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Research Article

Students' awareness, willingness and utilisation of facebook for research data collection: Multigroup analysis with age and gender as control variables

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Previous research has extensively analysed teachers' and students' Facebook use for instructional engagement, writing, research dissemination and e-learning. However, Facebook as a data collection mechanism for research has scarcely been the subject of previous studies. The current study addressed these gaps by analysing students' awareness, willingness, and utilisation of Facebook for research data collection [RDC]. This study aimed to predict students' Facebook use for research data collection based on their awareness and willingness and to determine age and gender differences in such predictions. A sample of 11,562 students of tertiary institutions participated in an online survey. The researchers designed and validated the online survey. Exploratory Factor Analysis was used for dimensionality. Average Variance Extracted [AVE] was used for convergent validity, whilst the Fornel-Larcker criterion and Heterotrait-Monotrait ratio were used for discriminant validity. Composite reliability indices of .97, .94 and .90 proved the instrument's three sub-scales usable. One sample t-test and multigroup analysis were conducted using SPSS 27 and Smart PLS 3. The study found high awareness but low usage of Facebook for RDC among Nigerian university students. Younger and male students showed higher willingness and actual use of Facebook for RDC. Awareness directly impacted by awareness, and acted as Facebook usage for RDC, with stronger impacts for males and students aged 19 to 28. Willingness was positively impacted and acted as a negative mediator between awareness and usage for some age groups and genders. These findings provide important insights into using Facebook for RDC among students in Nigerian universities and highlight the need to consider the impact of demographic factors such as age and gender when promoting social media platforms for academic purposes.

Keywords: Multigroup analysis; Perception; SmartPLS; Structural equation modelling; Writing

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1. Introduction

The use of Facebook for educational purposes has sparked considerable research interest among scholars globally. In the last decade, studies have paid substantial attention to teachers' and

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students' use of Facebook for various purposes. For instance, it has been shown that the platform could be used as a learning environment for students' engagement, support, and knowledge creation (Alwreikat et al., 2021; Moorthy et al., 2019; Shodiyev, 2022). Other higher education studies have linked students' Facebook use to variables such as their sexual behaviour (Carmack & Rodriguez, 2020; Olamijuwon et al., 2021), attitudes towards learning (Arop et al., 2019; Díez-Palomar et al., 2020), and academic achievement (Razavi, 2021; Tafesse, 2020). Some studies have determined how Facebook and other social media platforms can be used to disseminate scholarly publications (Aldahdouh et al., 2020; Chugh et al., 2021). However, research remains inclusive in this area since it is yet unknown how much higher education students use Facebook for research data collection. There can be serious consequences for both the quality and efficiency of their research endeavours if higher education students do not utilise Facebook for research data collection. Firstly, Facebook's vast user base and diverse content (Moran et al., 2020) provide a valuable pool of potential research participants and data sources. By not leveraging this platform, students might miss out on the opportunity to access a wide range of perspectives and insights that could enrich their research findings. This limitation could result in a skewed representation of data and potentially compromise the validity and generalizability of their research outcomes. Secondly, Facebook's interactive nature allows for real-time engagement and data collection through surveys, discussions, and polls (Mameli et al., 2022). By neglecting this platform, students might forego the chance to engage with participants in an accessible and interactive manner. This could hinder their ability to gather timely and contextually relevant data, impacting the depth and richness of their research findings (Jing et al., 2023; Li et al., 2022). Additionally, the absence of Facebook as a data collection tool might lead to a missed opportunity for innovative and dynamic data collection methods, potentially limiting the breadth of data that students can access. Furthermore, not utilizing Facebook for research data collection might curtail the depth, and engagement potential of students' research projects, ultimately affecting the rigour and comprehensiveness of their findings (Lijadi & Van Schalkwyk, 2015; Rife et al., 2016).

Admittedly, the existing literature is dominated by studies analysing students' Facebook use in writing. For instance, the effectiveness of Facebook groups in students' writing activity (Andini, 2019) and peer revision of written works (Razak & Saeed, 2015) has been examined. Other scholars have investigated students' use of Facebook to practice (Putri & Aminatun, 2021) and increase their writing motivation (Khusnita, 2017). However, using Facebook for RDC in academic research writing remains under-explored.

To bridge this gap, some scholars analysed the potency of Facebook-aided lessons on students' literature review skills (Arifani & Khaja, 2021). Although, the study of Nwangwa et al. (2014) appears the most closely related to the current research. The scholars assessed undergraduates' use of social media for research. They focused on three critical aspects: sourcing research materials, generating research ideas, and developing creative writing skills. While sourcing research literature is a form of data collection, the cited authors did not assess students' Facebook use in engaging with respondents during research projects. Besides, what constitutes research data takes many forms. Research data has been considered evidence that can enable scholars to reach meaningful conclusions (Odigwe et al., 2020; Owan & Bassey, 2019). Therefore, students' use of social media to source literature materials does not connote the same meaning as using the platform for RDC.

Regarding demographic characteristics, students' age and gender have regularly been featured in general ICT and social media studies (Al-Qaysi et al., 2020; Hassan & Masoud, 2021). Previous studies have been motivated by the need to compare students' use of ICT, cyberspace/Internet, social media or online-seeking behaviour across demographic traits (Maranita et al., 2019; Seymour, 2020). Apart from limited research on Facebook for RDC, the results from previous studies remain inconclusive due to disparities in findings, creating an evidence gap. Studies on gender have found males to be better Internet, ICT or social media users than their female counterparts (McGregor et al., 2017; Odigwe & Owan, 2020). Opposing studies have argued that

females are better social media users than males (Gil-Clavel & Zagheni, 2019; Oberst et al., 2016). Nevertheless, the results of other scholars show no significant difference in students' use of ICT, social media or Facebook based on gender (Guillén-Gámez et al., 2019; Mesagan et al., 2022), attributing any observed disparity between male and female students to chance. These arguments in the literature call for further research as there is a lack of consensus among the three groups of studies.

A similar trend is observed for age, where some scholars argue that younger students are better users of Facebook or social media than their older colleagues (Ozimek & Bierhoff, 2016). Contrastingly, other researchers have favoured older students over younger ones in using digital resources (including Facebook) for different purposes (McAndrew & Jeong, 2012; Owan, Asuquo, Ekaette, et al., 2021a). This suggests that age significantly influences students' use of ICT (Guillén-Gámez et al., 2019). Interestingly, other scholars have also reported no significant difference in ICT or social media use based on the age of respondents (Dúo-Terrón et al., 2022; Juhaňák et al., 2019; Owan & Asuquo, 2021).

Apart from the inconclusive arguments, these studies have rarely focused on Facebook as a social media platform. Furthermore, the cited studies viewed ICT or social media usage in the context of writing and learning, with a de-emphasis on RDC. As a result of this gap, it remains unclear the degree to which Facebook can serve educational purposes beyond teaching, students' engagement and academic writing skills improvement often reported by previous studies. Bridging the gap, this study considered Facebook's use for research data collection. The current research also builds on the limitations and recommendations of Nwangwa and colleagues by shifting focus to the practical use of social media (particularly Facebook) in collecting evidence-based data for research projects.

Thus, in the current study, we first quantified final-year students' awareness of Facebook for research data collection (RDC) to address this gap. We then determined whether students' Facebook use varies with their age and gender. We determined the extent to which students are willing to utilise Facebook for RDC and tested the age and gender variation in the willingness to use Facebook for RDC. We also estimated the extent to which students use Facebook for RDC and determined the age and gender variation in students' Facebook use. After that, we examined whether students' awareness and willingness predict their Facebook utilisation for RDC. A multigroup analysis was also performed to determine whether the prediction of awareness and willingness on Facebook use is equal for students of different ages and genders. We assessed whether willingness mediates the link between students' awareness and their Facebook use for RDC and if such mediation effect varies by age and gender.

Final-year students were specifically considered in this study for various reasons. First, they are in a critical stage in their academic journey as they are typically required to complete a substantial research project as part of their degree requirements. This research project serves as a culmination of their educational experience, making them an ideal group for investigating the use of social media for research purposes. Their active engagement in research activities provides valuable insights into how social media platforms can be harnessed for academic pursuits. Secondly, final-year students often exhibit a level of readiness and maturity that is conducive to conducting research effectively. Having undergone several years of education, they have likely developed the necessary academic skills and the ability to think critically. These skills are essential for navigating the complexities of data collection and analysis, which are central to any research endeavour, unlike undergraduates in lower levels. In addition to their academic readiness, final-year students typically have access to a range of academic resources that can complement their use of social media for research. This access includes libraries, research advisors, mentors, and experts in their respective fields. Such resources can be instrumental in validating information obtained through social media channels, enhancing the rigour of their research.

Thirdly, the time commitment of final-year students often leans heavily towards their research projects. With fewer distractions from coursework and other academic obligations, they are more

readily available to engage in online interactions and data collection through social media platforms. This focused dedication to their research makes them a prime group for studying the use of social media in an academic context. Considering the evolving landscape of technology and education, final-year students attending tertiary institutions during a period when innovative uses of social media are advocated or emerging offer a valuable perspective. They may be early adopters of new approaches and technologies, making their experiences particularly relevant to understanding how social media platforms are being adopted and adapted for academic purposes. Lastly, the potential long-term impact of studying final-year students should not be underestimated. The skills and knowledge they acquire in using social media for research during their final year can potentially carry over into their future careers. This could contribute to the development of a more tech-savvy and research-oriented workforce, with the ability to leverage social media for professional and academic pursuits.

1.1. Literature Review and Hypotheses Development

Facebook, established in 2004, has evolved into an indispensable global social networking platform for business, academia, and personal interaction (Mazman & Usluel, 2010). It is not only the most popular social networking site worldwide but also a prominent tool for students' online learning (Omar et al., 2012). Originally confined to Harvard students with university email IDs, Facebook swiftly gained momentum to become the most visited website. The mass appeal of social media raises concerns, particularly as students dedicate more time online. Undergraduates, heavily reliant on smartphones, frequently check and update their profiles on these platforms, sometimes to the detriment of educational and career pursuits (Owan et al., 2020).

Past investigations have indicated that students at different educational tiers allocate roughly half an hour to the Facebook platform as a component of their daily regimen (Bashir et al., 2021; Lattie et al., 2022). This escalating utilization of the platform might elucidate the rationale behind the substantial awareness observed in both male and female students, albeit with males demonstrating a greater level of awareness than females. This corroborates earlier literature in Africa, which ascertained that males tend to display superior proficiency as Internet, ICT, or social media users in comparison to their female peers (McGregor et al., 2017; Odigwe & Owan, 2020). Kasa et al. (2021) highlighted a worrying trend of students' obsession with social networking, potentially affecting their academic, social, and spiritual well-being. Parents express concerns about their children's absorption in the virtual world, leading to detachment from reality. Castor (2022) observed that students, particularly on Facebook and WhatsApp, remain online nearly 24/7, even during lectures. According to Ifeanyi-Obi et al. (2014), Facebook (94%), Blackberry Messenger (90%), and WhatsApp (72.5%) are the most frequently used social media platforms among students. The frequency of Facebook visits shows that most students access the platform once every three days (60%), spending an hour or less daily, with the primary activity being chatting (36.25%). Since the review of literature tend to suggest that there is a high use of Facebook for non-educational purposes, the first hypothesis of this study was developed.

Hypothesis 1: The extent of students' awareness of Facebook for research data collection is not significantly high.

Students' willingness to utilize Facebook pertains to their inclination to engage with peers, sharing valuable information through text or images (Zhou et al., 2020). Learners' actions significantly hinge on their determination and willingness to respond to given scenarios. Acquiring essential application skills hinges on a definitive willingness to exploit Facebook as a learning-oriented social platform. The readiness to employ Facebook for communication forms a pivotal personal factor influencing students' choices to adopt the platform in different contexts (Elahi et al., 2019). Moreover, factors such as communication confidence, teacher encouragement, motivation, and learners' beliefs contribute to this willingness (Lee & Hsieh, 2019). A study conducted by Bruneel et al. (2013) indicated that 77.8% of students displayed a willingness to employ Facebook regularly for educational communication, thereby enhancing their

communicative skills. A related investigation by Issa et al. (2021) uncovered that undergraduates possess a positive perception regarding Facebook's utility for learning purposes. Other investigations (such as Alwreikat et al., 2021; Shodiyev, 2022) have reported that the platform holds the capacity to serve as a learning arena where students can engage, receive support, and create knowledge.

The existing literature indicates that students' willingness to use Facebook is closely related to their engagement with peers, sharing of valuable information, and their responsiveness to various situations. The readiness to utilize Facebook for communication is influenced by factors like determination, confidence in communication, teacher encouragement, motivation, and personal beliefs. There is evidence that Facebook can serve as a learning platform where students engage, receive support, and generate knowledge. This readiness to use Facebook for educational purposes has been observed to enhance students' communication skills. Building upon the evidence from the literature, we propose that students might exhibit a lower willingness to employ Facebook for research data collection, leading to the second hypothesis.

Hypothesis 2: Students are less willing to use Facebook for research data collection.

The literature on Facebook's role in academia reflects a diverse landscape of usage patterns and effects. Some students employ Facebook to interact with instructors and exchange academic information, often reaping educational benefits (Al-Dheleai & Tasir, 2016). However, the impact hinges on the intended use - be it for academic tasks or social interactions (Barrot, 2018). Nevertheless, it is important to note that excessive daily Facebook usage might adversely affect concentration (Thompson, 2017), possibly due to the distractions presented by electronic devices during learning (Sahin, 2014).

The literature also presents mixed findings regarding the effects of Facebook on learning tasks (Arop et al., 2019). While some students fully utilize Facebook's academic potential, others may not exploit its benefits to the same extent (Owan & Robert, 2019). Sendurur et al. (2015) and Clements (2015) propose that social networks, including Facebook, could be valuable tools in academic settings, suggesting avenues for academic engagement and interaction. In contrast, Oginni et al. (2016) express concerns about negative impacts stemming from social networking, while Ilfa and Harjeet (2021) reveal significant correlations between Facebook usage and active learning. Arteaga et al. (2014) highlight the significant advancement brought about by the integration of Web 2.0 tools in education, with Facebook being a notable example. This sentiment resonates as Facebook's ubiquity extends across demographics (Owan et al., 2020), and within education, it serves as the primary mode of communication for students (Ellefsen, 2015). This aligns with research indicating that students are ready to use Facebook for educational communication (Bruneel et al., 2013), as underscored by positive perceptions of its utility for learning (Issa et al., 2021).

However, amid the optimism surrounding Facebook's educational potential, Asogwa et al. (2012) offer a contrasting view. They suggest that Facebook does not significantly disrupt classroom learning or impact academic performance, except in terms of spoken and written communication. Moreover, the Nigerian context introduces additional factors that dampen students' engagement with Facebook such as: costly internet subscriptions, irregular power supply, limited access to personal computers, and students' own perceptions (Aworanti, 2016; Carmack & Rodriguez, 2020; Díez-Palomar et al., 2020; Fahm et al., 2021; Olamijuwon et al., 2021; Owan, Asuquo, Makuku, et al., 2021b). Drawing on the literature, we propose the next hypothesis that there is a limited extent of Facebook utilization among students for research data collection. This hypothesis is grounded in the diverse array of factors that influence Facebook usage, including the practical barriers, the variability in students' readiness to employ it for educational purposes, and the nuanced effects on learning outcomes.

Hypothesis 3: There is a low extent of Facebook utilisation among students for research data collection.

The literature underscores how the widespread use of Facebook, particularly among students, has seamlessly integrated this social media platform into the educational fabric. The accessibility and appeal of Facebook for communication have established it as a staple in the educational landscape (Adegboyega, 2020; Siddiqui & Singh, 2016). This pervasive awareness of Facebook has transformed it into an integral part of students' daily lives, with many students possessing smartphones equipped with the Facebook app (Amali et al., 2012; Marshall, 2012).

Students' familiarity with various facets of Facebook, such as account management and privacy settings, has led to their utilization of the platform for academic purposes, encompassing peer communication and assessment-based learning (Odili, 2021). Research consistently highlights the educational potential of Facebook, offering students novel opportunities to interact with peers, teachers, and tutors (Abbas et al., 2019; Badri et al., 2017). This global recognition of Facebook's versatility has led to its integration as a valuable tool for education, particularly in well-established educational systems (Dhawan, 2020).

The synthesis of the literature underscores the seamless integration of Facebook into the educational realm due to its effective communication potential and widespread usage among students. As a result, it has found utility for various academic activities. The fourth hypothesis emerges from this synthesis, proposing that awareness significantly influences students' willingness to use Facebook for research data collection. Given the demonstrated role of awareness in shaping students' interactions with Facebook and their willingness to adopt it for educational purposes, it is reasonable to hypothesize that awareness will also play a crucial role in shaping their readiness to employ Facebook for research data collection.

Hypothesis 4: Awareness significantly affects students' willingness to use Facebook for research data collection.

The widespread adoption of Facebook, driven by its expansive user base, has led to its exploration as a platform for student learning (Hung & Yuen, 2010). The platform's vast network, encompassing connections like friends, friends of friends, and various groups, coupled with its integration into educational institutions globally, highlights its potential for facilitating social learning (Farhan, 2014). This global interest is underscored by the prevalence of Facebook's use among students across diverse economic settings, including both developed and developing nations (Aljasir et al., 2013; Farhan, 2014). With students contributing significantly to Facebook's user base (Vázquez-Cano & Díez-Arcón, 2021; Yotyodying et al., 2022), its integration into educational contexts appears both logical and has led to ongoing research endeavours.

Research substantiates Facebook's role as a valuable learning tool, enhancing interaction and collaborative learning experiences (Irwin et al., 2012). This sentiment is echoed in later studies by Barczyk and Duncan (2013), who observed American students recognizing Facebook's instructional worth. Students have acknowledged the platform's role in providing convenient access to academic resources and materials (Arteaga et al., 2014; Irwin et al., 2012). The platform's user-friendly interface has fostered its adoption as a learning management system (LMS), fostering student engagement and participation (Wang et al., 2012).

The correlation between Facebook usage and improved learning outcomes becomes evident in studies like Ainin et al.'s (2015), revealing a connection between increased Facebook usage and enhanced academic performance among university students. Furthermore, Facebook's educational applications encourage students to harness its potential for various tasks, such as seeking course-related information, sharing resources, discussing projects, and even communicating learning preferences with teachers (Hew, 2011). Facebook's capacity to cultivate positive learning attitudes, strengthen peer relationships, empower autonomous learning, and foster a connected educational community is also emphasized (Toker & Baturay, 2019).

The existing literature, the extensive adoption of Facebook for learning purposes, its adaptability for educational tasks, and its influence on learning outcomes serve as the foundation for the fifth hypothesis. This hypothesis posits that awareness has a direct and significant impact on students' utilization of Facebook for research data collection. Given Facebook's multifaceted

educational potential, its broad user base, and the observed connection between usage and academic performance, it is reasonable to infer that heightened awareness would contribute to an increased tendency among students to employ Facebook for research data collection.

Hypothesis 5: Awareness has a significant direct effect on students' Facebook use for research data collection.

The literature highlights the exponential growth of Facebook's user base, with the number of active users, including students, reaching 2.989 billion by April 2023 (Kowalm et al., 2020). This surge in users has positioned Facebook as the most active social media platform globally (Hoi & Hang, 2021). Students who use Facebook can exchange ideas, engage in live discussions, and share multimedia content, contributing to its popularity as a tool for students' learning (Amali et al., 2012). Even countries like Japan, Hong Kong, and China have embraced Facebook for educational purposes (Morofushi & Pasfield-Neofitou, 2012; Shittu et al., 2015). This adoption is driven by the desire to connect with others, maintain relationships, pass time, and engage in self-expression (Sherrell & Lambie, 2016; Yolanda, 2019). Privacy settings allow users to control the accessibility of their shared information. Considering this literature, the sixth hypothesis emerges, positing that students' willingness to use Facebook has a direct and significant impact on their utilization of the platform for research data collection. Given Facebook's widespread usage and its role in facilitating communication and content exchange, it is reasonable to expect that students who are more willing to engage with the platform would be more inclined to use it for research-related tasks, including data collection.

Hypothesis 6: Students' willingness has a significant direct effect on their Facebook use for research data collection.

The extensive use of Facebook and its varied impact on learning outcomes suggest that students' willingness to engage with the platform could play a crucial role in determining their utilization of Facebook for research data collection. Given the strong relationship between awareness and Facebook usage, it is reasonable to hypothesize that students' willingness could mediate this relationship, giving rise to the seventh hypothesis.

Hypothesis 7: Students' willingness significantly mediates the link between awareness and students' Facebook use for research data collection.

Gender differences in awareness and willingness have been consistent themes in the literature. Studies in Africa have shown that males tend to exhibit greater proficiency in using the Internet, ICT, and social media compared to females, often attributed to cultural factors that limit active female participation due to increased home responsibilities (McGregor et al., 2017; Odigwe & Owan, 2020). Similarly, the correlation between age and awareness aligns with the finding that younger individuals are more likely to be adept users of ICT (Odigwe & Owan, 2020; Owan & Asuquo, 2021; Ozimek & Bierhoff, 2016).

In terms of gender differences in willingness, the literature reflects a similar trend. Some studies indicate that males tend to be better Internet or social media users than their female counterparts (McGregor et al., 2017; Odigwe & Owan, 2020). However, there is opposing research suggesting that females may excel in social media use (Gil-Clavel & Zagheni, 2019; Oberst et al., 2016). Similarly, age-related findings in willingness underscore that age significantly influences students' ICT use, with younger students often displaying more proficiency in utilizing platforms like Facebook (Guillén-Gámez et al., 2019; Ozimek & Bierhoff, 2016).

Turning to utilization patterns, the results concerning gender differences in utilization echo previous studies that highlight a tendency for females to use ICT less than males (McGregor et al., 2017; Odigwe & Owan, 2020). However, there are differing viewpoints as well, with some research indicating no significant difference in cyberspace access between male and female higher education students (Mesagan et al., 2022). Meanwhile, in terms of age-related utilization, the findings align with other studies suggesting that older respondents tend to be more proficient ICT

users compared to their younger counterparts (McAndrew & Jeong, 2012; Owan, Asuquo, Ekaette, et al., 2021a).

Regarding the relationship between willingness and Facebook use, results from a study reinforce the idea that students who have a favorable disposition towards online technology are more likely to actively use it (Dúo-Terrón et al., 2022; Gómez-Fernández & Mediavilla, 2021). Moreover, the study aligns with findings indicating that students engage with ICT when they perceive it as suitable and when it enhances their digital competence during group discussions (Aesaert et al., 2015; Christoph et al., 2015). These insights underscore the interconnectedness between students' willingness, attitudes towards technology, and their actual engagement with platforms like Facebook.

The literature provided the groundwork for the formulation of the remaining hypotheses by highlighting the intricate relationships among awareness, willingness, gender differences, and age differences in students' utilization of Facebook for research data collection (RDC). These hypotheses are rooted in the understanding that students' engagement with Facebook for RDC is influenced by a combination of factors, including their awareness of the platform, their willingness to use it, and potential variations based on gender and age.

Hypothesis 8: The direct effect of awareness on willingness to use Facebook for research data collection is significantly different for male and female students.

Hypothesis 9: The direct effect of awareness on students' Facebook use for RDC significantly differs for males and females.

Hypothesis 10: Willingness significantly mediates the link between awareness and Facebook use for RDC differently for males and females.

Hypothesis 11: The direct effect of willingness on students' Facebook use for RDC significantly differs for males and females.

Hypothesis 12: The direct effect of awareness on willingness to use Facebook for RDC significantly varies with students' age.

Hypothesis 13: Awareness has a varying direct effect on Facebook use for RDC among students in different age categories.

Hypothesis 14: The direct effect of willingness on Facebook use for RDC is significantly unequal across respondents of different age categories.

Hypothesis 15: The mediation effect of willingness in linking awareness to Facebook use for RDC significantly differs among students of varying age groups.

1.2. Conceptual Framework

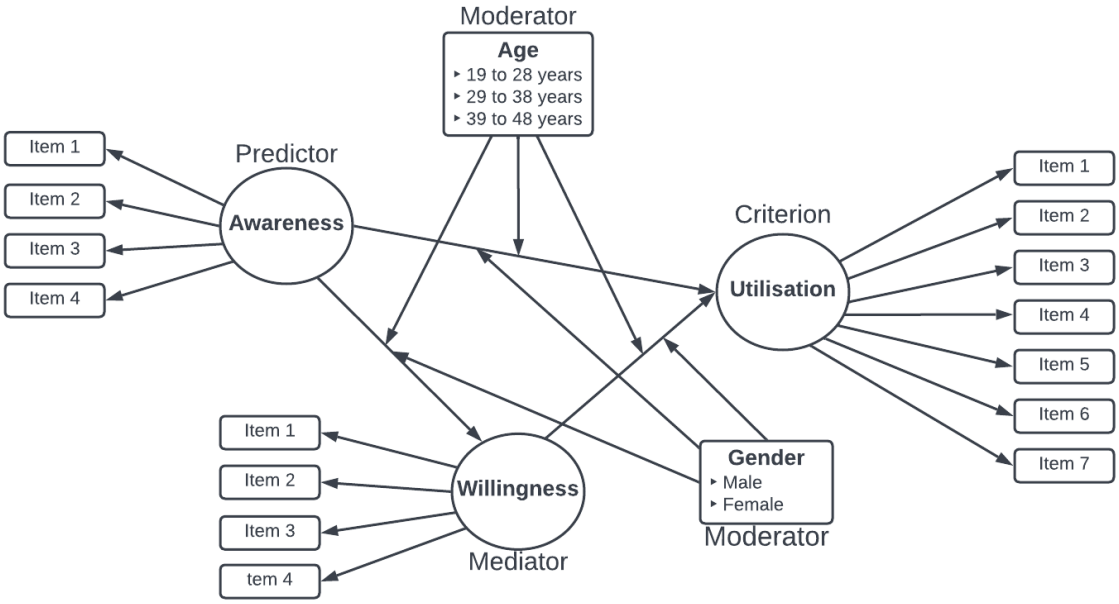
The conceptual framework of this study, is presented in Figure 1. The conceptual framework presents a pictorial representation of the various hypotheses of this study.

2. Method

2.1. Research Design and Participants

The cross-sectional correlational research design was adopted for the study. The study adopted a cross-sectional correlational design to examine relationships between awareness, willingness, gender, age, and students' Facebook use for research data collection. This non-interventional approach gathered data at one point, uncovering associations among variables without manipulating them. The design suited the exploration of connections among factors, offering insights into their interplay, albeit without establishing causation. A total of 11,562 (Eleven thousand, five hundred and sixty-two) final-year students participated in this study. The eligibility criteria are that a respondent is a final year student (in a college, polytechnic or university) and

Figure 1
Conceptual model of the study



writing a research project requiring field data collection. This eligibility criterion covered a broad range of higher education students. Another reason was to target a more contemporary set of final-year students who attended tertiary institutions at a time when innovative uses of social media are advocated or evolving. This study considered final-year students because they were writing their final research project report. Through Facebook, interaction with experts could provide an essential context for guidance. At the same time, students could gather valuable data or information from respondents using Facebook groups, chats, posts and comments, live sessions, or voice notes for their research projects. The demographic characteristics of this study's participants indicated that 45.9% (n = 5309) were females, whereas 54.1% (n = 6253) were males. In terms of age, 60.4% (n = 6982) of the participants were between 19 and 28 years, 34.7% (n = 4013) were between 29 and 38 years, whereas 4.9% (n = 567) were between 39 and 48 years. Regarding the type of institution, 91.2% of the participants (n = 10539) are final-year students of universities, 8.2% (n = 947) are of colleges, and 0.7% (n = 76) are of polytechnics.

2.2. Instrument and Measures

An online survey tagged: *Facebook and Data Collection for Research Report Writing Questionnaire* was used for data collection. We designed the questionnaire, which can be accessed (link) using Google Forms. Google Form was specifically chosen because it is free, easy to use and flexible, and the nature of our items were straightforward. The online questionnaire was structured into four sections. The first section was a cover letter detailing the study's objectives and statements bordering on ethics (confidentiality, anonymity, and the need for honest responses). A checkbox was provided to obtain written informed consent from respondents to participate. The respondents' email addresses were requested to enable us to trace multiple submissions. Section 2 elicited respondents' biodata such as age, gender and institution type.

Section 3 elicited information on students' awareness of and willingness to use Facebook for RDC. The section was subdivided into two parts – awareness and willingness. Awareness is defined operationally as the degree to which final-year students possess knowledge or the correct perception that Facebook can be used for RDC. Willingness refers to final-year students' intention, preparedness, or desire to use Facebook for data collection regardless of their awareness status. The first and second parts of section 3 comprised four items. All items in section 3 were on a four-point scale, with response options ranging from strongly agree to strongly disagree. One sample item from the first part (awareness) is "I am aware that the Facebook group feature can be handy

for sharing links to electronic questionnaires hosted on other websites." A sample item for the second part of section 3 (willingness) is "I am willing to use Facebook comments to obtain qualitative views of my research participants." Section 4 contained ten Facebook features used to collect different data types. On a linear scale of zero (No utilisation) to four (high utilisation), respondents were allowed to tick the extent to which they currently utilise them for RDC. Utilisation refers to how students use different features of Facebook to collect research data. Five features include Facebook Live, comments, groups, sound recorder and paid advertisements.

2.3. Content Validity

After reviewing literature and existing scales and exploring the Facebook mobile application for unique features that could aid data collection from other users, an initial pool of 46 items was assembled across the three variables. These included 15 items each on awareness and willingness and 16 for utilisation. An independent panel of seven professionals (three psychometrists and four educational technologists) was consulted. The experts prioritised the number of items used to measure a domain and ensured that item pools addressed a wide range of domain needs. Five items for awareness and five for willingness were eliminated at the expert assessors' recommendation, leaving 36 items. The analysis of experts' ratings yielded an acceptable range of values for item content validity indices (I-CVIs), ranging from .71 to .99 (for clarity) and from .74 to .99 (for relevance). Five items with I-CVIs below .80 were revised for either clarity, relevance or both. This was done in line with the suggestions of experts (Lawshe, 1975; Zamanzadeh et al., 2015). The scale content validity Indices for clarity and relevance ranged from .92 to .95 and .90 to .97. After revising the six items with weak I-CVIs, the second draft of the instrument was assembled with a total of 36 items (10 each for awareness and willingness and 16 for utilisation). A focus group session was held with 15 graduates after responding to the second draft of the instrument. These participants were engaged in sharing their thoughts on item clarity, reaction time, scale choices, and ambiguity. Their thoughts and comments led to the deletion of three items, reducing the questionnaire to 33.

2.4. Pilot Study

The third draft of the instrument was compiled into an electronic form using Google Forms and mailed to a cross-section of 360 Bachelor's degree holders who graduated between 2020 and 2021. The pilot sample of 360 respondents was decided because it is recommended to obtain a selection large enough to get a ratio of 10:1 respondents to an item in the survey (Boateng et al., 2018; von Rezori et al., 2022). Therefore, for the 33-item questionnaire of this study, a sample of 330 participants or larger is considered sufficient by the ratio rule of thumb. The link to the electronic version of the questionnaire was mailed to the targeted respondents. After three months, the respondents had all replied through several reminders.

2.5. Internal Structure, Construct Validity and Reliability

Using the data collected from the pilot study, we assessed the internal structure of the instrument using Exploratory Factor Analysis (EFA). The study employed EFA using an orthogonal (varimax) rotation based on the maximum likelihood extraction technique (Brown, 2009). Initially, a seven-factor solution was obtained, but a three-factor solution was obtained after removing dysfunctional items. This three-factor solution explained a cumulative 75.34% variance in squared loadings. The first factor (utilisation) accounted for 39.86% of the variance, the second factor (willingness to use) accounted for 21.27%, and the third factor (awareness) accounted for 14.98% of the variance. Bartlett's test of sphericity yielded a significant result, $\chi2(105) = 4912.13$, $p < .001$, indicating that the correlation matrix was not an identity matrix. The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy returned a value of .89, suggesting that the sample size of 360 graduates used in the pilot study was sufficient for factor analysis. The factor loadings in Table 1 ranged from .74 to .94 for utilisation, .67 to .80 for willingness, and .46 to .74 for awareness. These values indicate the strength of the relationship between each item and its respective factor.

For construct validity, the Average Variance Extracted (AVE) method was used for convergent validity, whilst the 'Fornell-Larcker criterion' (Fornell & Larcker, 1981) were used for discriminant validity. Convergent validity was achieved for the three latent factors as the average variance extracted (AVE) for each factor exceeded the threshold of .50. Discriminant validity was also supported, as the Fornell-Larcker coefficients for each factor were higher than their correlations with other factors. This indicates that the items could differentiate from unrelated latent variables (Fresco et al., 2007; Patterson et al., 2005). The composite reliability measure of internal consistency was used. Regarding internal consistency, all the composite reliability coefficients in Table 1 exceeded .70, indicating good internal consistency for all factors.

Table 1
Dimensionality evidence of the internal structure of the instrument using EFA

Items	*M*	*SD*	*Skew.*	*Kurt*	λ	λ^2	ε	*z*	*Factors*
UT5	0.94	1.27	1.07	-0.08	.91	.83	.17	4.88	Utilisation
UT7	0.98	1.34	1.10	-0.10	.90	.81	.19	4.26	CR = .96
UT4	1.01	1.27	1.03	-0.06	.89	.79	.21	3.76	AVE = .76
UT2	0.97	1.33	1.15	0.04	.89	.79	.21	3.76	DV = .87
UT6	0.92	1.19	0.95	-0.33	.88	.77	.23	3.35	
UT14	0.72	1.02	1.38	1.34	.85	.72	.28	2.57	
UT13	0.77	1.12	1.30	0.74	.79	.62	.38	1.63	
Sum	6.31	8.54	7.97	1.55	6.11	5.34	1.67	3.20	
WI7	3.10	0.57	−0.89	3.83	.91	.83	.17	4.88	Willingness
WI5	3.14	0.59	−0.70	2.58	.89	.79	.21	3.76	CR = .92
WI3	3.08	0.63	−0.74	2.08	.83	.69	.31	2.23	AVE = .73
WI1	3.14	0.58	−0.87	3.55	.79	.62	.38	1.63	DV = .85
Sum	12.46	2.38	−3.21	12.05	3.42	2.93	1.07	2.74	
AW6	2.76	0.71	−0.52	0.38	.87	.76	.24	3.17	Awareness
AW2	2.70	0.73	−0.32	-0.03	.83	.69	.31	2.23	CR = .90
AW8	2.67	0.77	−0.45	-0.06	.82	.67	.33	2.03	AVE = .70
AW4	2.68	0.74	−0.45	0.04	.81	.66	.34	1.94	DV = .84
Sum	10.81	2.96	−1.74	0.32	3.33	2.78	1.22	2.28	

Note. CR values of .70 or higher provide evidence of internal consistency; AVE values of .50 or higher are acceptable indices for convergent validity; DV = Fornell-Larcker coefficients of discriminant validity

2.6. Ethical Consideration

Participation in the study was voluntary, and we tried to minimise potential bias by carrying out a thorough validity and regulating the collection process. Although the study involved human subjects, ethical clearance was waived per National regulations (Federal Ministry of Health, 2007). Written informed consent was obtained from the respondents during the data collection process. The respondents were told that all the responses would be aggregated with all self-identifying information removed to promote integrity and confidentiality. Respondents were told their emails were collected to serve as evidence to screen multiple submissions. All the data collected were only accessible from the personal computer of the principal investigator, with a strong password, antivirus and firewall to block all unauthorised access. Lastly, respondents were informed in the cover letter that collected data would be analysed, and the report will be published as a journal article. The data will be deleted, and the hard drive will be destroyed.

2.7. Procedure for Data Collection and Analysis

The data for the main study were collected by administering the questionnaire to the targeted respondents electronically. To avoid potential bias and ensure that links get to only those that met the eligibility criteria, a team of 50 research assistants were recruited and incentivised to support the researchers. The 50 research assistants were divided into five groups comprising ten assistants. Each author was attached to a group of research assistants. Each group was randomly assigned to

cover five geopolitical zones in Nigeria. The North-East geopolitical zone was excluded from this study for safety reasons due to terrorism, war and insurgency issues. Each research team made physical contact with the tertiary institutions in the zone assigned to them to locate final-year students across different departments. After gaining the contact information of class representatives across various groups, a Telegram group was formed where all the class representatives (n = 2,321) were added based on the physical agreement made. The link to the questionnaire was posted on the Telegram group for the class representatives to respond to and share the link to their respective class online forums such as WhatsApp groups, closed Facebook groups, and Telegram groups, among others. These class representatives were instructed to avoid forums such as departmental, faculty, and institutional groups where other students who do not meet this study's eligibility criteria may be found. The data collection period for the main research started from 18th January 2021 to 20th January 2022. Although this was a one-year period, we considered stopping the process because no new response was obtained for two months. We received responses from 11,563 participants after downloading and inspecting the .csv file.

3. Results

3.1. Hypothesis 1: Students' Awareness of Facebook for RDC

We used the one-sample t-test to estimate how much students know that Facebook can be used for RDC based on a population mean value of 10.0. The population mean was derived by summing each item's expected mean score of 2.5 across the four items measuring the variable. Our analysis showed that students were more aware (M=10.87, SD=2.18) of using Facebook for RDC than the general population mean value of 10.0. The difference between these two means was 0.87, with a 95%CI [0.83, 0.91]. The mean difference was proven statistically significant, $t(11562)=42.803$, $p<.001$. Male students (n=6254) had a higher mean value (M=11.03, SD=2.37) of awareness of Facebook for RDC than the criterion mean value (μ=10.00), with a significant mean difference of 1.03, 95%CI [0.98, 1.09], $t(6253)=34.43$, $p<.001$. Similarly, female respondents (n=5309) had a mean value of awareness of Facebook for RDC (M=10.67, SD=1.91) than the criterion mean (μ=10.00), with a significant mean difference of 0.67, and a 95%CI of [0.62, 0.72], $t(5308)=25.67$, $p<.001$. The study found that the awareness of using Facebook for research data collection (RDC) among male respondents is stronger than among female respondents. Respondents aged 19 to 28 years (n = 6838) had a high mean awareness of Facebook for RDC (M=10.94, SD=2.00) than the population mean (μ=10.00), with a mean difference of 0.94, and a 95%CI of [0.90, 0.99], that is statistically significant, $t(6837)=38.95$, $p<.001$. Similarly, for respondents aged 29 to 38 years (n = 4002), the mean level of awareness of using Facebook for RDC was 10.92, with a standard deviation of 2.38. This was significantly higher than the population mean of 10.00, with a mean difference of 0.92 and a 95%CI of [0.84, 0.99]. The mean difference was statistically significant, $t(4001)=24.33$, $p<.001$. Furthermore, respondents aged 39 to 48 years (n=773) had lower awareness (M=9.86, SD=2.38) of Facebook for RDC than the general population mean (μ=10.00). The mean difference of 0.14 with a 95%CI of [0.03, 0.31] was not statistically significant, $t(772)=1.60$, $p>.05$.

3.2. Hypothesis 2: Students' Willingness to Use Facebook for RDC

We estimated the population mean for willingness by summing the expected item mean score across the four 4-point Likert scale items, resulting in a value of 10.00. The result showed that the mean score of students' willingness to use Facebook for RDC (N=11563, M=12.44, SD=1.88) was higher than the population mean value (μ=10.00), with a significant mean difference of 2.44, and a 95%CI [2.40, 2.47], $t(11562)=139.46$, $p<.001$. Male students (n=6254) had a higher mean value (M=12.40, SD=2.14) of willingness to use Facebook for RDC than the criterion mean value (μ=10.00), with a significant mean difference of 2.40 and a 95%CI of [2.35, 2.45], $t(6253)=88.73$, $p<.001$. Similarly, female respondents (n=5309) had a mean value of willingness to use Facebook for RDC (M=12.48, SD=1.51) than the criterion mean (μ=10.00), with a significant mean difference (Md = 2.48, 95%CI [2.44, 2.52]), $t(5308)=119.30$, $p<.001$. Respondents aged 19 to 28 (n=6838)

reported a high willingness to use Facebook for RDC (*M*=12.47, *SD*=1.57) than the population mean (μ=10.00), with a difference of 2.47, 95%*CI* of [2.44, 2.51], that is statistically significant, *t*(6837)=130.37, *p*<.001. Similarly, respondents aged 29 to 38 (*n*=4002) had a high willingness to use Facebook for RDC (*M*=12.43, *SD*=2.33) than the general population (μ=10.00). This mean difference of 2.43, with a 95%*CI* of [2.36, 2.50], is statistically significant, *t*(4001)=66.19, *p*<.001. Also, respondents aged 39 to 48 years (*n*=4002) had a high willingness to use Facebook for RDC (*M*=12.10, *SD*=1.76) than the population (μ=10.00), with a significant mean difference (*Md*=2.10, 95%*CI* [1.97, 2.22), *t*(4001)=33.14, *p*<.001.

3.3. Hypothesis 3: Students' Facebook Use for RDC

For students' Facebook use for RDC, we estimated the population mean by summing each item's average expected mean score across the seven items, yielding a value of 17.50. Our analysis revealed that the observed mean score (*N*=11563, *M*=7.20, *SD*=7.90) of students' utilisation of Facebook for RDC was lower than the population mean (μ=17.50), with a significant mean difference (*Md*=10.30, 95%*CI* [10.16, 10.45]), *t*(11562)=140.20, *p*<.001. Male students (*n*=6254) had a low mean value of Facebook use for RDC (*M*=7.48, *SD*=7.51) than the criterion mean (μ=17.50), with a significant mean difference (*Md*=10.02, 95%*CI* [9.83, 10.20]), *t*(6253)=105.48, *p*<.001. Female respondents (*n*=5309) also had a lower mean value of Facebook use for RDC (*M*=6.86, *SD*=8.32) than the population mean value of 17.50, with a significant mean difference (*Md*=10.64, 95%CI [10.42, 10.87]), *t*(5308)=93.16, *p*<.001. The results indicated that respondents aged 19 to 28 (*n*=6838) had a low mean of Facebook use for RDC (*M*=6.27, *SD*=7.95) than the population mean (μ = 17.50), with a mean difference of 11.23, 95%*CI* [11.04, 11.42], that is statistically significant, *t*(6837)=116.82, *p*<.001. Those aged 29 to 38 (*n*=4002) used Facebook for RDC to a low extent (*M*=8.44, *SD*=8.00) below the population average (μ=17.50), with a difference of 9.06 and a 95%*CI* of [8.82, 2.50]. The t-test result was *t*(4001)=71.694, and the p-value <.001, indicating that the difference is statistically significant. Respondents aged 39-48 (*n*=773) had a low mean of Facebook use for RDC (*M*=9.14, *SD*=5.07) below the population mean (μ=17.50) with a significant mean difference (*Md*=8.36, 95%CI [8.01, 8.72]), *t*(772)=45.86, *p*<.001.

3.4. Test of Predictions

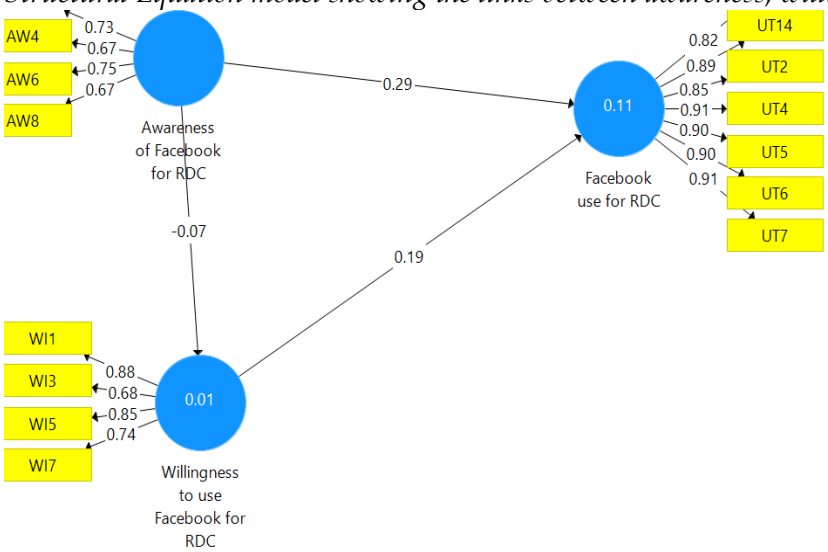
We performed a Partial Least Squares Structural Equation Modelling (PLS-SEM) to determine the extent to which students' awareness and willingness predict their Facebook use for RDC. We also used the same approach to determine how much students' awareness predicts their willingness and how the latter mediates the link between the former and students' Facebook use for RDC. The results in Figure 2 indicate that their awareness and willingness jointly explain 11% of the variance in students' Facebook use for RDC, R^2 = 0.11 95%*CI*[.10, .12], *p*<.001. Similarly, students' awareness accounted for 1% of the variance in their willingness to use Facebook for RDC, R^2 = 0.01, *p*<.05. The f-square statistic shows that awareness and willingness had small but significant effect sizes F^2 =.09, 95%CI [.08, .10], *p*<.001 and F^2 =.04, 95%CI [.03, .05], *p*<.001 in predicting students Facebook use for RDC. Also, awareness had a small but significant effect size (F^2 =.01, 95%CI [.00, .01], *p*<.05) in predicting students' willingness to use Facebook for RDC.

Hypothesis 4: Table 2 shows a significant direct effect of awareness (β=.29, 95%*CI*[.27, 30], *t*=34.60, *p*<.001) on students' Facebook use for RDC. Therefore, hypothesis 4 was supported. The F-statistics showed that awareness has small but significant effect sizes on students' Facebook use for RDC respectively (F = .09, 95%CI [.08, .10], *p* <.001).

Hypothesis 5: Table 2 shows a significant negative direct effect of awareness (β= −.07, 95%CI [−.10, −.04], *t* = 4.88, *p*<.001) on students' willingness to use Facebook for RDC. Thus, hypothesis 5 was supported by evidence. The F-statistics showed that the effect size of awareness on students' willingness to use Facebook for RDC is small but statistically significant (F = .01, 95%CI [.00, .01], *p* <.05).

Figure 2

Structural Equation model showing the links between awareness, willingness and Facebook use for RDC



Hypothesis 6: Table 2 reveals a significant direct effect of willingness (β=.19, 95%CI [.17, 21], *t*=21.10, *p*<.001) on students' Facebook use for RDC. Therefore, hypothesis 6 was upheld for receiving support. The F-statistics showed that willingness (F = .04, 95%CI [.03, .05], *p* <.001) has small but significant effect sizes on students' Facebook use for RDC, respectively.

Hypothesis 7: Table 2 shows that willingness negatively but significantly mediated the link between students' awareness and their Facebook use for RDC. Therefore, hypothesis 7 was supported.

Table 2

Direct and mediation effects

Hypotheses	*B*	*95%CI*	*M*	*SD*	*t*	*p*	*Remark*
H4: Awareness →Facebook Use	.29	[.27, .30]	.29	.01	34.60	<.001	Accepted
H5: Awareness → Willingness	−.07	[−.10, −.04]	−.07	.02	4.88	<.001	Accepted
H6: Willingness → Facebook Use	.19	[.17, .21]	.19	.01	21.10	<.001	Accepted
H7: Awareness → Willingness → Utilisation	−.01	[−.01, −.02]	-.01	.00	4.67	<.001	Accepted

3.5. Gender Differences in the link between Predictor and Criterion Variables

A multigroup analysis was performed in this study to determine whether the relationships established in H4 to H7 vary with respondents' gender.

Hypothesis 8: Table 3 shows that students' awareness significantly predicts their Facebook use for RDC positively for both males (β=.38, *t*=30.11, *p*<.001) and females (β=.15, *t*=12.49, *p*<.001), with the effect being stronger on males than females. The permutation test found a significant gender difference (δ= .23, *p*<.001) in the prediction of awareness of students' Facebook use for RDC. Hypothesis 8 was supported based on the results.

Hypothesis 9: Table 3 also shows that students' awareness significantly predicted their willingness to use Facebook for RDC negatively for males (β= −.27, *t*=17.90, *p*<.001) but positively for females (β=.41, *t*=45.35, *p*<.001), with the effect being stronger on the latter than the former. The permutation test found a significant difference (δ= −.68, *p*<.001) in how awareness predicts students' willingness to use Facebook for RDC between males and females. Therefore, our hypothesis was supported.

Table 3
Multigroup analysis based on students' gender

Paths	*B*	*95%CI*	*M*	*SD*	*t*	*p*
	Males					
Awareness→Utilisation	.38	[.35, .40]	.38	.01	30.11	<.001
Awareness →Willingness	−.27	[−.30, −.24]	−.27	.01	17.90	<.001
Willingness →Utilisation	.23	[.19, .25]	.23	.02	15.08	<.001
Awareness→Willingness→Utilisation	−.06	[−.07, −.05]	−.06	.01	11.61	<.001
	Females					
Awareness→Utilisation	.15	[.13, .17]	.15	.01	12.49	<.001
Awareness →Willingness	.41	[.40, .43]	.41	.01	45.35	<.001
Willingness →Utilisation	.22	[.18, .25]	.22	.02	13.43	<.001
Awareness→Willingness→Utilisation	.09	[.08, .10]	.09	.01	12.49	<.001

permutation test of differences

Hypotheses	Path Coefficients					
	Baseline	Male	Female	Δ	95%CI	*p*
H8: Awareness→Utilisation	.29	.38	.15	.23	[−.03, .03]	<.001
H9: Awareness →Willingness	−.07	−.27	.41	−.68	[−.06, .06]	<.001
H10: Willingness→Utilisation	.19	.23	.22	.01	[−.03, .03]	>.05
H11: Awareness →Willingness → Utilisation	−.01	−.06	.09	−.15	[−.01, .01]	<.001

Note. M = Mean; SD = Standard deviation; β = Path coefficient; δ = Difference in path coefficients; Hypotheses 8, 9, and 11 were accepted. However, hypothesis 10 was not supported.

Hypothesis 10: Table 3 shows that students' willingness significantly predicted their Facebook use positively for both males (β= .23, t=15.08, p<.001) and females (β= .22, t=13.43, p<.001), with the effect being stronger on males. The permutation test associated with the analysis did not reveal any significant difference (δ= .01, p>.05) in the path coefficients between male and female students regarding the prediction of willingness to students' Facebook use. Therefore, the hypothesis did not receive empirical support.

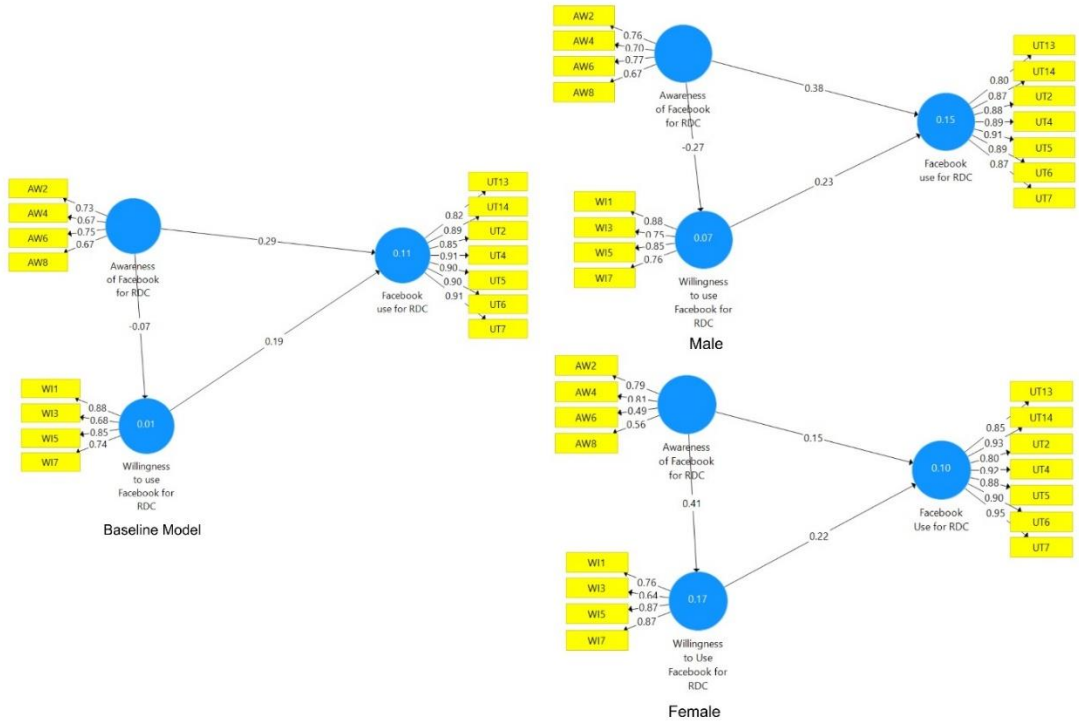
Hypothesis 11: Table 3 further shows that willingness significantly mediated the link between students' awareness and Facebook use for RDC negatively for males (β= −.06, t=11.61, p<.001) but positively for females (β=.09, t=12.49, p<.001). The mediation effect was stronger for females than for male students. The permutation test reveals a significant difference (δ = −.15, p<.001) in the mediation effect of willingness for both male and female respondents. Therefore, hypothesis 11 was supported.

Figure 3 further shows that awareness and willingness jointly explained 15% of the variance (R^2 =.15) in male students' Facebook use for RDC, whereas 10% (R^2 =.10) was explained for females. Similarly, willingness explained 7% of the variance (R^2 =.07) in male students' Facebook use for RDC, whereas it explained 17% of the variance (R^2 =.17) in female students' Facebook use for RDC. Further evidence from F-square statistics revealed that awareness had small but significant effect sizes on Facebook use for RDC for both males (F^2=.16, 95%CI [.13, .18], p<.001) and females (F^2=.02, 95%CI [.02, .03], p<.001) students. Similarly, awareness had small but significant effect sizes on students' willingness to use Facebook for RDC for both males (F^2=.08, 95%CI [.06, .10], p<.001) and females (F^2=.21, 95%CI [.19, .23], p<.001). Furthermore, willingness had small but significant effect sizes on male (F^2=.06, 95%CI [.04, .07], p<.001) and female (F^2=.04, 95%CI [.03, .06], p<.001) students' Facebook use for RDC.

3.6. Age Differences in the links between Predictors and Criterion Variables

Table 4 shows the pairwise comparisons of the three age groups regarding their differences in the path coefficients of the various hypotheses.

Figure 3
Gender differences in the inner and outer loadings of the paths



Hypothesis 12: The results indicate that students' awareness significantly predicts their willingness to use Facebook for RDC positively for those aged 19 to 28 years (β=.23, *t*=11.58, *p*<.001) but negatively for those aged 29 to 38 years (β= −.27, *t*=17.22, *p*<.001). However, awareness has a positive but insignificant direct effect on their willingness to use Facebook for RDC for students aged 39 to 48 years (β=.69, *t*=1.08, *p*>.05). The effect is stronger for students aged 39 to 48 years but weaker for those aged 19 to 28 years. A permutation test of multiple pairwise comparisons was performed to test for significant differences in the path coefficients. The second part of Table 4 shows significant age differences in the prediction of awareness of students' willingness to use Facebook. Thus, this hypothesis was supported.

Hypothesis 13: Table 4 shows that awareness has a significant positive direct effect on students' Facebook use for RDC across all the age categories, such as 19 to 28 years (β=.22, *t*=22.56, *p*<.001), 29 to 38 years (β=.40, *t*=27.23, *p*<.001) and 39 to 48 years (β=.36, *t*=2.94, *p*<.01). The effect was however, stronger for students aged 29 to 38 years and weaker for those aged 19 to 28 years. Significant age differences were also recorded in the prediction of awareness on students' utilisation of Facebook for RDC, except for comparing students aged 29 to 38 versus those aged 39 to 48. This hypothesis was also supported since there was a significant age difference in how awareness predicted students' Facebook use for RDC, but not for all groups.

Hypothesis 14: Table 4 reveals that willingness has a significant direct effect on Facebook use for RDC among students aged 19 to 28 years (β=.24, *t*=16.13, *p*<.001) and those aged 29 to 38 years (β=.18, *t*=9.59, *p*<.001). In contrast, the direct effect of willingness on Facebook use for RDC is positive but not statistically significant for students aged 39 to 48 years (β=.00, *t*=0.02, *p*>.05). The effect was stronger for younger students aged 19 to 28 years but weaker for older students aged 39 to 48 years. Furthermore, Table 4 shows significant age differences in the link between students' willingness and their Facebook use for RDC across all pairwise comparisons. The evidence in Table 6 supported this hypothesis.

Table 4
Multigroup analysis based on respondents' age

	β	95%CI	*M*	*SD*	*t*	*p*
19 to 28 years (G1)						
Awareness → Willingness	.23	[.19, .26]	.23	.02	11.58	<.001
Awareness → Utilisation	.22	[.20, .24]	.22	.01	22.56	<.001
Willingness → Utilisation	.24	[.21, .26]	.24	.01	16.13	<.001
Awareness → Willingness → Utilisation	.05	[.05, .06]	.05	.00	14.07	<.001
29 to 38 years (G2)						
Awareness → Willingness	−.27	[−.30, −.24]	−.27	.02	17.22	<.001
Awareness → Utilisation	.40	[.37, .43]	.40	.01	27.23	<.001
Willingness → Utilisation	.18	[.14, .21]	.18	.02	9.59	<.001
Awareness → Willingness → Utilisation	−.05	[−.06, −.04]	−.05	.01	8.76	<.001
39 to 48 years (G3)						
Awareness → Willingness	.69	[−.73, .73]	−.01	.64	1.08	>.05
Awareness → Utilisation	.36	[−.13, .50]	.35	.12	2.94	<.01
Willingness → Utilisation	.00	[−.51, .42]	−.06	.25	0.02	>.05
Awareness → Willingness → Utilisation	.00	[−.29, .24]	−.007	.15	0.02	>.05

Permutation test of pairwise comparisons

Hypotheses	Path coefficients				G1 versus G2			G1 versus G3			G2 versus G3		
	Baseline	G1	G2	G3	δ	95%CI	*p*	δ	95%CI	*p*	δ	95%CI	*p*
H12: Awareness → Willingness	−.07	.23	−.27	.65	.50	[−.06, .06]	<.001	−.46	[−.12, .21]	<.001	−.96	[−.07, .08]	<.001
H13: Awareness → Utilisation	.29	.22	.40	.30	−.18	[−.04, .03]	<.001	−.14	[−.07, .06]	<.001	.04	[−.08, .09]	>.05
H14: Willingness → Utilisation	.19	.24	.18	.26	.06	[−.04, .03]	<.001	.23	[−.10, .10]	<.001	.17	[−.11, .16]	<.05
H15: Awareness→Willingness→Utilisation	−.01	.05	−.05	.17	.10	[−.01, .01]	<.001	.05	[−.02, .04]	<.05	−.05	[−.05, .03]	<.05

Note. M = Mean; SD = Standard deviation; β = Path coefficient; δ = Difference in path coefficients; G1 = 19 to 28 years; G2 = 29 to 38 years; 39 to 48 years.
Hypotheses 12, 14 and 15 were all supported since significant differences (Md) were recorded for different pairwise comparisons of the three age groups.
Hypothesis 13 was supported in all the comparisons except for G2 versus G3 in the awareness to utilisation path.

Hypothesis 15: Table 4 shows that the mediation effect of willingness in linking students' awareness to their Facebook use for RDC is positive and significant for students aged 19 to 28 years (β=.05, *t*=14.07, *p*<.001) but significantly negative for those aged 29 to 38 years (β= −.05 t=8.76, p<.001). However, the mediation effect is insignificantly positive for students aged 39 to 48 years (β=.00, t=.02, p>.05). The mediation effect was stronger for younger students aged 19 to 28 years but weaker for older students aged 39 to 48. The mediation effect of willingness in linking students' awareness to their Facebook use for RDC significantly differs across all the pairwise comparisons. Therefore, sufficient statistical evidence was available to accept hypothesis 15.

Figure 4
Age differences in the inner and outer loadings of the paths

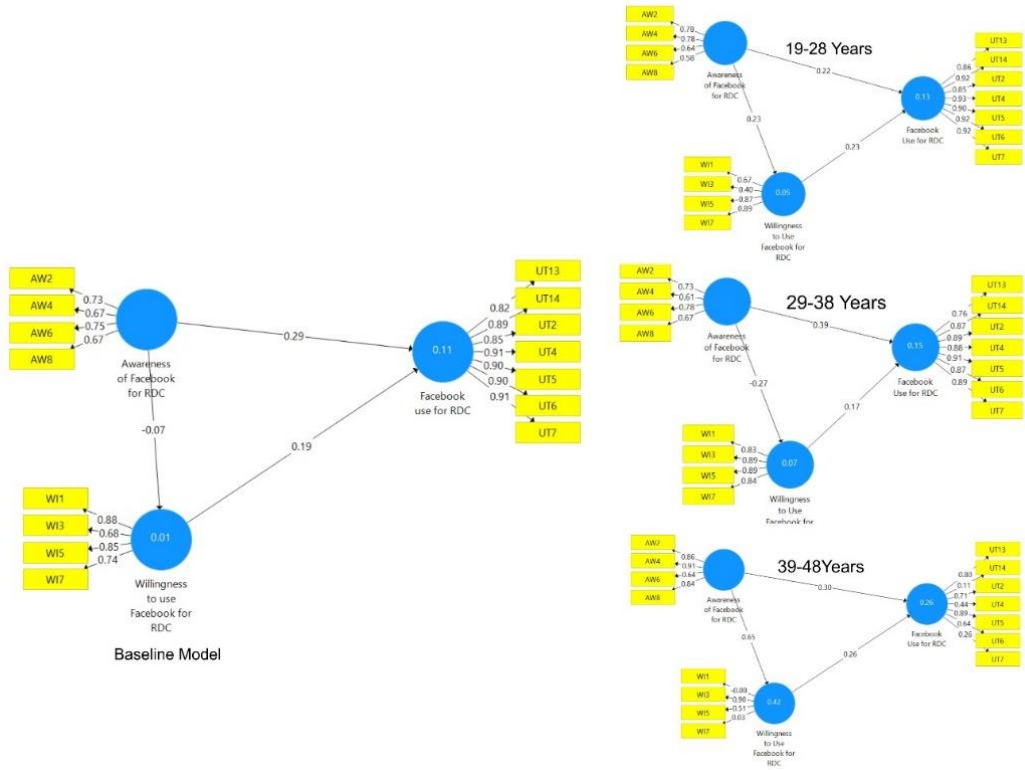


Figure 4 shows that awareness and willingness jointly explained 13%, 15%, and 13% of the variance in students' Facebook use for RDC for students aged 19-28 years (R^2=.13, 95%*CI* [.11, .14], *p*<.001), 29-38 years (R^2=.15, 95%*CI* [.13, .18], *p*<.001), and 39-48 years (R^2=.13, 95%*CI* [.10, .45], *p*>.05), respectively. Thus, 87, 85, and 87% of the unaccounted variances are attributable to other extraneous variables. Furthermore, the result indicated that students' awareness is responsible for 5%, 7% and 4.8% of the variance in their willingness to use Facebook for RDC among those aged 19-28 years (R^2=.05, 95%*CI* [.04, .07], *p*<.001), 29-38 years (R^2=.07, 95%*CI* [.06, .09], *p*<.001), and 39-48 years (R^2=.48, 95%*CI* [.21, .55], *p*<.001).

The F-squared statistics show that awareness has a small but significant effect size on Facebook use for RDC across students aged 19-28 years (F^2=.05, 95%CI [.04, .06], *p*<.001), 29-38 years (F^2=.17, 95%CI [.15, .20], *p*<.001) and 39-48 years (F^2=.08, 95%CI [.04, .18], *p*<.05). Results also showed that for students in the age groups of 19-28 (F^2=.05, 95%CI [.04, .07], *p*<.001) and 29-38 (F^2=.08, 95%CI [.06, .10], *p*<.001), awareness had a small effect on their willingness to use Facebook for RDC. However, for those aged 39-48, a large effect (F^2=.92, 95%CI [.27, 1.24], *p*<.001) was recorded. The F-squared statistics further showed a small yet noteworthy effect size of willingness and Facebook use for RDC among students in the age groups of 19-28 (F^2=.06, 95%CI [.04, .08], *p*<.001) and 29-38 years (F^2=.03, 95%CI [.02, .05], *p*<.001). However, a very small and insignificant effect size was obtained for students aged 39-48 (F^2=.00, 95%CI [.00, .31], *p*>.05).

3.7. **Evaluation of the Outer Models**

3.7.1. Outer loadings

Figure 2 shows the outer loadings of the individual items to their latent factors in the baseline model. All the items loaded above .70 to their respective constructs except for item AW4 in the awareness factor and WI3 in the willingness factor. Although outer loading values greater than .70 are desirable (Memon & Rahman, 2014), the literature suggests that outer loadings above .40 are acceptable (Henseler et al., 2009; Hulland, 1999). The two items were not considered for deletion since their removal weakened reliability. It has been suggested that items with loadings values below .70 be deleted only if their removal improves reliability (Götz et al., 2009). In Figure 3, the outer loadings of the model were further cross-examined by respondents' gender. The results showed some consistency in the functioning of the items for both males and females. For male respondents, outer loadings ranged from .67 to .91, whereas for female respondents, outer loadings ranged from .49 to .95. Similarly, in Figure 4, the items functioned differently across respondents in different age groups. For students aged 19 to 28, outer loadings ranged from .40 to .93; for those aged 29 to 38 years, outer loadings ranged from .61 to .91, whereas for those aged 39 to 48, they ranged from .00 to .91. More specifically, items WI1, WI7, UT14 and UT7, which all had loadings below .40, functioned poorly for respondents in the 39 to 48 years. This means such items may not be suitable for adult respondents.

3.7.2. Convergent validity

The average variance extracted (AVE) was used to determine whether convergent validity was achieved in the measurement models in Figures 2, 3 and 4. It is common knowledge that an AVE value of .50 or higher is sufficient evidence for convergent validity for a construct. Table 5 shows that convergent validity was achieved for all the variables in the baseline model, where the parameters were estimated for the entire respondents. After splitting the population according to gender, convergent validity was also achieved for all the variables across male and female populations. Convergent validity was achieved across all the variables for students aged 19-28 and 29-38 years. Similarly, convergent validity was achieved for students aged 39 to 48 for awareness and willingness, but not utilisation.

Table 5
Average variance extracted for the baseline model and population sub-groups

Variables	*Baseline*	*Gender*		*Age*		
		Males	Females	19 to 28 yrs	29 to 38 yrs	39 to 48 yrs
Awareness	.50	.51	.53	.54	.55	.67
Utilisation	.78	.80	.76	.81	.76	.47
Willingness	.63	.62	.66	.54	.75	.57

3.7.3. Reliability

The reliability of the measurement model was assessed using the coefficients of Cronbach's alpha and composite reliability. Table 6 shows that all the reliability estimates are greater than .70. Therefore, reliability was achieved for the three factors in the entire population and across the various gender and age sub-groups.

Table 6
Cronbach alpha and composite reliability estimates

	Baseline		Males		Females		19-28 years		29-38 years		39-48 years	
Variables	α	CR	α	CR	α	CR	α	CR	α	CR	α	CR
Awareness	.70	.80	.71	.79	.75	.79	.85	.89	.72	.77	.70	.82
Utilisation	.95	.96	.96	.97	.95	.96	.90	.77	.96	.96	.95	.96
Willingness	.82	.87	.74	.82	.89	.92	.85	.81	.80	.87	.84	.88

3.7.4. Discriminant validity

Fornell-Larcker criterion. Under the Fornell-Larcker criterion, discriminant validity is achieved for a construct if the square root of the AVE along the leading diagonal (in bolded fonts) is greater than the correlation coefficients off the diagonal. Table 7 provides evidence of discriminant validity since all the bolded values in the diagonals are higher than the correlation coefficients beneath them.

Table 7
Discriminant validity based on Fornell-Larcker Criterion

Variables	Baseline			Males			Females			19-28 years			29-38 years			39-48 years		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Awareness (1)	**.71**			**.68**			**.73**			**.70**			**.70**			**.82**		
Utilisation (2)	.27	**.88**		.24	**.89**		.32	**.87**		.27	**.90**		.35	**.87**		.47	**.61**	
Willingness (3)	-.07	.17	**.79**	.41	.28	**.79**	-.27	.13	**.81**	.23	.28	**.74**	-.27	.07	**.86**	.65	.46	**.52**

HTMT. All HTMT values obtained in this study were less than .90, providing evidence for discriminant validity for the overall population. Furthermore, discriminant validity was also achieved across all the gender and age categories since their HTMT values are less than .90.

3.7.5. Collinearity test

Collinearity was assessed using the inner and outer variance inflation factors associated with the structural and measurement models of the PLS-SEM. The cut-off criteria for an acceptable VIF remain debatable. For instance, Kock (2015) recommends VIF values below 3.3 as evidence of a lack of collinearity. However, Hair et al. (1995) recommended a value of 10 as the maximum level of an acceptable VIF. In contrast, Ringle et al. (2015) argued that VIF values should not exceed a maximum of 5. Following these suggestions, the VIFs in the inner and outer models were evaluated. For the inner model, all the VIFs for the general population and across the sub-groups were less than 2.00. Therefore, there are no collinearity issues in this study's inner models. For the outer model, most VIFs were below the recommended cut-off value of 5.00, with a few exceeding 5.00. Generally, none of the VIF values in the outer model reached the maximum value of 10.00; the highest VIF was 8.06. Therefore, there might be evidence supporting the absence of collinearity. In fact, in the general population, none of the VIF in the outer model was up to the value of 5.00. High VIFs greater than 5.00 were recorded in some of the population sub-groups, but none was up to the 10.00 suggested as the maximum acceptable (Hair et al., 1995).

4. Discussion

4.1. Awareness of Facebook for RDC

The study found that Nigerian university students were highly aware that Facebook can be used for research data collection (RDC). The high awareness among the general population of students may be attributed to the growing popularity of Facebook for different educational purposes. Previous research has shown that students of different education levels spend approximately 30 minutes on the Facebook platform as part of their daily routine (Bashir et al., 2021; Lattie et al., 2022). This increasing use of the platform may explain why both male and female students also had a high level of awareness, although males had a higher awareness than females. This supports previous literature in Africa that found males to be better Internet, ICT or social media users than their female counterparts (McGregor et al., 2017; Odigwe & Owan, 2020). These scholars mostly attributed males' superiority over females to cultural factors that often limit active female participation through increased home responsibilities.

Also, the current study further proved that students aged 19 to 28 and 29 to 38 reported high awareness of Facebook for RDC, while respondents aged 39 to 48 reported low awareness. The results of this study can be explained by considering the general demographic trends and

technology usage patterns. Younger students tend to have higher levels of technological proficiency. They are more likely to be familiar with Facebook as a platform, explaining why they were more aware than their older counterparts. In contrast, older respondents aged 39 to 48 may have less familiarity with Facebook and prefer alternative research data collection methods, which could account for their low awareness of using it for RDC. This corroborates previous research revealing that ICT use is a decreasing function of age, with younger individuals more likely to be satisfied and better users of ICT (Odigwe & Owan, 2020; Owan & Asuquo, 2021; Ozimek & Bierhoff, 2016).

4.2. Willingness to use Facebook for RDC

The results of the second hypothesis indicate that students were highly willing to use Facebook for RDC. This implies that the respondents of this study hold a positive perception that Facebook can be used for educational purposes. The finding agrees with the results of other studies (e.g., Alwreikat et al., 2021; Shodiyev, 2022), documenting that the platform could be used as a learning environment for students' engagement, support, and knowledge creation. After assessing gender differences, this study found that male and female students were highly willing to use Facebook for RDC. However, male students reported a higher willingness. Male students' higher willingness may be due to their greater comfort and familiarity with technology and cultural and societal factors that influence their engagement with social media platforms. This result aligns with previous studies that found males to be better Internet users or social media users than their female counterparts (McGregor et al., 2017; Odigwe & Owan, 2020). However, the results oppose other studies that reported females as better social media users than males (Gil-Clavel & Zagheni, 2019; Oberst et al., 2016). Contextual and cultural differences in the areas of the studies may be responsible for the variations in results. Thus, further research is necessary to clarify the arguments by explaining the gender differences in students' willingness to use Facebook for RDC.

Nevertheless, respondents across the three age categories (19 to 28, 29 to 38, and 39 to 48 years) all reported a high willingness to use Facebook for RDC. However, the willingness to use Facebook for RDC was highest for respondents aged 29-38 and the lowest for those aged 39-48. The differences in willingness among different age groups may be due to varying experiences and comfort with technology and generational differences in attitudes towards social media. The result corroborates previous research that ages significantly influences students' use of ICT (Guillén-Gámez et al., 2019), with younger students being better users of Facebook than their older colleagues (Ozimek & Bierhoff, 2016). These findings imply that it is important to consider the age-related differences in willingness to use Facebook for RDC when designing research studies and choosing data collection methods.

4.3. Students' Facebook use for RDC

The results indicate that Nigerian university students generally used Facebook for RDC to a significantly low extent. This finding suggests that, there may be barriers to using Facebook for RDC among Nigerian university students. Surprisingly, students had low utilisation of the Facebook platform for RDC, even with high awareness and willingness. One would expect individuals with increased awareness and willingness to use Facebook for RDC. Nevertheless, several personal and environmental factors might be responsible for students' low utilisation of Facebook for RDC, regardless of their awareness and willingness. It could mean that students are not using Facebook for RDC because it is not a common practice in Nigeria, or they may not have adequate knowledge of using the platform for RDC. Another reason for the low utilisation of Facebook for RDC despite the high awareness and willingness may be due to the challenges of ICT. It is often reported in the Nigerian literature that such factors as the high cost of internet subscriptions, inconsistent electricity supply and poor access to personal computers, among others, affect students' Facebook use (Aworanti, 2016; Fahm et al., 2021; Owan, Asuquo, Makuku, et al., 2021b). Similarly, students' lack of interest and poor attitudes toward social media exposure (Carmack & Rodriguez, 2020; Díez-Palomar et al., 2020; Olamijuwon et al., 2021) might be other

reasons for the results. Nevertheless, the findings have important implications for students to develop skills in using social media for RDC as it is becoming increasingly relevant in the modern academic landscape.

The MGA analysis discovered that male and female students reported low use of Facebook for RDC, with females reporting lower use than males. This result strengthens other studies (McGregor et al., 2017; Odigwe & Owan, 2020) documenting that females use ICT less than males. This finding indicates a need for females to be trained to improve Facebook utilisation for RDC. Similarly, respondents across the three age categories (19 to 28, 29 to 38, and 39 to 48 years) all reported low levels of Facebook use for RDC, with the lowest level of use reported by those aged 19 to 28 and the highest by those aged 38 to 49. This finding suggests that Facebook use for RDC increases with the age of respondents. The result is consistent with several others that reported older respondents as better ICT users than younger ones (McAndrew & Jeong, 2012; Owan, Asuquo, Ekaette, et al. 2021a). Since the youngest age group (19-28 years) reported the lowest level of use, this could indicate a need for this group of students to be trained.

4.4. Awareness and Facebook use for RDC

This study's result indicated that students' awareness directly and significantly impacts their Facebook use for RDC. This suggests that students who reported being more aware of the potential of Facebook as a tool for RDC are more likely to use it for this purpose. Several reasons could explain this relationship. Firstly, students who are more aware of the benefits and capabilities of Facebook as a research tool are more likely to see its value and use it for data collection purposes. Secondly, students who are more aware of the importance of social media in research may be more motivated to use it for this purpose.

Furthermore, the finding of this study proved that awareness has a stronger positive impact on Facebook use for males than females could be due to gender differences in technology use and attitudes towards social media. For example, males may be more likely to embrace technology and see the value of using social media for research. This finding is also attributed to males having more time to engage in social media than females due to the latter's involvement in home chores. Studies in Africa have shown that females are often busy with home activities limiting their chances of using online tools for research (Odigwe & Owan, 2020; Owan, Asuquo, Ekaette, et al., 2021).

Regarding age, the impact of awareness on Facebook use for RDC was strongest for students aged 29 to 38 and weakest for those aged 19 to 28. The result could be due to differences in experience and prior exposure to technology. Students in the older age category may have more social media experience and, therefore, are more likely to see its value for RDC. On the other hand, younger students may be less familiar with using social media for research purposes and may need more guidance and support to develop their skills. This implies that older respondents of this study may have positively perceived that Facebook can be used for educational purposes. The finding agrees with the results of other studies (e.g., Alwreikat et al., 2021; Shodiyev, 2022), documenting that the platform could be used as a learning environment for students' engagement, support, and knowledge creation.

4.5. Willingness and students' Facebook use

This study found that students' willingness to use Facebook for RDC directly and positively impacts their actual Facebook use for this purpose. This effect was stronger among males and students aged 19 to 28 years. However, the effect was not statistically significant for students aged 39 to 48, indicating that their willingness to use Facebook for RDC may not significantly impact their actual use of the platform. These results suggest that willingness is crucial in determining how students use Facebook for RDCA. In particular, younger students and males appear more receptive to using Facebook for RDC due to their willingness. This could be because these groups are more familiar with and comfortable using technology for academic purposes. This provides further support to other studies that have also shown that students who like online technology are

more likely to utilise them (Dúo-Terrón et al., 2022; Gómez-Fernández & Mediavilla, 2021). Furthermore, the result of this study also agrees with other studies that students utilise ICT when they think it is appropriate and increases their digital competence during group discussions (Aesaert et al., 2015; Christoph et al., 2015). Therefore, the implications of these findings are important for educators and administrators as they can use this information to promote using Facebook for academic purposes among students.

4.6. Awareness and Students' Willingness to use Facebook for RDC

This study discovered that awareness negatively impacts students' willingness to use Facebook for RDC. This means the willingness to use Facebook for RDC decreases as awareness increases. This may provide support to previous research, which has documented that students who like online technology are more likely to utilise them (Dúo-Terrón et al., 2022; Gómez-Fernández & Mediavilla, 2021). Therefore, many students may be unwilling to use Facebook for RDC even when they know it because they perceive it negatively. Another reason is that many students with a high level of awareness did not know how to make practical use of Facebook for RDC, thereby reducing their interest in using it prospectively. This suggests that universities may need to train students to use Facebook and other social media platforms for RDC.

The study further found a differentiated relationship between awareness and willingness to use Facebook for RDC by respondents' gender and age. For males, awareness negatively impacts willingness to use, while for females, it has a positive impact, with the effect being stronger on the latter. This implies that males who reported being aware of using Facebook for RDC also reported a lower willingness to use the platform for such a purpose. This result suggests that males may not have adequate knowledge to use Facebook for RDC, although they are aware it can be used as such. It could also mean that males have other data collection mechanisms they consider more effective or efficient than Facebook. In contrast, females who reported being aware also reported being willing to use Facebook for RDC. This result suggests that female students might be more flexible and open to innovation than males. It could also imply that females are more knowledgeable about using Facebook for RDC than males. This result disagrees with previous research (Mesagan et al., 2022), which documented no significant difference in cyberspace access between male and female higher education students.

For age, it was found that students' awareness significantly predicted their willingness to use Facebook for RDC positively for those aged 19 to 28 but negatively for those aged 29 to 38. However, awareness had a positive but insignificant impact on the willingness to use Facebook for RDC among students aged 39 to 48. This result suggests that younger students are more likely to embrace Facebook for RDC if they are aware of it than older students. The result is unsurprising since younger students are of the digital age and are highly curious to learn and try new things. Older students may negatively perceive technology, which could affect their willingness to try them. This supports other studies documenting that students utilise ICT when they think it is appropriate and increases their digital competence (Aesaert et al., 2015; Christoph et al., 2015). The varying effects across different age groups suggest that age may play a role in students' attitudes towards using Facebook for RDC and that age-specific approaches may be needed to promote its use effectively.

4.7. Mediation of Willingness to Link Students' Awareness to their Facebook use for RDC

It was discovered that willingness negatively but significantly mediated the link between students' awareness and their Facebook use for RDC. This suggests that students aware of Facebook use for RDC are less likely to be willing to use it. This, in turn, affects the direct relationship between awareness and Facebook use, making it negative. These results may be due to various factors such as privacy concerns, misinformation, or a lack of trust in the platform as a source of information for RDC. Additionally, students may not see the value in using Facebook for RDC or prefer to use other, more specialised platforms better suited to this purpose. This supports other studies

documenting that students utilise ICT when they think it is appropriate for what they seek to achieve (Aesaert et al., 2015; Christoph et al., 2015).

Moreover, willingness significantly mediated the link between students' awareness and Facebook use for RDC negatively for males but positively for females. The negatively mediated relationship for male students means that male students who are more aware of Facebook use for RDC are less likely to be willing to use it. However, the mediation effect was positive for female students, indicating that female students who are more aware of Facebook use for RDC are more likely to be willing to use it. These results may be due to differences in gender attitudes towards technology, privacy concerns, or prior experience with using social media for educational purposes. Female students tend to see greater value in using Facebook for RDC or feel more confident in using it effectively. This finding suggests that targeted interventions may be necessary to promote the use of Facebook for RDC among male students who are less willing to use it. This study supports previous research (e.g., Aduma et al., 2022; Owan & Asuquo, 2021), revealing a significant gender difference in ICT satisfaction, job performance and Internet use for research dissemination. However, the result disagrees with Toroujeni's (2021) finding that there is no significant gender effect on computer attitudes and ICT literacy.

It was further shown that the mediation effect of willingness on the relationship between students' awareness and their Facebook use varied by age. The effect is positive and significant for students aged 19 to 28, negative for those aged 29 to 38, and insignificantly positive for those aged 39 to 48. This indicates that younger students (19-28 years) are more likely to use Facebook when they are willing and aware of it, whereas the relationship between willingness and Facebook use for older students (29-38 years) is less clear, and for the oldest group (39-48 years), there is no significant relationship. The results may be due to differences in technology adoption and use patterns between different age groups. Younger students may be more comfortable and familiar with technology, making them more likely to use Facebook when they are willing and aware of it. On the other hand, older students may have less experience or interest in using technology, leading to a weaker relationship between willingness and Facebook use. Previous studies have found that students' lack of interest and poor attitudes toward educational activities affected their use of social media (Carmack & Rodriguez, 2020; Díez-Palomar et al., 2020; Olamijuwon et al., 2021). These findings have implications for tertiary institutions and individuals looking to understand and target Facebook use for RDC. Understanding the mediating effect of willingness can help inform strategies for increasing Facebook usage among different age groups.

5. Limitations and Future Research Directions

This study had several limitations that should be considered when interpreting its results. Firstly, the study was conducted in Nigerian tertiary institutions, and the results may not be generalisable to other contexts. Further research is needed to examine how these findings apply to other countries and higher education institutions. Another limitation is that the study was based on a self-reported survey, subject to biases and limitations in the respondents' ability to recall and report their experiences accurately. Using alternative methods, such as observation or data collected directly from Facebook, could provide a more accurate picture of students using the platform for RDC. Finally, the study was cross-sectional, and a longitudinal design would have allowed for a more comprehensive understanding of the development of students' awareness and willingness to use Facebook for research data collection over time. This would provide a more nuanced understanding of how these factors change as students progress through their careers and gain more experience using social media for academic purposes. Despite these limitations, this study provides valuable insights into the awareness and willingness of Nigerian university students to use Facebook for RDC. It highlights the role of demographic factors in shaping these attitudes. Further research is needed to build on these findings and address the current study's limitations.

6. Conclusion

In conclusion, this study proved that students are highly aware of and willing to use Facebook for RDC, but actual usage is low. Students' awareness directly and significantly impacts their Facebook use for RDC, with a stronger effect on males and students aged 19 to 28. Furthermore, students' willingness to use Facebook for RDC has a direct and positive effect on their actual use, with the effect being stronger for males and students aged 19 to 28. Students' willingness mediates the relationship between their awareness and Facebook use for RDC, with a differential effect based on gender and age. These findings provide important insights into using Facebook for RDC among students in Nigerian universities and highlight the need to consider the impact of demographic factors such as age and gender when promoting social media platforms for academic purposes. This study contributes to the existing literature on social media use in the educational sector, specifically Facebook. Through this study, there might be increments in using Facebook by students and other individuals for academic purposes. Therefore, tertiary institutions must provide opportunities for students to access institutional ICT resources and services. There should be open access to institutional wireless networks to promote students' use of Facebook or other internet-based platforms for research engagements. Sensitisation campaigns on designing and managing electronic data collection tools should be organised in workshops, seminars or conferences for all undergraduates and postgraduate students in tertiary institutions.

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