# Inclusive Digital Learning Ecosystems in National Open University of Nigeria (Noun): Policies and Practices

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## Abstract

*Open and distance learning is aimed at fostering equitable access, participation, and success for diverse learners within digital learning environments. This study seeks to investigate inclusive digital learning in-ecosystems in National Open University of Nigeria (NOUN): Policies and practice. The study is a survey that utilized structured questionnaire to generate information from 300 participants comprising NOUN students selected through stratified random sampling from the six geopolitical zones of Nigeria. Data analysis involves the use of SPSS version 25 to run frequencies and percentages for the research questions while for the hypothesis s a correlation coefficient statistic (p<0.5). Findings showed (33.3%) that NOUN offers alternative formats for study materials for students with specific needs. The study also revealed (50.0%) that NOUN promotes awareness and understanding of inclusivity in the digital learning environment among students and faculty members. Also, the findings of the study indicated that non- availability of assistive technologies and in particular not having their course materials in braille were major challenges. The study recommended creating awareness and training of lecturers and students on how to use assistive technologies for policymakers, educators, and stakeholders to advance inclusive digital learning ecosystems, emphasizing the importance of policies and practices evaluations of distance and e-learning in the Nigerian ecosystems.*

**Keywords: open and distance learning, e-learning, distance learning, inclusive education, digital education.**

## Introduction

Throughout education history, the development of teaching approaches has frequently kept pace with advances in technology. From the earliest oral storytelling traditions to the modern digital spaces of virtual classrooms, the pursuit of information distribution has always changed to keep up with the rapid advancement of technology. One paradigm that has become a transformative force in this ever-changing world in recent decades is open, distance, and e-learning (ODeL). Distance education has its origins in the early attempts of educational institutions and teachers to break free from the limitations of in-person instruction and time constraints. Correspondence courses first appeared in the 18th century as a way to reach students outside of the traditional classroom (Aboderin, 2015). The development of postal services made it easier for students to

share educational resources and participate in self-paced learning from a distance. The telegraph and radio were two examples of communication technology that advanced over time and increased the effectiveness and reach of remote learning programs (Obioha & Ndidi, 2011).

However, a true renaissance in distant learning did not occur until the later part of the 20th century, driven by the democratizing power of television and then the Internet. Conventional ideas of teaching and learning were challenged by the advent of televised courses, which were typified by establishments such as the British Open University (Bozkurt & Stracke, 2023). This marked the beginning of a new age in public education. The emergence of e-learning platforms was fueled by later advancements in networking and computer technology, which opened the door for the digital revolution in education (Moore & Piety, 2022).

Ghosh (2024) stressed that the development of the Internet ushered in a period of unprecedented connectedness and information access, and it was a turning point in the history of education. Digital technologies, which were formerly limited to the domain of academics and research, have evolved into widely used instruments for education, learning, and teamwork. Similarly, Multimedia tools, online courseware, and virtual learning environments grew in popularity, providing students with a wide range of customized learning modes (Gottschalk & Weise, 2023). With the introduction of Web 2.0 technology, the educational environment underwent even more change, encouraging interactive and collaborative learning. Beyond the constraints of conventional hierarchical pedagogies, peer-to-peer interaction and knowledge exchange were made possible by social media platforms, discussion boards, and collaborative tools. In the meantime, the development of mobile computing devices and the widespread availability of internet connectivity made learning possible anytime, anywhere, and allowed students to access educational materials whenever they wanted, regardless of time or location restrictions.

Ianes and Venturoso (2021) opined that as digital learning technologies proliferate quickly, it has become increasingly important to pursue educational justice and inclusivity. The existence of educational gaps depending on socioeconomic position, geography, or demographics is a stark critique of the current educational paradigm in a time when information is more accessible than ever. It is more important than ever to design inclusive learning environments that meet the varied needs of all students as societies work toward greater social fairness and economic opportunity (Otto & Becker, 2019). A wide range of factors are included in inclusive learning ecosystems, from educational approaches and cultural responsiveness to technology infrastructure and physical accessibility. Fundamentally, inclusiveness means removing obstacles that prevent students from taking advantage of educational opportunities and fostering settings that value equity, diversity, and a sense of belonging (Job, 2021). According to Mason and Pillay (2015), inclusive learning ecosystems prioritize the needs of disadvantaged and underprivileged communities in order to guarantee that every person, regardless of background or circumstances, has the chance to reach their full potential. But even with the lofty objectives of inclusion, it is still difficult to create truly equal learning ecosystems because of the many obstacles and complexities involved. The digital gap, known as the digital divide, is a primary obstacle to inclusion, delineating the substantial difference between individuals or communities with access to digital technology and the internet and those lacking such access. Underprivileged groups are pushed to the periphery of the digital society due to inequalities in internet connectivity, technology infrastructure, and digital literacy (Megahed & Ghoneim, 2022). The National Open University of Nigeria (NOUN) is pivotal in enhancing higher education accessibility in Nigeria. It is imperative for individuals contemplating enrollment in this distinct learning institution to comprehend its policies and operational methods.

NOUN is guided by the principles of Open and Distance Learning (ODL), offering adaptable and accessible education through diverse media, including print and e-learning platforms. A core mandate at NOUN is to widen access to university education for all, regardless of location, age, or socioeconomic background. NOUN adheres to quality assurance standards in curriculum development, instructional materials, and assessment. Its policies, like the OER Policy, emphasize high-quality learning resources. NOUN encourages research activities aligned with its mission and national development goals. The Research Policy outlines ethical guidelines that promotes collaboration with other institutions (Megahed & Ghoneim, 2022). NOUN actively promotes the use and creation of OERs, making educational materials more accessible and affordable. NOUN offers a wide range of undergraduate and postgraduate programs in various fields, providing students with interactive and content-rich course materials. The university utilizes a Virtual Learning Environment (VLE) platform, enabling face-to-face interactions between facilitators and students, access to e-learning materials, peer interaction, and submission of assignments. Examinations are conducted at designated study centres nationwide, ensuring fairness and consistency.

**Statement of the Problem**

The spread of digital technologies has created new learning opportunities in the quickly changing field of education, offering never-before-seen levels of access, flexibility, and customization.

Even so, despite the revolutionary promise of digital learning environments, enduring obstacles pose a threat to amplify already-existing disparities and isolate marginalized communities, impeding the achievement of truly inclusive educational opportunities. The fundamental problem of the digital divide, which still hangs over attempts to democratize education, is at the core of the difficulty. Significant gaps in Internet access, technology infrastructure, and digital literacy still exist despite advancements in connectivity and technology adoption, especially among underprivileged people in low-income areas, rural areas, and developing nations. The digital divide worsens the achievement gap in school and restricts people's ability to fully engage in digital learning settings, which feeds the vicious cycle of economic inequality and social exclusion.

Learners from disadvantaged backgrounds often have unique needs that digital learning platforms fail to accommodate. Vulnerable populations face additional barriers, including inaccessible content, lack of assistive technology support, and inadequate accommodations for learners with disabilities. These barriers hinder academic success and exacerbate existing difficulties. Moreover, concerns around privacy, security, and data governance pose ethical implications, particularly when students' personal information is misused or exploited. To address these issues, it is crucial to study the intersection of policies and practice aimed at fostering equitable access, participation, and success for diverse learners, and ensure privacy and data security measures that promote trust and engagement in digital learning environments.

The study investigated inclusive digital learning ecosystems in National Open University of Nigeria, Policies and practice.

**Objective of the Study**

The primary objective of this study is to investigate inclusive digital learning ecosystems in open, distance and e-learning education: policies and practice. Specific objectives include**;**

1. Find out the policies in place in National Open University of Nigeria (NOUN) to promote inclusive digital learning ecosystems.
2. Examine students' perception of inclusivity in digital learning environment in NOUN.

3. Investigate the challenges faced by persons with disabilities in accessing and engaging with digital learning contents in NOUN.
4. Find out the strategies that can be adopted by NOUN to enhance the inclusivity of its digital learning ecosystems.

**Research Question**

1. What policies are in place in National Open University of Nigeria to promote inclusive digital learning ecosystems?
2. What is students' perception of inclusivity in digital learning environment in National Open University of Nigeria?
3. What are the challenges faced by persons with disabilities in accessing and engaging with digital learning contents in National Open University of Nigeria?
4. What are the strategies that can be adopted by National Open University of Nigeria to enhance the inclusivity of its digital learning ecosystems?

**Hypotheses**

**$H0_1$:** There is no significant relationship between policies in place in National Open University of Nigeria and inclusive digital learning ecosystems.

**Literature Review**

**Brief History of National Open University of Nigeria (NOUN).**

The National Open University of Nigeria, commonly referred to as "NOUN," is the primary federal institution in the West African sub-region that offers open and distance learning (ODL) programs. It holds the distinction of being Nigeria's largest postsecondary institution in terms of student population. Initially founded on July 22, 1983, as a trailblazer in remote and open learning in Nigeria, the university encountered a setback when its operations were halted by the government on April 25, 1984. Nevertheless, the institution was reestablished through the efforts of Gen. Olusegun Obasanjo, the former president of Nigeria, on April 12, 2001. Upon its establishment, the university admitted 32,400 pioneer students (Osang, 2012). At present NOUN has about 120 study centres across the nation and provides about 80 programs at both undergraduate and postgraduate levels with active population of over 150,000 students.

**Inclusive Digital Learning**

The term "inclusive digital learning" is a method of teaching that values accessibility, equity, and diversity by utilizing digital technologies to design learning environments that meet the needs and preferences of every student, regardless of their circumstances, background, or ability. Fundamentally, inclusive digital learning aims to guarantee that each person has an equal chance to partake in educational activities, have meaningful learning experiences, and realize their full potentials (Smah, 2023). By making sure that instructional materials, platforms, and technologies are created and used in a way that enables all students, including those with disabilities, to access and interact with content efficiently, inclusive digital learning places a high priority on accessibility. This could entail following accessibility standards and rules, ensuring assistive technology compatibility, and delivering alternative forms like closed captions or audio descriptions. By addressing the structural inequalities and impediments that limit access to educational opportunities and resources, inclusive digital learning advances equity. In order to close the digital divide, it is necessary to give underprivileged and marginalized people fair access

to digital technology and internet connectivity. It also entails tackling socioeconomic disparities by offering financial aid, subsidies, or scholarships to guarantee that all students have the tools necessary for success.

In another related study, Singh and Kumar (2024) explained that by acknowledging and appreciating the distinctive histories, viewpoints, and experiences of students from a range of socioeconomic, linguistic, and cultural backgrounds, inclusive digital learning celebrates diversity. Supporting culturally sensitive teaching strategies that acknowledge and value students' identities, cultural heritage, and life experiences, helps them feel included and at home in the learning community. Because learners have different needs and preferences when it comes to learning, inclusive digital learning provides flexibility in terms of learning pace, delivery medium, and instructional approaches. This could entail giving students' access to a variety of learning pathways, individualized instruction, and the freedom to interact with the material at their speed and convenience. Inclusive digital learning promotes cooperation, communication, and active engagement among students, teachers, and other stakeholders. In doing so, it fosters a feeling of community and shared ownership of the learning process by supporting inclusive communication and collaboration tools that support peer-to-peer engagement, group work, and joint projects (Tonia, et al., 2021).

**Policies in place in National Open University of Nigeria (NOUN) to promote inclusive digital learning ecosystems.**

Muibi (2018) conducted research to investigate the influence of institutional policy factors on the academic achievement of learners in two open distance learning institutions in Nigeria: the National Open University of Nigeria (NOUN) and the Distance Learning Centre (DLC) at the University of Ibadan. The study focused on policy factors such as learner support services, course material development, information communication technology, staff capacity development, quality assurance, and feedback methods. Learners' academic achievement was assessed based on cumulative grade performance average records. The study concluded that effective implementation of institutional policies could significantly improve learners' academic achievement. Aboderin (2017) conducted a comprehensive analysis of the influence of e-learning on the academic achievement of distance e-learners in a Nigerian university, as outlined in their doctoral thesis. The research aimed to investigate the impact of e-learning on academic performance and identify factors predicting academic success among distance e-learners, proposing a framework to improve academic outcomes. The study identified eight key factors that affect academic performance, including students' ICT proficiency, frequency of ICT usage, marital status, past academic performance, daily Internet usage hours, daily social media engagement hours, daily computer usage hours for studies, and family size. Recommendations were put forward for distance learning institutions to effectively implement these strategies to enhance students' academic achievements.

**Students' Perception of Inclusivity in Digital Learning Environment in NOUN**

Onwuagboke et al. (2022) investigated students' perspectives on the utilization of technology for learning at the National Open University of Nigeria (NOUN). The research focused on evaluating educators' proficiency in contemporary media technology and their effectiveness in evaluating learners through technology. The aim was to comprehend students' viewpoints regarding the integration of technology by educators at NOUN in Imo State. The results revealed a moderate level of access to and utilization of modern ICT in teaching and assessment, with instructors being perceived to possess moderate skills and abilities in utilizing technology for instructional delivery and evaluation. The study suggests the provision of essential learning technologies at the learning

center and the training of instructors in the use of modern resources, especially considering the COVID-19 pandemic's impact, which has led to social distancing measures and the promotion of virtual learning.

Similarly, Algahtani (2011) conducted a study to evaluate the efficacy of e-learning experiences among male students at select universities in Saudi Arabia. The research employed social science methodology to gauge the effectiveness of e-learning in two Saudi universities, with a specific focus on the viewpoints of male learners. Data collection involved a mixed-methods approach, including a questionnaire distributed to 300 learners and a focus group interview with 21 participants. The results indicated that e-learners felt they could independently learn using the available technological tools, were motivated by interactive elements, and reported successful outcomes in their courses. Positive consensus was noted across four dimensions, with prior elearning experience and ICT skills emerging as significant factors.

Participants appreciated e-learning for its support in communication, its adaptability to learning requirements, and its effectiveness in meeting the growing demand for education. However, concerns were raised regarding potential risks to physical and social well-being, as well as challenges related to information overload. Recommendations for enhancement encompassed improved planning, training initiatives, the engagement of specialized personnel, and addressing infrastructure deficiencies and acceptance issues. The study concluded with proposals for tackling the identified challenges and suggestions for future research endeavors.

**Challenges Faced by Persons with Disabilities in Accessing and Engaging with Digital Learning Contents in NOUN**

Fredrick (2015) carried out a research investigation on the potential advantages and hurdles associated with e-learning in Nigerian university education, concentrating on the National Open University of Nigeria Akure Study Centre. The primary objective of the study was to scrutinize the possible benefits and challenges of e-learning within the Nigerian university education system, particularly focusing on the context of the National Open University of Nigeria Akure Study Centre. The research employed questionnaires and a variety of analytical techniques such as frequency count, percentage, mean, t-test, and ANOVA to evaluate the merits and limitations of computer utilization in this setting. A total of 140 students and staff participated, providing data on their computer training background, competence, and literacy levels. Findings revealed that students generally had a high level of familiarity with e-learning tools, but a lack of computer and internet device operation skills made e-learning less engaging. Some staff and students lacked computer proficiency, although learning new software was not perceived as time-wasting. Inequality of technology access emerged as a primary challenge. E-learning is viewed as a substitute for conventional in-person teaching, providing greater possibilities for collaboration and interaction. Jabi (2018) carried out a study centered on improving the accessibility of quality education for individuals with disabilities (PWDs) via the National Open University of Nigeria (NOUN). The investigation, grounded in Moore's theory of distance education, employed qualitative survey techniques. Results indicated that the majority of respondents believed NOUN could enhance access to education for PWDs. Inclusiveness and integration through open and distance learning (ODL) were seen as key in reducing stigma against PWDs. However, respondents expressed concerns about challenges such as poverty and cultural barriers affecting PWDs' access to ODL. The paper concluded with recommendations for advocacy, government support for ODL, development of ICT and open educational resources, and legislative measures to institutionalize PWDs' education through ODL, particularly as provided by NOUN.

**Strategies that can be adopted by NOUN to Enhance the Inclusivity of its Digital Learning Ecosystems**

Ogbo et al. (2023) investigated approaches to promote impactful digital inclusion ecosystems, raising the query "if we construct it, will they arrive?" The article discusses the ongoing challenge of narrowing digital disparities to ensure internet accessibility for societal engagement, particularly in marginalized areas. Despite the increased financial investments in this domain, the lack of a holistic strategy hampers the efficacy of these investments. The paper advocates for an ecosystem based strategy, with local universities, particularly those serving minority populations, taking the lead in advancing digital inclusion. It delves into public policies designed to bolster universities as pivotal institutions in expanding broadband access in communities, citing initiatives such as the Broadband Equity, Access, and Development (BEAD) and Digital Equity programs under the Bipartisan Infrastructure Law, as well as the Connecting Minority Communities program outlined in the Consolidated Act of 2021.

Nkechinyere (2011) scrutinized e-learning tactics for facilitating learning in the digital era at the National Open University of Nigeria (NOUN). E-learning has traditionally been seen as a remedy for educational accessibility, with the notion that integrating e-learning technologies into educational packages will ensure learners' achievements and enable economies of scale in open and distance learning (ODL). Technological advancements like the internet and mobile technologies present a significant avenue for widespread dissemination of educational content, particularly in Africa, where governments and institutions are striving to equip individuals with essential skills for advancement. While the literature indicates that ODL and e-learning delivery are interchangeable, there is apprehension that the original vision of distance education as a means to provide education to those previously deprived of it is being eroded by an excessive emphasis on technology. The author contends that a blend of e-learning strategies is essential for delivering and supporting learning in the digital era, complementing and enriching the efforts of educators.

**Methodology**

The research was conducted at the National Open University of Nigeria (NOUN) using a survey research design. The sample includes 300 NOUN students chosen through stratified random sampling from the Nigeria's six geopolitical zones. Data was collected through a self-structured questionnaire. For data analysis, SPSS version 25 was employed to compute frequencies and percentages and conduct a z-test statistic ($p<0.5$).

**Results**

**Research question 1:** What are the policies in place in National Open University of Nigeria (NOUN) to promote inclusive digital learning ecosystems?

**Table 1:** Policies in place in National Open University of Nigeria (NOUN) to promote inclusive digital learning ecosystems

| S/N | Policies in place in National Open University of Nigeria (NOUN) to promote inclusive digital learning ecosystems | N | Yes | % | No | % |
|---|---|---|---|---|---|---|
| 1. | NOUN offers alternative formats for study materials for students with specific needs (e.g., audio versions, braille) | 300 | 100 | 33.3 | 200 | 66.7 |
| 2 | The university provides training and resources to help students develop digital skills for online learning | 300 | 110 | 36.7 | 190 | 63.3 |
| 3. | NOUN offers financial assistance or subsidies for students facing challenges accessing technology or internet | 300 | 20 | 6.7 | 280 | 93.3 |
| 4. | NOUN fosters a strong online community where students feel supported and connected | 300 | 250 | 83.3 | 50 | 16.7 |
| 5. | Faculty members are adequately trained and equipped to deliver inclusive online courses | 300 | 100 | 33.3 | 200 | 66.7 |

Table 1 presents the analysis of the frequency and percentage of policies implemented at the National Open University of Nigeria (NOUN) to enhance inclusive digital learning environments. For the first item, 33.3% of participants agreed that NOUN provides alternative study materials formats for students with specific needs (such as audio versions, braille), while 66.7% disagreed. Item 2 revealed that 36.7% of respondents agreed that NOUN offers training and resources to assist students in developing digital skills for online learning, while 63.3% disagreed. In relation to Item 3, 6.7% of participants agreed that NOUN offers financial aid or subsidies for students In your analysis you are not expected to report everything in your table rather you dwell your discussions on perhaps two upper level and 1 item with least response. You should avoid mentioning "items" but rather focus on percentage of responses (highest and lowest) encountering difficulties accessing technology or the internet, while 93.3% disagreed. Item 4 demonstrated that 83.3% of respondents agreed that NOUN cultivates a robust online community where students feel supported and connected, while 16.7% disagreed. Lastly, Item 5 indicated that 33.3% of participants agreed that NOUN faculty members are adequately trained and equipped to deliver inclusive online courses, while 66.7% disagreed.

**Research question 2:** What is students' perception of inclusivity in digital learning environment in NOUN?

**Table 2:** Students' perception of inclusivity in digital learning environment in NOUN

| S/N | Students' perception of inclusivity in digital learning environment in NOUN | N | Yes | % | No | % |
|---|---|---|---|---|---|---|
| 1. | The digital learning materials provided by NOUN are accessible | 300 | 280 | 93.3 | 20 | 6.7 |
| 2. | The digital learning materials provided by NOUN are easy to navigate for students with special needs (e.g., visual impairments, motor disabilities) | 300 | 80 | 26.7 | 220 | 73.3 |
| 3. | NOUN offers adequate support services for students requiring accommodations in the digital learning environment (e.g., alternative formats, assistive technologies) | 300 | 75 | 25.0 | 225 | 75.0 |
| 4. | The digital learning platforms used by NOUN effectively cater for various learning styles and preferences (e.g., visual, auditory, interactive) | 300 | 280 | 93.3 | 20 | 6.7 |
| 5. | The university actively promotes awareness and understanding of inclusivity in the digital learning environment among students and faculty members | 300 | 150 | 50.0 | 100 | 50.0 |
| 6. | Students feel empowered to provide feedback on the inclusivity of digital learning resources and environments at NOUN | 300 | 100 | 33.3 | 200 | 66.7 |

Table 2 illustrates the frequency and percentage analysis of students' perspectives on inclusivity within the digital learning environment at NOUN. In Item 6, 93.3% of participants agreed that the digital learning materials provided by NOUN are easily accessible, while 6.7% disagreed. Item 7 revealed that 26.7% of respondents agreed that the digital learning materials offered by NOUN are user-friendly for students with special needs (such as visual impairments, motor disabilities), while 73.3% disagreed. Concerning Item 8, 25.0% of participants agreed that NOUN provides sufficient support services for students requiring accommodations in the digital learning setting (such as alternative formats, assistive technologies), while 93.3% disagreed. Item 9 indicated that 93.3% of respondents agreed that NOUN's digital learning platforms effectively cater to diverse learning styles and preferences (e.g., visual, auditory, interactive), while 6.7% disagreed. For Item 10, 50.0% of participants agreed that NOUN actively promotes awareness and comprehension of inclusivity in the digital learning environment among students and faculty members, while 50.0% disagreed. Item 11 suggested that 33.3% of respondents agreed that students feel empowered to offer feedback on the inclusivity of digital learning resources and environments at NOUN, while 66.7% disagreed.

**Research question 3:** What are the challenges faced by persons with disabilities in accessing and engaging with digital learning contents in NOUN?

**Table 3:** Challenges faced by persons with disabilities in accessing and engaging with digital learning contents in NOUN

| S/N | Challenges faced by persons with disabilities in accessing and engaging with digital learning contents in NOUN | N | Yes | % | No | % |
|---|---|---|---|---|---|---|
| 1. | Persons with disabilities encounter difficulties accessing digital learning materials provided by NOUN due to lack of compatibility with assistive technologies | 300 | 290 | 96.7 | 10 | 3.3 |
| 2. | Limited availability of alternative formats (e.g., audio, braille) for digital learning materials poses a significant challenge for persons with visual impairments at NOUN | 300 | 280 | 93.3 | 20 | 6.7 |
| 3. | Persons with physical disabilities face obstacles in navigating digital learning platforms and participating in online activities due to inaccessible interfaces and controls | 300 | 275 | 91.7 | 25 | 8.3 |
| 4. | Inadequate provision of technical support and training on accessibility features in digital learning platforms adds to the challenges faced by persons with disabilities at NOUN | 300 | 260 | 86.7 | 40 | 13.3 |
| 5. | Limited awareness and understanding of the needs of persons with disabilities among faculty members contribute to the barriers encountered in accessing digital learning contents at NOUN | 300 | 250 | 83.3 | 50 | 16.7 |

Table 3 presents the frequency and percentage analysis of the obstacles experienced by individuals with disabilities when accessing and interacting with digital learning materials at NOUN. In Item 12, 96.7% of participants acknowledged that individuals with disabilities encounter challenges accessing NOUN digital learning materials due to compatibility issues with assistive technologies, while 3.3% expressed disagreement. For Item 13, 93.3% of respondents agreed that the lack of alternative formats (such as audio, braille) for digital learning materials poses a significant hurdle for individuals with visual impairments at NOUN, while 6.7% held a differing view. Item 14 pointed out that 91.7% of participants recognized that individuals with physical disabilities face difficulties in navigating digital learning platforms and engaging in online activities due to inaccessible interfaces and controls, while 8.3% disagreed. Regarding Item 15, 86.7% of respondents concurred that the insufficient provision of technical support and training on accessibility features in digital learning platforms compounds the challenges experienced by individuals with disabilities at NOUN, while 13.3% did not share this perspective. Lastly, Item 16 Indicated that 83.3% of participants agreed that the lack of awareness and understanding of the needs of individuals with disabilities among faculty members contributes to the barriers encountered in accessing digital learning content at NOUN, while 16.7% disagreed.

**Research question 4:** What are the strategies that can be adopted by NOUN to enhance the inclusivity of its digital learning ecosystems?

**Table 4:** Strategies that can be adopted by NOUN to enhance the inclusivity of its digital learning ecosystems

| S/N | Strategies that can be adopted by NOUN to enhance the inclusivity of its digital learning ecosystems | N | Yes | % | No | % |
|---|---|---|---|---|---|---|
| 1. | Implementing universal design principles in the development of digital learning platforms and materials to ensure accessibility for all users | 300 | 290 | 96.7 | 10 | 3.3 |
| 2. | Providing comprehensive training and resources to faculty members on creating inclusive digital content and employing accessible teaching methods | 300 | 290 | 96.7 | 10 | 3.3 |
| 3. | Establishing a dedicated accessibility support team to provide technical assistance, accommodation services, and personalized support for students with disabilities | 300 | 280 | 93.3 | 20 | 6.7 |
| 4. | Collaborating with disability advocacy groups and experts in inclusive education to develop and review policies aimed at promoting accessibility and inclusivity | 300 | 280 | 93.3 | 20 | 6.7 |
| 5. | Establishing a feedback mechanism to collect input from students, particularly those with disabilities, on their experiences and needs regarding digital learning inclusivity | 300 | 280 | 93.3 | 20 | 6.7 |

Table 4 displays the frequency and percentage analysis of potential strategies that NOUN could adopt to improve the inclusivity of its digital learning environments. In Item 17, 96.7% of participants supported the idea of incorporating universal design principles into the development of digital learning platforms and materials to ensure accessibility for all users, while 3.3% expressed disagreement. For Item 18, 96.7% of respondents recognized the importance of providing thorough training and resources to faculty members on creating inclusive digital content and utilizing accessible teaching methods, while 3.3% held a differing opinion. Item 19 revealed that 93.3% of participants agreed on the importance of establishing a dedicated accessibility support team to offer technical assistance, accommodation services, and personalized support for students with disabilities, while 6.7% disagreed. Regarding Item 20, 93.3% of respondents acknowledged the significance of collaborating with disability advocacy groups and experts in inclusive education to develop and review policies aimed at fostering accessibility and inclusivity, while 6.7% did not agree. Item 21 highlighted that 93.3% of participants agreed on the value of implementing a feedback mechanism to gather input from students, especially those with

disabilities, about their experiences and requirements concerning inclusivity in digital learning, while 6.7% disagreed.

**Test of Hypothesis**

**$H0_1$:** There is no significant relationship between policies in place in National Open University of Nigeria (NOUN) and inclusive digital learning ecosystems.

**Table 5:** Relationship between policies in place in National Open University of Nigeria (NOUN) and inclusive digital learning ecosystems

| Variable | N | df | $r_{cal}$ | $r_{tab}$ | Sig. |
|---|---|---|---|---|---|
| Policies | 300 | 598 | 0.054 | 0.159 | 0.125 |
| Inclusive digital learning ecosystems | 300 | | | | |

Not Significant

Table 5 presents the correlation between the policies implemented at the National Open University of Nigeria (NOUN) and inclusive digital learning environments. The computed r-value of 0.054 was obtained which is lower than the critical r-value of 0.159 with 598 degrees of freedom at a significance level of 0.05. As the calculated r-value was less than the critical r-value, the null hypothesis was retained. This indicates that there is no statistically significant relationship between the policies at NOUN and inclusive digital learning ecosystems.

**Discussion of Findings**

The data presented in Table 1 is an indication that, it is not just enough to create videos and deliver course materials in both print and electronic formats, the National Open University of Nigeria (NOUN) must still address the needs of individuals with special needs. For instance, NOUN should consider acquiring read-aloud software and developing some course materials in braille. This aligns with the argument made by Otto and Becker (2019) that, as nations strive for increased social justice and economic opportunities, it is essential to establish inclusive learning resources that cater for the diverse needs of all students. NOUN should provide training on braille and other assistive technologies to educators, librarians, and students with special needs. The current level of training provided by NOUN in this area (36.7%; as shown in Table 2) is inadequate. Furthermore, Onwuagboke et al. (2022) corroborated that there are significantly low levels of availability and utilization of assistive technology in teaching, learning, and assessment at NOUN. He noted that instructors possess only a moderate level of skills and competencies for utilizing technology in instructional delivery and assessment. The non-availability and utilization of assistive technology may be attributed to poverty in developing countries and address this challenge, financial aid is essential for students who encounter difficulties accessing technology or the internet (Fredrick, 2015).

Finally, given that only 50% of NOUN students and faculty members are knowledgeable about the needs of individuals with special needs, raising awareness of these needs is crutial. This will establish a strong foundation for enhancing the ecosystem of inclusive digital learning.

## Conclusion/Recommendations

Open and distance learning endeavors to advance equitable access, engagement, and achievement for a diverse range of learners in digital learning settings. This is fundamental for realizing educational equity and inclusivity. Developing inclusive learning environments that meet the varied needs of all students is vital for fostering social equity and economic opportunity. Nevertheless, establishing truly equitable learning ecosystems poses challenges due to disparities in internet access, technology infrastructure, and digital skills to mention a few.

Marginalized groups encounter additional hurdles, as barriers to accessibility such as inaccessible content, limited support for assistive technologies, and insufficient accommodations for learners with disabilities compound their challenges. Effectively implementing institutional guidelines for open and distance learning could significantly diminish these obstacles and enhance content accessibility for individuals with special needs, thereby boosting students' academic achievements. To tackle these issues, it is advised that NOUN invests in assistive technologies and explores the option of offering certain course materials in braille. The Virtual Learning Environment (VLE), student portals, and course content should be designed to be user-friendly for individuals with special needs. Furthermore, NOUN should prioritize raising awareness and providing training for educators and students on utilizing assistive technologies.

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