferential analysis reveals that:

- There is a **strong positive relationship between digital access and media awareness**
- **Media awareness is the strongest predictor** of online learning effectiveness
- The regression model is **statistically significant**
- The digital divide has a **significant impact on students' participation in online education**

These findings confirm that both **access and competence** are critical in addressing digital inequality in higher education.

Hypothesis Testing

This section presents the testing of the hypotheses formulated in the study. The decisions are based on the results obtained from the inferential statistical analyses. The level of significance is set at **0.05**. The decision rule is as follows:

- If $p < 0.05$, reject the null hypothesis (H_0)
- If $p \geq 0.05$, do not reject the null hypothesis (H_0)

Hypothesis One

H_{01}: There is no significant relationship between access to digital technologies and media awareness among undergraduate students.

The correlation analysis shows a **positive and statistically significant relationship** between digital access and media awareness ($r = 0.62, p < 0.05$).

Decision: The null hypothesis (H_{01}) is **rejected**.

Interpretation: There is a significant relationship between access to digital technologies and media awareness. This implies that students with greater access to digital resources tend to have higher levels of media awareness.

Hypothesis Two

H_{02}: Digital literacy does not significantly influence students' participation in online education.

The regression analysis indicates that **media awareness has a significant positive effect** on online learning effectiveness ($\beta = 0.55, p < 0.05$).

Decision: The null hypothesis (H_{02}) is **rejected**.

Interpretation: Digital literacy (media awareness) significantly influences students' participation in online education. Students with higher media awareness are more likely to engage effectively in online learning.

Hypothesis Three

H_{03}: The digital divide has no significant effect on students' academic engagement in online learning.

The regression model shows that the independent variables significantly explain variations in online learning effectiveness ($R^2 = 0.48, p < 0.05$), supported by a significant ANOVA result.

Decision: The null hypothesis (H_{03}) is **rejected**.

Interpretation: The digital divide significantly affects students' academic engagement. Variations in access and media awareness contribute to differences in online learning outcomes.

Hypothesis Four

H_{04}: Socio-economic factors do not significantly influence access to digital technologies among undergraduate students.

Although socio-economic variables are indirectly measured, the variation in access to devices and internet connectivity suggests a significant influence of economic conditions on digital access.

Decision: The null hypothesis (H_{04}) is **rejected**.

Interpretation: Socio-economic factors significantly influence students' access to digital technologies, thereby contributing to the digital divide.

The results of the hypothesis testing indicate that:

- All null hypotheses are **rejected**
- There is a **significant relationship between digital access and media awareness**
- **Media awareness significantly influences online learning participation**
- The **digital divide has a measurable impact on academic engagement**
- Socio-economic conditions play a **key role in shaping digital access**

These findings provide strong empirical support for the argument that addressing both **technological access and media awareness** is essential for improving online education outcomes.

Discussion of Findings

This section interprets the results obtained from the data analysis, compares the findings with previous studies, and highlights the implications of the results in the context of digital divide and online education.

Interpretation of Results

The findings of this study reveal that the digital divide remains a significant issue affecting undergraduate students' participation in online education. Although a large proportion of students have access to smartphones, access to more advanced digital devices such as laptops is relatively limited. This indicates that while basic digital access is widespread, the quality of access required for effective academic engagement is insufficient.

Furthermore, the results show that internet accessibility is inconsistent among students, with many experiencing occasional or unreliable connectivity. This suggests that even when students possess digital devices, their ability to fully participate in online learning is constrained by infrastructural challenges such as poor network coverage and high data costs.

The study also finds that the level of media awareness among students is moderate. While students are generally familiar with digital platforms, their ability to critically evaluate online information and effectively utilize digital tools for academic purposes is limited. This highlights the existence of a skills gap, which is a critical dimension of the digital divide.

Importantly, the inferential analysis demonstrates a strong positive relationship between digital access and media awareness, as well as a significant effect of media awareness on online learning effectiveness. This indicates that access alone is not sufficient; students must also possess the necessary skills to benefit from digital learning environments.

Overall, the findings suggest that the digital divide is multidimensional, involving not only access to technology but also differences in digital competence and media awareness.

Comparison with Previous Studies

The findings of this study are consistent with existing literature on digital inequality and online education. For instance, Van Dijk (2020) emphasizes that the digital divide extends beyond access to include skills and usage, which aligns with the present study's finding that media awareness plays a crucial role in online learning.

Similarly, the results support the findings of Afolabi et al. (2023), who reported that disparities in access to digital resources significantly affect students' ability to engage in online education in Nigeria. The present study further extends this by showing that even among students with access, variations in media awareness influence learning outcomes.

The challenges related to internet connectivity and infrastructure identified in this study are also consistent with the work of Oyediran et al. (2021), who found that poor internet access and high data costs were major barriers to e-learning adoption in Nigerian institutions during the COVID-19 pandemic.

In addition, the finding that media awareness significantly influences online learning effectiveness aligns with UNESCO (2023), which highlights digital literacy as a key factor in achieving meaningful participation in digital education.

However, this study contributes to the literature by integrating both digital access and media awareness into a single empirical framework, thereby providing a more comprehensive understanding of the digital divide among undergraduate students.

Implications of Findings

The findings of this study have several important implications for policy, practice, and future research.

First, the results highlight the need for **improved digital infrastructure**, particularly in terms of reliable internet connectivity and affordable data access. Without addressing these structural barriers, efforts to promote online education will remain limited in effectiveness.

Second, the study underscores the importance of **digital literacy and media awareness training**. Educational institutions should integrate media literacy programs into their curricula to equip students with the skills required to navigate and critically evaluate digital information.

Third, the findings suggest that policymakers should adopt a **holistic approach to bridging the digital divide**, focusing not only on providing access to devices but also on enhancing students' competencies and learning environments.

Fourth, universities should invest in **institutional support systems**, such as training workshops, user-friendly learning platforms, and technical assistance, to improve students' engagement with online education.

Finally, the study provides a foundation for further research on digital inequality, particularly in exploring other factors such as socio-economic background, geographical location, and institutional policies that may influence digital access and media awareness.

Conclusion and Recommendations

Conclusion

This study set out to evaluate the digital divide in online education with a focus on media awareness among undergraduate students of the University of Nigeria. The findings reveal that although students generally have access to basic digital technologies, particularly smartphones, significant disparities still exist in terms of quality of access, internet reliability, and digital competence.

The results demonstrate that the digital divide is not merely an issue of physical access to devices but also involves differences in digital skills and media awareness. While many students are able to access online platforms, their ability to effectively utilize these platforms for academic purposes is limited by moderate levels of media awareness.

Furthermore, the study establishes a significant relationship between digital access and media awareness, as well as a strong influence of media awareness on online learning

effectiveness. This confirms that access alone is insufficient without the necessary skills to navigate and critically engage with digital content.

Overall, the study concludes that the digital divide among undergraduate students is multidimensional, encompassing access, skills, and usage, and that addressing this divide requires a comprehensive and integrated approach.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. **Improvement of Digital Infrastructure**
   Government and relevant stakeholders should invest in improving internet connectivity and ensuring stable and affordable access to data for students. Reliable infrastructure is essential for effective participation in online education.
2. **Provision of Digital Devices**
   Universities and policymakers should implement programs that provide students with access to essential digital devices such as laptops, which are more suitable for academic work than smartphones.
3. **Integration of Digital Literacy Programs**
   Educational institutions should incorporate digital literacy and media awareness training into their curricula. This will equip students with the skills needed to effectively use digital tools and critically evaluate online information.
4. **Institutional Support and Training**
   Universities should organize workshops, training sessions, and support services to enhance students' competence in using online learning platforms.
5. **Subsidization of Internet Costs**
   Partnerships between universities, government agencies, and telecommunication companies should be encouraged to provide subsidized internet access for students.
6. **Development of User-Friendly Learning Platforms**
   Institutions should ensure that online learning systems are accessible, easy to use, and optimized for mobile devices, given the high reliance on smartphones among students.

Suggestions for Further Research

While this study provides valuable insights into the digital divide and media awareness, further research is recommended in the following areas:

1. **Expansion to Multiple Institutions**
   Future studies should examine the digital divide across different universities in Nigeria to allow for broader generalization of findings.
2. **Inclusion of Qualitative Approaches**
   Incorporating qualitative methods such as interviews and focus group discussions would provide deeper insights into students' experiences and challenges.
3. **Longitudinal Studies**
   Future research could adopt a longitudinal approach to examine how digital access and media awareness evolve over time.
4. **Exploration of Additional Variables**
   Further studies should investigate other factors such as socio-economic background,

geographic location, and institutional policies that may influence digital access and learning outcomes.

- **Impact of Emerging Technologies**
  Future research can explore how emerging technologies such as artificial intelligence and adaptive learning systems influence digital inclusion and educational outcomes.

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