

A Study on the Demographic Profiles of Postgraduate and Undergraduate Users of Digital Reference Services in Federal University Libraries in Northwest Nigeria

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Abstract— Purpose –This study investigates the demographic profiles of postgraduate and undergraduate users of Digital Reference Services (DRS) in federal university libraries in Northwest Nigeria. It aims to identify how age, gender, academic level, and study program influence DRS usage, frequency, and satisfaction, while assessing how users engage with different digital platforms such as email, instant messaging, and video conferencing.

Methodology –The research adopted a quantitative approach using a structured questionnaire administered via Google Forms. Data were collected from 376 students across eight federal universities in Northwest Nigeria, including the Nigerian Defence Academy. Statistical analysis was performed by SPSS to examine demographic variables and patterns of DRS usage.

Findings – The study reveals that students aged 21–25, especially males and Level 4 or postgraduate students, are the predominant users of DRS. Email remains the most frequently used platform, while tools like WhatsApp and Zoom are gaining traction. A majority use DRS outside operational hours and rely on it as a primary source for academic support. However, gender disparities, low awareness among lower-level students, and usability challenges on library websites persist.

Research limitations/implications – The study is limited to eight federal universities in Northwest Nigeria, which may affect the generalizability of the findings. Future research could expand to include private and state universities or adopt a mixed-methods approach for deeper insights.

Practical implications –The findings inform library managers and academic institutions about the need to enhance 24/7 DRS access, improve interface usability, integrate emerging tools like WhatsApp Business, and provide targeted support based on users' academic levels and gender disparities.

Originality/value –This study extends the Theory of Planned Behavior by incorporating librarian skills, technology competency, and user attitudes into the framework. It provides empirical evidence on how these constructs influence user satisfaction and usage of DRS in a context of developing country.

Keywords—Digital Reference Services, User Demographics, Academic Libraries, University Students, Library Technology, Nigeria, User Satisfaction

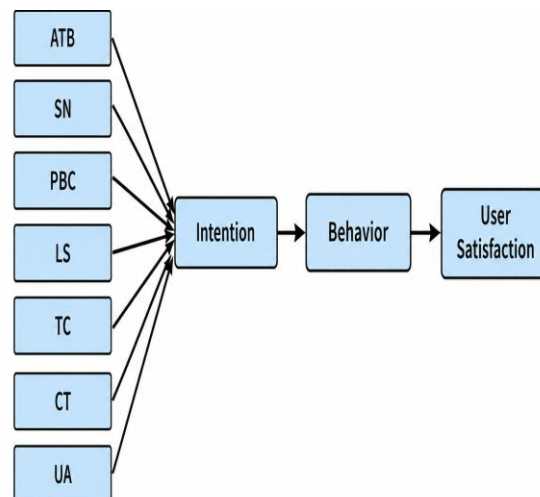
I. INTRODUCTION

In the digital era, university libraries have embraced technology to enhance information access and service delivery. Among these advancements, Digital Reference Services (DRS) have become an essential component of academic libraries, enabling students to seek and receive assistance remotely through various online platforms. These services include email-based reference inquiries, live chat, video conferencing, and knowledge bases, which facilitate seamless interaction between librarians and users. In federal university libraries across Northwest Nigeria, DRS have been introduced to cater to the growing needs of postgraduate and undergraduate students who require timely and efficient academic support. Understanding the demographic characteristics of students using DRS is crucial in assessing their accessibility, effectiveness, and areas for improvement. Factors such as age, gender, academic level, study level and institutionalize their frequency of use can provide insights into how different student groups engage with these services. Postgraduate students, for instance, may rely on DRS for advanced research and thesis-related inquiries, while undergraduates may use them for coursework assistance, Assignment, long semester reports and general information retrieval. Examining these variations can help university libraries tailor their digital reference services to better serve their diverse user base. Despite the significance of DRS, challenges such as limited awareness, inadequate technological skills, and infrastructural constraints may hinder their optimal utilization. While previous studies have explored digital library services, there is a need for specific research on the demographic composition of users and how it influences their interaction with DRS in federal universities in Northwest Nigeria.

This study aims to fill that gap by analyzing the demographic characteristics of postgraduate and undergraduate users, assessing their usage patterns, and identifying factors that affect their engagement with digital reference services. Moreover, this research is centered on evaluating the effectiveness of digital reference services offered by eight federal university libraries in the Northwest geopolitical zone of Nigeria, including a specialized military institution—the Nigerian Defence Academy (NDA), Kaduna. The study investigates the demographic characteristics of both undergraduate and postgraduate students who utilize these services. By analyzing usage patterns, the research aims to determine how digital reference services contribute to students' academic success and improve their access to relevant information resources. Furthermore, the study incorporates an examination of respondents' demographic profiles to contextualize their level of satisfaction and frequency of usage. The study also extends existing theoretical frameworks by contributing new insights and support to the Theory of Planned Behavior, offering a broader understanding of user engagement with digital reference services.

II. LITERATURE

This provide supportive lens of the theory of planned behavior (TPB) as extension to the theory of reasoning and explains user engagement with digital reference services (DRS) based on attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). Positive attitudes, shaped by perceived usefulness and past satisfaction, influence users' willingness to seek digital assistance (Chang et al., 2009; Hani et al., 2021). Subjective norms, including peer and institutional support, affect users' decisions to use DRS. Perceived behavioral control, such as ease of access and technological confidence, determines the likelihood of adoption. Studies suggest that positive experiences with DRS enhance user attitudes and encourage continued use.



Theory of planned behavior developed by (Ajzen, 1991)

These were built on builds upon Ajzen's theory of planned behavior (TPB) (Ajzen, 1991; Sadaf & Gezer, 2020) by integrating additional constructs to enhance its explanatory power in the context of digital reference services (DRS). This extended framework incorporates Attitude toward

Behavior (ATB), Subjective Norms (SN), Perceived Behavioral Control (PBC), Librarian Skills (LS), Technology Competencies (TC), Complex Tasks (CT), and User Attitude, Furthermore, it accounts for the relationships between intention, behavior, and overall user satisfaction. The four key constructs-Librarian Skills (LS), Technology Competencies (TC), Complex Tasks (CT), and User Attitude (UA) serve as independent variables influencing user satisfaction, which functions as the dependent variable. The findings from this study provide empirical validation for the framework, confirming that these factors significantly impact user satisfaction with DRS in federal university libraries in Northwest Nigeria. Previous studies (Connaway et al., 2011; Faizan, 2023) have also demonstrated the role of technological competencies and librarian skills in influencing satisfaction levels in digital services.

By refining TPB with these additional constructs, this framework offers a more comprehensive understanding of the determinants of user satisfaction, contributing valuable insights for academic library management and service improvement. Furthermore, this aligns with prior research (Singh, 2012; Taufiq et al., 2020), which highlights that ease of access, institutional support, and digital literacy play essential roles in user satisfaction with DRS. This research provides valuable insights that will help academic libraries assess both the advantages and limitations of digital reference services (DRS). By understanding these factors, libraries can enhance their services to better meet user needs. The study specifically examined user satisfaction with DRS in federal university libraries across Northwest Nigeria. Findings indicate that asynchronous methods dominate, email emerging as the most widely used platform due to its reliability, accessibility, and acceptance as a standard communication tool. Frequently Asked Questions (FAQ) services also play a critical role by efficiently addressing common enquiries, thereby reducing redundancy in librarian user interactions as (Sinhababu & Kumar, 2021a),

In addition to asynchronous methods, the study highlights the importance of real-time synchronous communication in digital reference services. Tools such as Google Meet, Zoom, and Microsoft Teams are increasingly being used to facilitate live interactions between librarians and users, offering immediate and personalized assistance. These tools enhance the effectiveness of digital reference services by enabling librarians to provide in-depth explanations, screen-sharing demonstrations, and face-to-face consultations that foster a more interactive user experience added by (Sinhababu & Kumar, 2021b). Although synchronous methods are less frequently used than email, they represent a growing trend in academic libraries' efforts to modernize reference services. Their ability to support complex user enquiries, collaborative

III. METHODOLOGY

The study adopted a quantitative research design, utilizing a questionnaire administered via Google Forms to gather data from users of digital reference services across eight federal university libraries in Northwest Nigeria. The target population included both undergraduate and postgraduate students actively engaged with these services. A total of 376 participants responded to the survey, comprising 280 males and 96 females, reflecting the gender distribution within the population. The respondents, drawn from diverse academic levels, were all users of digital reference service (DRS) platforms, seeking information and academic support.

This diversity highlights the broad engagement of students with DRS tools, offering valuable perspectives on their experiences, interactions, and satisfaction with the services provided by their respective libraries. As noted by (Stratton, 2021), a population includes all entities that fulfil specific criteria a definition that aligns with the study's scope. This approach is also consistent with the 2011 policy of the National Universities Commission (NUC), which supports the federal government's commitment to establishing a federal university in each Nigerian state. This initiative aims to ensure equal access to higher education and to enhance the development of educational resources and infrastructure nationwide. The table below presents a breakdown of the study's respondents across the eight selected federal university libraries in Northwest Nigeria, detailing gender distribution and total responses per institution.

Table 3 .1 Eight Selected Federal University Libraries

S/ N	Name of university	Location	state	Dist	Percent
1	Ahmadu Bello university zaria	Zaria	Kaduna	43	11%
2	Bayero university kano	Kano	Kano	125	33%
3	Usmanu Danfodio university	sokoto	sokoto	19	5.1%
4	Nigerian Defence Academy	kaduna	kaduna	13	3.5%
5	Federal university Dutsenma	Dutsenma	Katsina	93	24.7%
6	Federal university Dutse	Dutse	Jigawa	51	13.6%
7	Federal university kebbi	kebbi	kebbi	23	6.1%
7	Federal university Gusau	zamfara	zamfara	9	2.4%
8	Total			376	100

The sample size and sampling technique illustrate the distribution of respondents across universities in Northwest Nigeria. Bayero University Kano (BUK) represents the largest share of respondents, contributing 33.2% to the study, highlighting its prominent role in the research. This is followed by Federal University Dutsenma, Katsina (FUDK) with 24.7%, and Federal University Dutse, Jigawa (FUDJ) with 13.6%, both of which play significant roles in the sample composition. Ahmadu Bello University Zaria (ABU) accounts for 11.4%, reflecting its status as a key university in the region.

The remaining universities, including Federal University Birnin Kebbi (FUK) with 6.1%, Usmanu Danfodio University Sokoto (UDUS) with 5.1%, Nigerian Defence Academy Kaduna (NDA) with 3.5%, and Federal University Gusau, Zamfara (FUG) with 2.4%, collectively contribute a smaller but still valuable portion to the overall sample. This diverse distribution ensures a comprehensive representation of the federal university libraries in the region.

A. Demographic profiles of responders

In this present study, the respondents' demographic profiles were examined and described according to five classifications. The respondents' demographic profiles are age, gender, current academic levels, level of study, and the Institutions name; the following sections present more of the statistical analysis in a table.

Table2. Age profile distribution

Age Range	Frequency	Percent
18-20	45	12.0
21-25	162	43.1
26-30	82	21.8
31-35	27	7.2
36 and above	60	16.2

The age profile data in Table 0.2 shows that most respondents were aged 21-25, making up 43.1% of the total sample. This highlights that young adult, who is all students in federal university libraries in Northwest Nigeria, are the main users of digital reference services. The next largest group is the 26-30 age range, at 21.8%, followed by students aged 18-20, who make up 12.0%. These groups suggest that most respondents are undergraduate or graduate students. In contrast, older students aged 31-35 and 36 and above represent smaller portions of 7.2% and 16.0%, respectively. This indicates fewer older students or part-time learners in the sample. With a total of 376 respondents, the data provides a clear overview of the age distribution.

Table 3 Gender Profile Distribution

Gender	Frequency	Percent
Male	280	74.5
Female	96	25.5
Total	376	100

The gender profile data in Table 0.2 shows that the majority of respondents were male, making up 74.5% of the total sample, while females accounted for 25.5%.

This significant difference suggests that male students are more likely to engage with or respond to digital reference services in these libraries. The gender distribution could reflect broader trends in library usage or the demographic composition of students in federal universities in Northwest Nigeria. With a total of 376 respondents, this data provides a clear view of the gender dynamics among users of digital reference services.

Table3 Academic Level Distribution

Academic Levels	Frequency	Percent
Level one	14	3.7
Level two	62	16.5
Level three	37	9.8
Level four	142	37.8
Level five	18	4.8
PG	103	100.0

The academic level data in Table 0.4 provides insights into the distribution of respondents across various educational stages. The largest groups of respondents were at Level Four, making up 37.8% of the total sample, indicating that senior undergraduate students form the majority of users of digital reference services in federal university libraries in Northwest Nigeria. Postgraduate students accounted for 27.4% of respondents, highlighting their significant reliance on these services, likely for research and advanced academic support.

Table 4 Study Level Distribution

Degree Level	Frequency	Percent
Bachelors	274	72.9
Master's Degree	76	20.2
Doctoral Degree	26	6.9
Total	376	100

The study level data in Table 0.4 highlights that the majority of respondents, 72.9%, are pursuing a Bachelor's degree, making them the predominant users of digital reference services in federal university libraries in Northwest Nigeria. This finding reflects the heavy reliance of undergraduate students on library services for their academic activities, including coursework and foundational research. Master's degree students account for 20.2% of the sample, representing a substantial portion of users who may depend on these services for advanced studies and thesis preparation.

B. Discussion of the finding

Overall, the demographic findings demonstrate that DRS have relevance across different categories of students in federal university libraries in Northwest Nigeria.

The study's 376 respondents were distributed across eight federal universities, different age groups, genders, academic levels, and degree programmes. The findings particularly demonstrate the importance of academic level and study level in understanding DRS users. Level four and undergraduate students formed the largest groups, while postgraduate students also represented a substantial proportion. This suggests that DRS is not exclusively a postgraduate research service but functions as a broader academic support mechanism. The study also identifies important implications for library management. Since DRS enables users to obtain assistance remotely through platforms such as email, live chat, video conferencing, and other digital channels, libraries need to ensure that these services are accessible, convenient, and responsive. The paper further indicates that email remains an important DRS platform, while WhatsApp and video-conferencing tools are emerging as additional channels. This suggests that libraries should maintain reliable asynchronous services while gradually integrating appropriate synchronous and mobile-based communication channels.

IV. RECOMMENDATION

Based on the findings, the following recommendations are proposed:

1. *Improve DRS awareness:* Federal university libraries should conduct regular orientation programmes, workshops, and awareness campaigns to introduce students to available digital reference services.
2. *Develop services according to academic level:* Libraries should provide basic DRS assistance for undergraduate students and more specialized research consultation for Master's and Doctoral students.
3. *Strengthen email-based reference services:* Since email is identified as an important DRS channel, libraries should establish clear response-time standards and ensure that reference enquiries are handled promptly.
4. *Integrate mobile-friendly platforms:* Libraries should consider appropriate platforms such as WhatsApp Business and other widely used communication technologies to complement existing DRS channels.
5. *Improve library website usability:* Library websites should provide clearly visible DRS links, simple navigation, frequently asked questions, contact information, and easy-to-follow instructions.

6. *Promote gender-inclusive access:* Libraries should ensure that DRS awareness and access programmes reach both male and female students and should investigate barriers that may affect participation.
7. *Provide continuous librarian training:* Librarians should receive regular training in digital reference techniques, communication technologies, online searching, information literacy, and emerging digital tools.
8. *Provide extended or 24/7 support:* Where institutional resources permit, libraries should develop extended-hours DRS, automated FAQs, chatbots, or other mechanisms that can support users outside normal library operating hours. The paper itself identifies enhanced 24/7 access as a practical implication.
9. *Adopt user-centred DRS design:* DRS should be designed around the actual information needs, technological capabilities, and academic requirements of different categories of users.
10. *Conduct further comparative research:* Future research should include state and private universities and may adopt mixed-method approaches to obtain deeper explanations of users' experiences. This is consistent with the limitation already identified in the paper

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