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Undergraduates' Awareness of the Use of Technological Tools for Information Collection and Analysis

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ABSTRACT

The study examined Undergraduates' awareness of the use of technological tools for information collection and analysis. Specifically, the study is focused on: (i) examining how often final-year undergraduates have heard about the different methods used to collect information about a respondent or participants (ii) investigating how commonly final-year undergraduates believe technological tools are used to collect information (iii) examining how frequently final-year undergraduates have heard about technological tools used to analyze information collected. The sample of the study comprised 100 undergraduates selected using Krejcie and Morgan sample size determination table. The results revealed that the respondents are aware of the common methods (questionnaire, experiment, and interview) used to collect information, except for focused group discussion, which is occasionally used as a method to collect information. Also, it was revealed that the use of computer-assisted tools, social media, and audio-visual tools are common technological tools used to collect information, with low awareness of the use of Google Forms and email. The use of SPSS and Microsoft Excel for information analysis is common amongst undergraduates, which showed high awareness whereas, the use of ACTIVITY INSIGHT, STATA, and NVIVO is not frequent, which showed low awareness. Awareness and practical teachings be organized for undergraduates on the different methods as well as technological tools that can be to collect and analyze information respectively.

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1. INTRODUCTION

Undergraduate students need to have an awareness of information-collecting methods and various technological tools for collecting and analyzing information collected before they can use it for research. Awareness in this study refers to a situation in which undergraduates are made aware of information-collecting methods, information-analysis technological tools, and their ability to recognize a new technology. In this study, awareness refers to whether undergraduate students in the Faculty of Education, Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria are aware of these methods and technological tools used to collect and analyze information about respondents or participants in research. According to research, bringing awareness can influence undergraduate students' behavior in collecting, organizing, and analyzing information in a research (Gauld *et al*., 2020; Wathuge & Sedera, 2021; Alordiahb, *et al*., 2023).

The collection of information is an important step in conducting research. Qualitative research is used when researchers must work with words and images, while quantitative research is used for generalization, hypothesis testing, and measurement of phenomena (Aborishade, 2013). The procedures for collecting information were outlined in the study, which includes documentation, observation, questioning, measuring, or a combination of various methods (see https://www.gfmer.ch/SRH-Course-2017/Geneva-Workshop/Data-collection-methods-Abawi-2017). The gathering of data for any research helps in determining the findings of the study and the level of quality (Moosavi, 2020).

Collecting information from respondents or study participants presented difficulties for researchers (Rimando *et al*., 2015). Numerous research projects have attempted to investigate various techniques for collecting information, including surveys, interviews, observations, experiments, focused group discussions, and so forth. Research methods, which include experiments, tests, and surveys, are techniques and tools used to conduct research, as highlighted in the study. Questionnaires are still distributed to respondents or participants in research and evaluation efforts using paper and pencil. Additionally, it was noted in recent years that more researchers are now using technological or Internet-based tools to collect, organize, and analyze information (Weston & Bain, 2010).

Web-based surveys, which are increasingly common in higher education institutions, are advantageous in settings with easy access to technology (Bebell *et al*., 2010). Technology plays an important role in contemporary research and academic institutions. Therefore, using technological tools for information gathering, organization, and analysis is a valuable tool for academics and undergraduate students in higher education. Tertiary institutions employ a variety of technological tools to collect, organize, and analyze information in different forms, particularly regarding students; for admission, training, student support, quality assurance, and management (Farah *et al*., 2019). The diversity of the information collected has increased interest in Information analysis to support data-driven decision-making at all levels of educational institutions and has sparked new data analytics research. As a result, universities and organizations have begun to create technological tools that gather, arrange, and analyze information from their databases and provide collected data in an appropriate format for all stakeholders. This has given data analytics technological tools a tremendous amount of potential in tertiary institutions and research. However, technology acts as a catalyst for many changes in research, particularly in collecting and analyzing data. A technology-driven society and the widespread use of technological tools like ICTs, mobile devices, multimedia tools, and other tools put more pressure on education to adapt. The technology used in the field of education is a blend of practices and different tools that function as a whole to demonstrate the expanding need for ICT (Laferrière *et al*., 2013).

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Technology in education has significantly improved the quality of education, availability, and access to educational resources. The process of teaching and learning, as well as performing research, has been positively altered by the use of technological tools. ICTs have changed how education is practiced around the world in terms of the number of technological tools available for learning, evaluating, and conducting research (Onasanya *et al*., 2021). Nigeria's tertiary institutions consider ICTs indispensable in the learning and teaching process and have therefore brought new methods of sorting out the educational activities in institutions, which include research. Before the development of technology, undergraduate students had difficulty collecting information for study, interpreting it, and communicating the findings. However, as technological tools for research activities have developed, such as the usage of Google Form for survey research, SPSS for information analysis, and multimedia messages sent via mobile phones in teaching and learning, (Onasanya & Ayelaagbe, 2013), undergraduate students can now easily complete their final-year research projects without worrying about the expense of printing a large number of surveys or the laborious process of manually computing and communicating findings. As a result, in our modern age, using communication technologies is necessary for efficient communication and reporting (Asuquo *et al*., 2022). Although most social network services are internet-enabled and offer options for users to engage, including e-mail and instant messaging, social networking encourages cooperation among individuals. Google Form, however, is an internet-based technological tool for collecting information from respondents or research participants that enable a group of people to engage in networking, as described in a study on online networking (Onasanya *et al*., 2013).

Also, the study mentioned how quickly and easily information can be accessed and analyzed when it is collected using technological tools, which contributes to streamlining the entire information-collecting process. However, final-year undergraduates may not be aware of the various methods and technological tools that can be used to collect, organize, and analyze a collection of information during the research process. In addition, it appears that there is little research on the awareness of the use of technological tools to collect, organize, and analyze information collected through different methods by undergraduates based on the researcher's investigations, observations, and experiences working with the students over the years. This study looked at undergraduates' awareness of the use of technological tools for collecting and analyzing Information. The study's specific objectives are to: (i) ascertain how frequently undergraduate final-year students have heard about the various techniques or methods used to collect information from respondents or participants. (ii) Examine how frequently undergraduate final-year students think technological tools have been used to gather data over the past three to four years of study. (iii) Analyze how frequently undergraduate students in their final year of study have heard about technological tools for collecting, organizing, and analyzing information. Research project supervisors and undergraduates in their final year of study as well as those in their penultimate year would benefit from the study's results.

2. METHOD

The study adopted the descriptive survey design because it involved the use of an adapted questionnaire by Olasehinde-Williams & Owolabi in 2023 to elicit responses from the undergraduates. The study's population comprised all final-year undergraduates in the Faculty of Education, Adekunle Ajasin University, Akungba-Akoko, Ondo, Nigeria. A purposive sampling technique was adopted for this study. Thus, only final-year undergraduates in the Department of Science Education were used as the sample size for this study because they

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were the most convenient students to reach by the researcher, the most readily available respondents from the study population, which the researcher is working closely with and he is even a research project supervisor in EDU 400 to 20 of them.

Based on the Krejcie and Morgan sample size determination table, a sample size of 100 final-year undergraduate students was chosen from 135 for the study. The collection of information was carried out using a questionnaire as the instrument. The questionnaire was distributed by hand by the researcher with the help of research assistants. Frequency count and percentage were used to analyze the data from the questionnaire to answer the three research questions raised in the study. In the course of retrieving back the questionnaire from the respondents, only 95 out of 100 questionnaires distributed were collected. The researcher was unable to retrieve back 5 of the questionnaires due to respondents' attitudes and negligence.

3. RESULTS AND DISCUSSION

3.1. Methods of Collecting Information

Information on respondents or study participants can be collected using different methods. These methods for collecting information are qualitative and quantitative in research. The qualitative method is used by researchers to work with words and images as opposed to the quantitative method, which is used to measure a phenomenon, test a hypothesis, and generalize. In terms of the research objective, the topic of interest, the quantity, the nature of respondents or participants, and the design of the interviews or questionnaires, the effectiveness or suitability of a particular method depends on the type of research (Aborishade, 2013). Moreover, methods for collecting information include documentation, observation, questioning, measuring, and so on (see https://www.gfmer.ch/SRH-Course-2017/Geneva-Workshop/Data-collection-methods-Abawi-2017). Similarly, there are different methods for collecting information that is accessible to both quantitative and qualitative researchers (Aborishade, 2013). Since information can take on various forms and shapes, there is no one particular type of information collection method. Surveys, interviews, observations, experiments, and other techniques for gathering information were highlighted. Accurate and systematic information collection is essential for conducting scientific research because it enables the researcher to collect the necessary information about the study participants. A wide range of methods can be employed for data collection such as focused group discussions, observation, interviews, photographs, videos, surveys, and so on (see https://www.intrac.org/wpcms/wp-content/upload/2017/01/Basic-tools-for-datacollection.pdf). In corroboration, questionnaires, experiments, focused group discussions, interviews, tests, and observations are some of the research methods used to collect information to conduct research.

3.2. Collecting Information using Technological Tools

Photographs are still or moving images, which can be used to collect information from participants with written captions, providing added information whereas videos are complemented by an interpretation. The use of photographs and video has become common in recent years, partly because of improvements in mobile phone technology, which has increasingly helped researchers across the world to produce cheap, high-quality audio-visual research instruments for a study (Aborishade, 2013). Email is in electronic format, which requires little formatting or editing before being processed for analysis. Email is a practical substitute for in-person or audiovisual interviews conducted via social media platforms including Twitter, Skype, Facebook, WhatsApp, Canvas Instructure, Google Classroom, and webcam. This is a result of their appeal to people's hearing and vision senses. By sending them

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an email message board or discussion group, you can contact a sizable number of participants or a sizable sample of people at various locations instead of making long-distance phone calls, sending normal mail, or going to the participants' locations (Aborishade, 2013; Meho, 2006).

More so, the computer aids in the computation of many statistical methods used in information analysis. For calculations and analysis in research, a variety of technological tools are accessible, including MS Excel, SPSS, NVIVO, NCSS-PASS, STATA, and Activity Insight. They can also be used to determine the proposed study's sample size, test hypotheses, and determine the study's power. Computers are a sort of technology that may be used for statistical analysis as well as for monitoring the accuracy and completeness of collected information.

3.3. Technological Tools for Information Analysis

Information analysis software is a tool that is used to process and handle information. It helps with qualitative analysis like content, transcription, discourse analyses, and grounded theory methodology. Nvivo was created to help researchers analyze qualitative data. Such as discussions on social media, articles, field notes, interviews, surveys, and websites: Researchers can utilize information stored in NVIVO to create charts, diagrams, and reports from information analysis. Data gathering, cross-examination, finding of trends, and testing of theories are part of the uses of Nvivo in research. Qualitative information analysis allows you to collect, organize, and analyze non-numerical information (see https://www.rmit.libguides.com). ACTIVITY INSIGHT is an online software product with more watermarks designed to make it easier for faculty members to collect, arrange, and present their information. It aims to give researchers a simpler, more effective approach to managing time-consuming reporting processes for big amounts of information. TRANSANA is an open-source software tool designed for transcription and analysis of information. MAXQDA is skilled software for qualitative, quantitative, and mixed strategies of information analysis. It provides researchers with a powerful, innovative means of analyzing information. ATLAS.ti is used to visualize large information and appreciate details.

3.4. Research Question 1: How often Have You Heard About Different Methods used for Collecting Information About a Respondent or Participants in a Study?

Table 1 showed the responses of final year undergraduate students on the different methods to collect information about a respondent or a participant, which include: questionnaire, interview, observation, experimentation, and focused group discussion. It revealed that 43.2% (41) of the respondents have heard about questionnaires used very often as a method of collecting information, 14.7% (14) maintained that interview is often used, 10.5% (10) agreed that observation is occasionally used, 28.4% (27) have heard of experimentation very often used as a method to collect information and only 3.2% (3) agreed that focused group discussion is used as a method of collecting information from respondents or participants.

Table 1. Different methods often used to collect information about a respondent or a participant.

S/N	Different Methods of Collecting Information	Frequency	%
1	Questionnaire	41	43.2
2	Interview	14	14.7
3	Observation	10	10.5
4	Experimentation	27	28.4
5	Focused Group Discussion (FGD)	3	3.2
	Total	**95**	**100**

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3.5. Research Question 2: How Common do You Believe Each of the Following Technological Tools is Used to Collect Information from Participants in a Study?

Table 2 showed the responses of final year undergraduate students on the technological tools commonly used to collect information in the course of their 3 or 4 years of study, about a respondent or a participant, which include: Email, Google Forms, Social Media, Computer Assisted Tools, and Audio-visual Tools. The finding revealed that Audio-visual Tools 21.0% (20), Computer Assisted Tools 33.7% (32), and Social Media 27.4% (26) are the three technological tools commonly used to collect information, whereas 12.6% (12) and 5.3% (5) respondents believed that Google Forms and Email are not commonly used to collect.

Table 2. Technological tools commonly used as media to collect information.

S/N	Technological Tools Used as Media to Collecting Information	Frequency	%
1	Email	5	5.3
2	Google Forms	12	12.6
3	Social Media Tools	26	27.4
4	Computer Assisted Tools	32	33.7
5	Audio-visual Tools	20	21.0
	Total	**95**	**100**

3.6. Research Question 3: How Frequently have you Heard about the Following Technological Tools Used to Analyze Information Collected About Participants in a Study?

Table 3 showed the responses of final-year undergraduate students on the technological tools frequently used to organize and analyze information in their 3- or 4-years course of study, about a respondent or a participant, which include: Microsoft Excel, SPSS, NVIVO, STATA, and Activity Insight. It revealed that 3.2% (3), 2.1% (2), and 7.4 (7) of the respondents have never heard about Activity Insight, STATA, and NVIVO as technological tools used for organizing and analyzing information, 58.9% (56) of the respondents maintained that SPSS is a technological tool used very frequently to organize and analyze information while 7.4 (7) respondents believed that NVIVO is occasionally used to collect information from respondents.

Table 3. Technological tools frequently used to organize and analyze information.

S/N	Technological Tools Used to Organize and Analyze Information	Frequency	%
1	Microsoft Excel	27	28.4
2	SPSS	56	58.9
3	NVIVO	7	7.4
4	STATA	2	2.1
5	Activity Insight	3	3.2
	Total	**95**	**100**

3.7. Discussion

The result in **Table 1** showed that undergraduates are aware of the different methods used to elicit responses from respondents with questionnaire and experiment as the most often used methods to collect information from respondents, showing high awareness whereas, the undergraduates demonstrated a very low awareness with the focused group discussion method, which showed low awareness of students. However, where there is a low awareness or knowledge about an information collection method, students are bound to face difficulties in using such a method for a study. This is in line with Rimando, Brace, Namageyo-Funa, and others in the literature (Rimando *et al*., 2015).

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Similarly, the result in **Table 2** revealed that computer, social media, and audio-visual tools are the most commonly used technological tools to collect information from participants as shown by the percentages, also demonstrating high knowledge while the students demonstrated low knowledge with use of E-mail and Google form as tools for collecting information from research participants. This is in line with (Aborishade 2013; Onasanya *et al*, 2013) who reiterated the importance of Email and other technological tools that researchers can use to collect information, hence the need to encourage students to use it.

Finally, the result in **Table 3** also revealed that the use of SPSS and Microsoft Excel is popular amongst undergraduates, as these tools remain the most frequently used technological tools for analyzing information. ACTIVITY INSIGHT, STATA, and NVIVO are not too popular technological tools for information analysis among undergraduates. Nevertheless, the use of these technological tools for data analysis cannot be underestimated as they play an important role in information analysis, as shown in the literature by (see https://www.rmit.libguides.com).

4. CONCLUSION

The use of information collection methods and technological tools for educational research has come to stay; therefore, their acceptance and use in tertiary institutions for research purposes cannot be understated. Particularly, undergraduates who have a phobia for calculation-related activities would find the use of technological tools handy for collecting, organizing, and analyzing information in their final year research projects. In general, Universities should be committed to creating more awareness and encouraging the use of technological tools to collect, organize and analyze information among undergraduates. According to the findings of the study, it was recommended that final-year undergraduate students should be encouraged to study and explore more different methods used to collect information about respondents or participants other than the use of questionnaires and experimentation as they demonstrated low awareness toward other methods and tools. The university and relevant stakeholders should organize seminars and/or practical workshops for the final year students, particularly the penultimate undergraduate students on the use of other technological tools in collecting, organizing, and analyzing information such as Microsoft Excel and SPSS, which are generally known to students as revealed from the study. By implication, this study would create awareness among undergraduates and students' project supervisors and improve the way of doing research by both penultimate and final year undergraduates in the University.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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