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Information Literacy as Correlates of Engineering Undergraduates' Use of Electronic Resources in Three Universities in Osun State, Nigeria.

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INFORMATION LITERACY AS A DETERMINANT OF ENGINEERING UNDERGRADUATES' USE OF ELECTRONIC RESOURCES IN THREE UNIVERSITIES IN OSUN STATE, NIGERIA

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Abstract

Information literacy is conceptualized to be an individual recognizing the need for information and the possession of knowledge on how to find, evaluate and communicate information effectively to make a decision. With the surge in sources of information, particularly the electronic information sources, which are now abundantly available, it is expected that a good literate information user would use electronic resources better than a noninformation literate. This study therefore focused on information literacy as a correlate of engineering undergraduates' use of electronic resources in three universities in Osun state, Nigeria due to the centrality of current information to their engineering practices. The descriptive survey design was adopted, the population consisted of 100-500 level engineering students selected from a federal, private and state universities in Osun State. Three hundred and fifty- four (354) copies of the questionnaire were administered to engineering undergraduates across the selected three universities, two hundred and twenty-seven (227) copies of the questionnaire correctly filled were returned and were found useful for the analyses. The software package for social sciences was used for data analyses based on descriptive and inferential statistics for research questions and hypothesis respectively. The study revealed that, e-resources were found moderately available, and used for personal development of the engineering undergraduates in Osun state.The study equally established that Internet sources and e-journals were the predominantly used e-sources, while the frequency of use was daily. The students were found to be able to identify information ($\bar{x}$ = 3.22), do seek information ($\bar{x}$ = 2.84), can evaluate information ($\bar{x}$ = 2.89), and apply the information ($\bar{x}$ = 2.62). thence, the overall information literacy of the engineering students was found to be good ($\bar{x}$ = 2.91) and might be responsible for their use of electronic resources. Therefore, concludes and recommends that relevant electronic information resources should be subscribed to by the universities for the use of engineering undergraduates.

Keyword: information literacy, correlates, e-resources, undergraduates engineering students.

Words counts: 253

Introduction

Library users are no longer obliged to visit the library at regular open hours to meet all their information needs. They may search the library online catalogue; use a subject guide or

database to access a citation from the Internet or access a full-text article from Web-based journals; they may browse an electronic journal; fill out an interlibrary lending form; e-mail a reference question via the ask-a-librarian service or borrow an e-book– all by remote access Ibrahim (2004). The advancement and increasing availability of technology and the digitalization of information have helped to create a workplace that is more technology-based, where the effective management of information has become the norm, because of the value of information in creating competitive advantages Rander (2016). Electronic resources may be defined asinformation-bearing materials that require the use of computers to access them or it is any electronic product that delivers a collection of data, texts, and images. The latter part of the aforementioned definition portrays e-resources as multimedia products. These multimedia products could include numerical, graphical or time-based representations manufactured with the aim of being marketed in various forms for commercial purpose (Subbaiah, 2017).

Scholars in the academic environment on e-resources have stated that it has increased to a large extent. A researcher finds it convenient to make use of e-resources for his/her research work (Sharma, 2016). Nowadays, e-resources have an edge over the traditional print-based media as they are most likely to contain current information, offer advanced search capabilities, greater flexibility in storage, and enable access to information without time and location constraints (Mawere & Sai, 2018). Tariq and Zai (2014) maintained that e-resources are completely immersed in our environment; therefore, many library and information services can be provided or accessed through them. The globe has become entrenched in different ICTs controlling library functions and students are fully aware and conversant with these e-resources.

Mawere and Sai (2018) have identified that e-resources are invaluable tools for studying, learning, and researching. The rapid adoption in the use of the Internet has facilitated the creation and use of these e-resources. As a result, users of e-resources are more empowered to not only learn but also study at their own pace by accessing these resources in a timely fashion. Similarly, Ankrah and Acheampong (2017) affirmed that e-resources provide favourable access to information that might be restricted to the user because of geographical location or finances. E-resources also provide access to current information because they are frequently updated.

Moreover, through various search techniques, e-resources provide extensive links to explore additional resources or related content. Urhiewhuet al. (2015) asserted that e-resources play an important role in facilitating access to required information by the users in an easy and

expeditious manner. Negahban and Mysore (2009) also revealed that e-resources play a major role in many academic institutions. For instance, they bridge the gap between library resources and users in relation to library services, and they serve as a motivating factor to students as they are provided with the opportunity to select, locate (acquire), process, transmit, and disseminate information on any subject of interest.

Ankrah and Atuase (2018) revealed that e-resources have steadily become a key resource in every university library. The development of e-resources has rapidly transformed information access and management procedures in the academic environment, particularly in university libraries. Through the use of e-resources, students, researchers, and other information seekers are now exposed to a variety of information sources available globally. It is worthy of note that e-resources play a leading role in facilitating access to required information by the students in an easy and efficient manner (Tofiet al., 2020).

Computer literacy is described as the human competency that involves using one's own knowledge, skills, and abilities of various high-tech hardware and software including from the wider sphere of ICT to access information (Kvasnica & Hrmo, 2010). According to Bundy (2004), information literacy can be depicted under three main elements: the generic aptitudes involving problem-solving, working as a team, discussing and thinking critically; information aptitudes involving finding, utilizing, and applying information and information innovation familiarity; and qualities and convictions involving the ability to understand and use information cleverly. Shane (2011) added that the sign of information literacy is the ability to assess and morally apply data to discover answers to issues. Gwyer, et al., (2012) expressed computer literacy is a set of skills that a person learns and develops over time. It enables a person to use a computer and the Internet for finding information, computer programs for processing data and information, and all sorts of communication tools for sharing information.

Ekong and Ekong (2018) advocated that users of e-resources must be literate and must be able to navigate through them in order to adequately harness the electronic information at their disposal. Traditionally, literacy means the ability to read and write. There are various types of literacy, namely: audiovisual literacy, print literacy, computer literacy, media literacy, web literacy, technical literacy, functional literacy, library literacy, information literacy, etc. There also exists nominal and active literacy, which focuses on the ability of people to read and write as they engage in daily activities. Abiolu (2019) outlined eleven principal elements of building

information literacy, that is, research, improvement, structure, development, creation, activities, board administrations, testing, deals, counseling, and instructing.

California University Information Proficiency Truth Sheet (2000) described an information literate as any individual who can determine the degree of data he/she requires, access the required data successfully, and effectively evaluate the data and its sources incorporating chosen information into his/her information base. Information literacy originated from knowledge techniques for exploring information for problem solving and decision making in our ever-changing information-technology driven world. Information literacy is necessary as technology is rapidly growing, it is very important for all to be able to operate several electronic devices. Effective exploitation of e-resources can only be possible with a reasonable level of good computer competency.

Nevertheless, the electronic resources use cannot be overemphasised at all levels of academic endeavours, researches, particularly, in digital environments. Despite the importance attributed to the use of e-resources, previous research studies have indicated low usage of e-resources among engineering undergraduates. The university library provides information resources (print and electronic) to facilitate the tripartite function of teaching, learning, and research in order to advance the intellectual and career development of their patrons including students and staff. Though this objective has not changed, the low level of usage of e-resources by engineering students is an indicator of fundamental problems that might be connected to information literacy. With these causes, there is the likelihood that engineering students will not be able to sufficiently access information from e-resources for their daily academic activities. Obviously, their academics and career could be negatively affected. It is therefore important that information literacy be investigated as a correlate of engineering undergraduates' use of e-resources. This is to appropriately place these predictors such that Nigerian engineering undergraduates can be assisted in terms of information literacy and proper attendance to e-resources.

Research Questions

This study was guided by the following research questions:

i. What are the types of e-resources available for use by engineering undergraduates of universities in Osun State, Nigeria?

ii. What are the purposes of use of e-resources by engineering undergraduates in universities in Osun State, Nigeria?

iii. What is the frequency of use of e-resources among engineering undergraduates in universities in Osun State, Nigeria?

iv. What is the level of information literacy by engineering undergraduates in universities in Osun State, Nigeria?

Literature review

Engineers play a very critical role in various areas of life, including housing, transport, manufacturing, health, sports, recreation, food, clothing, and medicine (Abiolu, 2019). Hence, engineering undergraduates require the best training possible to be useful for their developmental task in the society essentially on information literacy to better perform their responsibilities.

Association of College and Research Libraries (2002) affirms that information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the accessed information. Information literacy is a vital quality for the modern information-intensive world, enabling personal, economic, social, and cultural development. Information literacy is very important in the modern environment due to the swift hi-tech changes and proliferation of information resources. Information is accessible everywhere through libraries, the Internet, media centres, and special interest organizations. Due to some unfiltered electronic information particularly via search engines on the Internet, many questions have been raised on its authenticity, reliability, and validity. The quantity, as well as the quality of information, creates many challenges.

Information literacy is a fusion of library literacy, computer literacy, media literacy, technological literacy, critical thinking, ethics, and communication, which when acquired would enable users of the information to become independent (Ukpebor & Emojorho, 2012). Ekong and Ekong (2018) assert that information literacy is the capability of individuals to locate and critically evaluate information. It is also the ability to make effective use of information in decision making and knowledge creation. Information literacy encompasses the ability of an individual to recognize his or her information needs, locate and evaluate the quality of information, store and retrieve information, make effective and ethical use of information and apply information to create and communicate knowledge (Afolabi, 2019). According to the University of Idaho Information Literacy Portal (2011), information literacy is the capability to identify needed information, understand organization of information, identify appropriate information sources, locate these sources, critically evaluate the sources, and disseminate such information.

Information literacy is a basic competency in selecting and retrieving pertinent and current information in an online environment. Information literacy acquisition is absolutely essential in using online resources since most information is available in electronic format that could exclusively be used when students are information literate. It is essential to get equipped with skills that are critical to handling information effectively and efficiently for higher education. Information literacy will also help students to possess skills such as critical and analytical thinking, decision making, acquiring knowledge, and problem-solving approach (Ahmad, 2017). With information literacy, students can choose the best information from available e-resources for important decisions. In a world where an infinite amount of information resources is available, individuals need to develop a greater understanding of information sources and the needed abilities to acquire, evaluate, use and communicate information effectively (Amusan & Lawal, 2020). Thus, Information literacy has to do with competence and a set of skills possessed by an individual to interact with information through the use of information resources in making rational decisions.

E-resources use by undergraduate students can be attributed to some factors. Urhiewhu et al (2015) during a study of undergraduates' use of e-resources found that their usage of e-resources was low coupled with difficulty in accessing e-resources. The use of electronic information resources within and outside the library environment will be influenced by many

factors. An information user has specific distinguishing attributes which to a large extent influence the information search process and subsequent use of the electronic information resources (Yusuf et al, 2016).

Adeleke and Nwalo (2017) defined electronic information resources as "resources in which information is stored electronically and which are accessible through electronic systems and networks". E-resources are now used to supplement printed information sources in university libraries. Different types of e-resources available are e-journals, e-books, online databases, electronic conference proceedings, and CD-ROM databases. Online databases that are commonly used in Nigerian universities for their research include EBSCOHOST, AGORA, HINARI, MEDLINE, JSTOR, and OARE. A number of these e-resources are accessible via the National Virtual Library which is run by National Universities Commission.

According to Popoola (2008), electronic resources are online information resources including bibliographic databases, electronic reference books, search engines for full-text collections, and digital collections of data sets. He further affirmed that the information resources and services available in institutional information systems must be capable of supporting research activities among the students and faculty members. Pasha (2020) describes e-resources as those electronic products that deliver a collection of data, such as full-text databases, e-journals, image collection, multimedia products, and so on for commercial intent.

Owolabi et al. (2016) argue that e-resources offer today's students new opportunities not available to previous generations emphasizing the fact that e-resources are invaluable research tools that complement the print-based resources in a traditional library. Commenting on the advantages of e-resources, Dadzie (2005) itemizes the advantages of e-resources to include: access to information that might be restricted to the user due to geographical location or finances; access to more current information; and provision of extensive links to additional resources or related content. Over the past few years, a number of related standards have been developed which allow documents to be created and distributed in electronic form. The e-resources on magnetic and optical media have had a positive impact on the collections of university libraries. However, the diversity of information needs by patrons, in terms of quality, depth and currency make it difficult for libraries to adequately fulfill users' needs through traditional information sources alone.

According to Kumar (2016), the use of e-resources enhances communication, career development, teaching, and research in addition to providing subject-specific and updated information. Pasha (2020) also discusses that most e-resources come equipped with powerful search-and-retrieval tools that allow users to perform literature searches more effectively and efficiently. Moreover, since most relevant e-resources are now available through the web, users can have desktop access to themtwenty-four hours a day. The users can navigate directly from indexing databases to the full text of an article and can even follow further links from there. Nevertheless, the emergence of e-books and e-journals followed the widespread adoption and use of electronic mail, listservers, and discussion groups to disseminate information quickly to large audiences (Pasha, 2020).

To this end, the optimal use of e-resources by students may depend on their information retrieval skills, i.e., information literacy. There have been a number of studies that discussed the impact of e-resources use in the universities in Nigeria and in the world. The current global surge in the awareness and use of electronic information resources by students, academics and researchers have brought about significant impact on the educational sector. There is a decline in students', academics 'and researchers' physical presence in the library in relation to the use of print formats. Nowadays, information needs can be met through-resources coming with a number of options.

Methodology

This study focused on information literacy as correlates of engineering undergraduates' use of electronic resources in two universities in Osun State, Nigeria. Descriptive survey design was adopted for this study. It was considered appropriate for collection of data from a given population with an intention to determine the opinions, attitudes and perceptions of persons in relation to the variables in the study. The population of the study consisted of engineering undergraduates from 100 to 500 levels in a federal, a state, and a private universities in Osun State. The universities are; Obafemi Awolowo University, Osun State University, and Adeleke University and with a total population of four thousand five hundred and twenty-three (4,523). A self-Structured questionnaire was used for this study to collect data from the respondents. This method was used because the population under study consist of literate individuals. The instrument used for this study was subjected to face validity approach, whereby a copy of the

questionnaire was made available to experts and scholars for comments, corrections and suggestions. A total of 354 copies of the questionnaire were administered to engineering undergraduates across the three universities used for the study. The objectives of the study were clearly explained to the respondents and they were assured that their information will not be divulged to the public and the research will strictly be for academic purposes. A total of 277 copies of the questionnaire were returned and found usable for analysis out of the 354 copies distributed. This represented a response rate of 78.2%.

The data obtained from the study were subjected to analysis using descriptive and inferential statistics. Software Package for Social Science (SPSS) was used for the analyses of the data. descriptive statistical analyses such as; frequency, percentage, the mean and standard deviation was used to analyse the research questions.

Results and Discussions

A total of two hundred and seventy-seven (277) copies of the questionnaire were returned and found usable for analysis out of the 354 copies administered. This represented a response rate of 78.2%.

Demographic characteristics such as institution, department, gender, age group, and level of study were analysed using descriptive statistics of frequency counts, percentages, and charts. The result is presented as follows;

Table 1: Institution of the Respondents

Name of Institution	Frequency	Percentage (%)
Adeleke University	19	6.9
Obafemi Awolowo University	203	73.3
Osun State University	55	19.9
Total	**277**	**100.0**

Table.1 reveals that 203(73.3%) of the respondents were from Obafemi Awolowo University, 55(19.9%) were from Osun State University and 19(6.9%) of the respondents were from Adeleke University. This shows that the engineering undergraduates in Obafemi Awolowo University were significantly higher in number than their counterparts in the other two universities in Osun State.

Table 2: Department of the Respondents

Department	Frequency	Percentage (%)
Civil Engineering	75	27.1
Electrical /Electronic Engineering	123	44.4
Mechanical Engineering	79	28.5
Total	**277**	**100.0**

Table 2 shows the distribution of respondents according to their departments. One hundretwenty-three (44.4%) were from Electrical/Electronics, 79(28.5%) were from Mechanical Engineering and 75(27.1%) were from Civil Engineering. This shows that the three main departments common to the three universities under study were adequately represented.

Table 3: Gender Distribution of the Respondents

Gender	Frequency	Percentage (%)
Male	194	70.0
Female	83	30.0
Total	**277**	100.0

Table 3 reveals that 70.0 % (194) of the respondents were males while 30.0% (83) were females. This shows that there were more male engineering undergraduates in universities in Osun State than their female counterparts.

Table 4. Age Distribution of the Respondents

ge Range	Frequency	Percentage (%)
18 – 20 years	61	22.0
21 – 25years	140	50.5
26 – 30years	35	12.6
31 – 35years	25	9.0
36 years and above	16	5.8
Total	**277**	100.0

Table 4. shows that a significant number of the respondents, that is, 140 (50.5%) were between 21 - 25 years of age, while the least, that is, 16 (5.8%) were above 36 years of age. This is an indication that most of the engineering undergraduates were between ages 18 and 25 years.

Table 5: Level of study of the Respondents

Level of Study	Frequency	Percentage (%)
100 level	59	21.3
200 level	53	19.1
300 level	62	22.4
400 level	51	18.4
500 level	52	18.8
Total	**277**	**100.0**

Table 5 show the distribution of respondents according to their level of studies. These revealed that: 21.3% were in 100 level; 19.1% were in 200 level; 22.4% were in 300 level; 18.4% were in 400 level while 18.8% of the respondents were in 500 level. This indicates that the highest number of participants was in 300 level and all engineering undergraduates at various levels of study were adequately represented in the study as participants.

The implication of the findings on demographic characteristics of respondents is the fact that the engineering undergraduates who participated in the study were well informed to be able to respond appropriately to the questions posed in the questionnaire used in the study. The distribution also showed that demographic characteristics of engineering undergraduates in the three universities in Osun State under review were homogeneous.

Research Question 1: What are the types of e-resources available for use by the engineering undergraduates in universities in Osun State, Nigeria?

Table 6. Types of e-resources available to engineering undergraduates

S/N	Electronic Resources	RA-4		A-3		SA-2		NA-1		mean	St.D
		N	%	N	%	N	%	N	%		
i.	CD ROM Database	55	19.9	11	40.1	56	20.2	55	19.9	2.62	0.931

										Mean	SD
									1		
ii.	Internet	135	48.7	70	25.3	57	20.6	15	5.4	3.38	0.722
iii.	e – Journal	104	37.5	112	40.4	40	14.4	21	7.6	3.33	0.764
iv.	e-news papers	69	24.9	106	38.3	76	27.4	26	9.4	2.62	0.927
v.	Online Public Access Catalogue (OPAC)	80	28.9	133	48.0	46	16.6	18	6.5	2.69	0.953
vi.	e-bibliographic data base	40	14.4	131	47.3	76	27.4	30	10.8	2.31	0.969
vii.	e-magazine*	15	5.4	131	47.3	61	22.0	70	25.3	2.49	0.890
viii.	e-books	105	37.9	96	34.7	46	16.6	30	10.8	3.22	0.888
ix.	Science-Direct Online	55	19.9	106	38.3	86	31.0	30	10.8	3.10	0.675
x.	Ebscohost	65	23.5	81	29.2	61	22.0	70	25.3	2.49	0.684
xi.	e-Thesis/Dissertation	81	29.2	95	34.3	46	16.6	55	19.9	3.11	0.732
xii.	Statistic & Database	52	18.8	96	34.7	64	23.1	65	23.5	3.14	0.632
xiii.	Indexing & Abstracting Database	39	14.1	96	34.7	101	36.5	41	14.8	2.35	0.809
xiv.	Library website	95	34.3	81	29.2	86	31.0	15	5.4	3.29	0.690
xv.	e-research Report	85	30.7	82	29.6	61	22.0	49	17.7	2.24	0.639
xvi.	Multimedia resources	95	34.3	152	54.9	15	5.4	15	5.4	3.20	0.902
xvii.	e-group discussion	41	14.8	136	49.1	55	19.9	45	16.2	2.17	0.783
xviii.	Web 2.0	51	18.4	135	48.7	46	16.6	45	16.2	2.72	0.931

Weighted mean = 2.80; Arithmetic 50.47; Standard deviation = 14.521

Decision Rule: Mean score of 1-1.49 = Not Available, 1.5-2.49 = Sometimes Available, 2.5-3.49 = Moderately Available, while 3.5-4 = Readily Available. The criteria mean =2.50 (that is

4+3+2+1=10 ÷ 4 = 2.5). This implies that any score below the critical point of 2.5 is considered low availability (i.e., rarely or not available).

The result shown in Table 4.6 revealed that the Internet is the e-resources with the highest mean score of 3.38 (standard deviation = 0.772). In terms of response format, 135(48.7%) of the respondents claimed that the Internet was readily available to them, 70(25.3%) claimed that the Internet was available, 57(20.6%) claimed that the Internet was rarely available to them while only 15(5.4%) of the respondents claimed that there was no Internet available to them. This implies that the Internet was moderately available for engineering undergraduates in universities in Osun State. Similarly, e-journals had a mean score of 3.33 to rank second in terms of the availability of e-resources. Specifically, 104(37.5%) of the respondents stated that e-journals were readily available, 112(40.4%) claimed that e-journals were available to them while only 21(7.6%) of the respondents claimed that e-journals were not available. In addition, 105(37.9%) of the respondents indicated that e-books were readily available, 96(34.7%) claimed that e-books were available, and 46(16.6%) pointed out that e-books were rarely available while 3(10.8%) claimed that e-books were not available. It could be noted that the e-books had the third highest mean score of 3.22 (standard deviation = 0.688). This means that e-books were available for engineering undergraduates in universities in Osun State, Nigeria.

However, e-group discussion (mean=2.17), e-research reports (2.24), and indexing and abstracting database (2.35) were the three e-resources that were rarely available to the engineering undergraduates in universities in Osun State as they scored below the critical mean score of 2.5. Other e-resources such as web 2.0, library websites, Ebscohost among others occupied the median position in terms of availability. Finally, the overall arithmetic mean was 50.47 with a weighted mean of 2.80. According to the decision rule, it is therefore concluded that e-resources were moderately available for undergraduate students in Universities in Osun State but Internet, e-journals and e-books were the types mostly available while e-group discussion, e-research reports, indexing, and abstracting databases were rarely available.

Table.7: Purposes of use of e-resources by engineering undergraduates

KEY: Very True (VT) =4, True (T) =3, Sometimes True (ST) =2, and Not True (NT) =1

S/N	Purposes of use: I use electronic resources for:	VT		T		ST		NT
		N	%	N	%	N	%	N
i.	sharing of information and knowledge with colleagues	95	34.3	112	40.4	55	19.9	15
ii.	Materials gathering for examinations	137	49.5	85	30.7	30	10.8	25
iii.	design and construction of equipment	56	20.2	166	59.9	15	5.4	40
iv.	Personal development	162	58.5	55	19.9	40	14.4	20
v.	Gathering materials for assignment and classwork	135	48.7	80	28.9	30	10.8	32
vi.	Updating knowledge in my field	117	42.2	105	37.9	45	16.2	10
vii.	Group discussion	66	23.8	101	36.5	59	21.3	51
viii.	Project writing	132	47.7	80	28.9	41	14.8	24
ix.	Getting materials for field work	86	31.0	122	44.0	50	18.1	19
x.	Form academic study group	101	36.5	131	47.3	25	9.0	20
xi.	Entertainment and for escapism	71	25.6	116	41.9	65	23.5	25
xii.	Preparing ahead of my lecturers' notes	112	40.4	81	29.2	65	23.5	19
xiii.	Trending issues in engineering forum	152	54.9	85	30.7	15	5.4	25
xiv.	Personal purposes	105	37.9	87	31.4	70	25.3	15
xv.	Overall, electronic resources are very much essential for my training	85	30.7	111	40.1	56	20.2	25

as engineering student

Weighted mean=2.86; Arithmetic Mean =42.94; Standard deviation = 17.767

The result in Table 4.7 revealed that engineering undergraduates used e-resources for personal development with a mean score of 3.64. In terms of frequency counts, 162 (58.5%) stated that it was very true that they used e-resources for personal development, 55(19.9%) stated that this was true while only 20(7.2%) did not seem to use e-resources for personal development. Another prominent purpose for which the respondents claimed they used e-resources was to gather materials for examinations. This was apparent as "materials gathering for examinations" had the second-highest mean score of 3.59 (Standard deviation = 1.336). Specifically, 137(49.5%) of the respondents stated that it was very true that they used e-resources for materials gathering for examinations, 85(30.7%) stated that this was true while only 25(9.0%) did not seem to use e-resources for Materials gathering for examinations.

Also, the majority of the engineering undergraduates in universities in Osun State used e-resources for trending issues in engineering forums (mean =3.51, St.D=1.166). In terms of frequency count, 152(54.9%) of the respondents claimed that the statement "I use trending issues in engineering forum" was very true, 85(30.7%) True, 15(5.4%) sometimes True and only 25(9.0%) claimed that the statement was not true. This implies that the three most prominent purposes for which engineering undergraduates in universities in Osun State, Nigeria used e-resources were for personal development, gathering materials for examinations, and trending issues in engineering forums.

Research Question 3: What is the frequency of use of e-resources among engineering undergraduates in universities in Osun State, Nigeria?

Table 8: Frequency of use of electronic resources by engineering undergraduates
KEY: D=Daily W =weekly, M= Monthly, O =occasionally, and N=Never

S/N	Electronic Resources Items: I use:	D-5 N	D-5 %	W-4 N	W-4 %	M-3 N	M-3 %	O-2 N	O-2 %	N-1 N	N-1 %	$\bar{x}$	St.D
i.	CD ROM Database	15	5.4	30	10.8	61	22.0	121	43.7	50	18.1	2.60	1.019
ii.	Internet	207	74.7	25	9.0	30	10.8	15	5.4		0.0	3.47	0.940

												Mean	SD
iii.	e – Journal	86	31.0	26	9.4	65	23.5	70	25.3	30	10.8	3.00	0.821
iv.	e-newspapers	72	26.0	50	18.1	45	16.2	95	34.3	15	5.4	2.91	0.880
v.	Online Public Access Catalogue (OPAC)	30	10.8	40	14.4	40	14.4	152	54.9	15	5.4	2.31	0.709
vi.	e-bibliographic database	46	16.6	55	19.9	43	15.5	91	32.9	42	15.2	2.33	0.857
vii.	e-magazine	52	18.8	59	21.3	74	26.7	51	18.4	41	14.8	2.65	0.915
viii.	e-books	75	27.1	86	31.0	46	16.6	53	19.1	17	6.1	3.31	0.991
ix.	Science Direct Online	46	16.6	25	9.0	55	19.9	121	43.7	30	10.8	2.67	0.915
x.	Ebscohost	31	11.2	30	10.8	65	23.5	66	23.8	85	30.7	2.51	1.109
xi.	e-Thesis/Dissertation	71	25.6	40	14.4	21	7.6	90	32.5	55	19.9	2.73	1.088
xii.	Statistic & Database	41	14.8	52	18.8	33	11.9	96	34.7	55	19.9	2.49	0.901
xiii.	Indexing & Abstracting Database	31	11.2	56	20.2	65	23.5	60	21.7	65	23.5	2.22	0.806
xiv.	Library website	55	19.9	71	25.6	66	23.8	79	28.5	6	2.2	3.12	1.019
xv.	e-research Report	31	11.2	76	27.4	55	19.9	85	30.7	30	10.8	2.65	0.940
xvi.	Multimedia resources	61	22.0	40	14.4	46	16.6	99	35.7	31	11.2	3.01	0.821
xvii.	e-group discussion	55	19.9	88	31.8	81	29.2	38	13.7	15	5.4	2.91	0.880
xviii.	Web 2.0	112	40.4	65	23.5	55	19.9	34	12.3	11	4.0	3.37	0.709

Decision Rule: Mean score of 1-1.67 = Low, 1.68-3.33 = Moderate; 3.34 – 5.00 = High

An observation of the result in Table 4.8 revealed that the Internet was the most frequently used e-resources by engineering undergraduates as indicated by 207(74.7%) of the respondents who claimed they used Internet facilities daily, 25(9.0%) claimed they used Internet weekly, 30(10.8%) used it monthly and 15(5.4%) of the respondents claimed they used the Internet occasionally. In terms of mean score, the Internet had the highest mean score of 3.47 (SD = 0.940). This implies that most engineering undergraduates used the Internet very frequently. The second most frequently used e-resources by engineering undergraduates was Web 2.0 (Mean=3.37, SD=0.709). Particularly, 112(40.4%) of the respondents claimed they used the Web 2.0 tools daily, 65(23.5%) claimed they used Web 2.0 weekly, 55(19.9%) used it monthly and 34(12.3%) of the respondents claimed they used Web 2.0 occasionally while only 11(4.0%) claimed they never used Web 2.0. This means that the frequency of use of Web 2.0 by engineering undergraduates was high.

Another type of e-resources frequently used by engineering undergraduates was e-books with a mean score of 3.31 (SD= 0.991). This was affirmed through the response format where 75(27.1%) of the respondents claimed they used the e-books daily, 86(31.0%) claimed they used e-books weekly, 46(16.6%) used it monthly and 53(19.1%) of the respondents claimed they used e-books occasionally while the remaining 17(6.1%) claimed they never used e-books. It could be concluded that the three most frequently used e-resources by engineering undergraduates in universities in Osun State, Nigeria were the Internet, Web 2.0, and electronic books.

Research Question 4: What is the level of information literacy by engineering undergraduates in universities in Osun State, Nigeria?

Table 4.9: Level of information literacy of engineering undergraduates

Items	VHA		HA		MA		NA		$\bar{x}$	St.D
Identification of information	N	%	N	%	N	%	N	%		
Ability to understand the need to use information resources to undertake research	166	59.9	66	23.8	15	5.4	30	10.8	3.45	1.403
Ability to recognise the need for information and data to achieve a	101	36.5	123	44.4	29	10.5	24	8.7	3.35	1.114

specific end.

	N	%	N	%	N	%	N	%		
Ability to define my specific information resource needs.	81	29.2	144	52.0	33	11.9	19	6.9	2.97	1.211
Ability to define concepts of a topic for research presentation	117	42.2	80	28.9	40	14.4	40	14.4	3.25	1.403
Ability to recognise appropriate reference sources	87	31.4	120	43.3	45	16.2	25	9.0	3.15	1.124
Ability to redefine/modify the information sought on basis of material found for a research activity.	71	25.6	110	39.7	65	23.5	31	11.2	3.15	1.453

Weighted mean =3.22; Arithmetic mean = 19.32; Standard deviation =7.708

Information seeking strategy (Finding information)	N	%	N	%	N	%	N	%		
Ability to use search tools/ search engine	90	32.5	141	50.9	25	9.0	21	7.6	3.41	0.598
Ability to choose a wide range of web search engines and search gateways to find materials for research	70	25.3	125	45.1	40	14.4	42	15.2	2.54	0.972
My capacity to choose a full range of print and electronic search tools	99	35.7	120	43.3	30	10.8	28	10.1	2.87	0.598
Capacity to choose a range of electronic databases, and printed abstracts to undertake research.	87	31.4	130	46.9	36	13.0	24	8.7	2.74	0.931
Ability to articulate information need to match against information resources.	70	25.3	131	47.3	30	10.8	46	16.6	2.97	0.894
Decision on where and how to find the information needed	101	36.5	123	44.4	30	10.8	23	8.3	3.17	0.786
Skill to use the library catalogue to search for specific books.	71	25.6	88	31.8	45	16.2	73	26.4	2.39	0.892
Ability to navigate around the web using live links.	87	31.4	135	48.7	41	14.8	14	5.1	3.14	0.973

	N	%	N	%	N	%	N	%		
Ability to use keywords to search for materials.	76	27.4	125	45.1	55	19.9	21	7.6	2.68	1.029
Ability to use the classification scheme system in the library to locate print material.	31	11.2	46	16.6	101	36.5	99	35.7	2.53	1.041

Weighted Mean = 2.84; Arithmetic mean = 28.44; Standard deviation =8.714

Evaluation of information	N	%	N	%	N	%	N	%		
Ability to select, retrieve and summarise information resources to suit my needs.	60	21.7	120	43.3	51	18.4	46	16.6	2.65	0.580
Ability to evaluate currency, bias, and authority of information resources.	70	25.3	131	47.3	27	9.7	49	17.7	2.96	0.482
The ability to evaluate the accuracy, relevance, and comprehensiveness of information resources is relatively low.	91	32.9	110	39.7	51	18.4	25	9.0	2.88	0.482
Ability to evaluate the nature of information available on the internet.	117	42.2	80	28.9	55	19.9	25	9.0	3.42	0.731
Ability to sift resources.	111	40.1	86	31.0	55	19.9	25	9.0	2.97	0.916
Ability to choose a range of materials on topics, taking into account currency, bias, authority, accuracy, relevance and comprehensiveness.	88	31.8	96	34.7	28	10.1	65	23.5	2.43	0.766

Weighted Mean = 2.89; Arithmetic mean = 17.31; Standard deviation =3.957

Applying the Information	N	%	N	%	N	%	N	%		
Ability to apply information resources to the problem at hand	91	32.9	128	46.2	35	12.6	23	8.3	3.35	0.695
Ability to use current awareness	117	42.2	67	24.2	51	18.4	42	15.2	3.30	0.668

method to keep up to date

	N	%	N	%	N	%	N	%	AM	St.D
Ability to communicate effectively using the appropriate medium	76	27.4	91	32.9	65	23.5	45	16.2	3.26	0.580
Ability to construct a personal bibliographic system	61	22.0	85	30.7	90	32.5	41	14.8	2.14	0.584
Ability to use bibliographic references in research reports	67	24.2	112	40.4	66	23.8	32	11.6	3.23	0.639

Weighted Mean = 3.06; Arithmetic mean = 15.28; Standard deviation =3.166

Acknowledging information source	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**		
Ability to create new knowledge in research.	86	31.0	126	45.5	48	17.3	17	6.1	3.12	0.708
Ability to synthesize newly gathered information with previous information.	45	16.2	132	47.7	55	19.9	45	16.2	2.98	0.685
Ability to acknowledge sources of information used	76	27.4	111	40.1	65	23.5	25	9.0	2.39	0.500
Ability to select appropriate publications and dissemination in which to publish.	56	20.2	131	47.3	40	14.4	50	18.1	2.30	0.728
Ability to acknowledge all sources cited in my research	41	14.8	141	50.9	45	16.2	50	18.1	2.48	0.842
Ability to understand citations methods	81	29.2	106	38.3	65	23.5	25	9.0	2.46	0.936

Weighted Mean = 2.62; Arithmetic mean = 15.73; Standard deviation =0.733

Weighted mean =2.91; Arithmetic mean = 96.08; Standard deviation =27.94

Key: Very Highly Acquired (VHA) – 4, Highly Acquired (HA) – 3, Moderately Acquired (MA) – 2 and Not Acquired (NA) – 1, AM = Arithmetic Mean, St. D = Standard Deviation.
Decision Rule: Mean score of 1-1.49 = VL (Very Low), 1.5-2.49 = L (Low), 2.5-3.49 = H (High), while 3.5-4 = VH (Very High) the criteria mean =2.50 that is 4+3+2+1=10 ÷ 4 = 2.5.

Table 9 presented results on the level of information literacy by engineering undergraduates in universities in Osun State, Nigeria. Information literacy was considered under

five indicators of identification of information, information seeking strategy, evaluation of information, applying the information and acknowledging information. On Identification of information, the majority of the respondents affirmed a high level of skills in the ability to understand the need to use information resources to undertake research (Very Highly Acquired: 166, 59.9%, Highly Acquired: 66, 23.8%, Mean=3.45); ability to recognise the need for information and data to achieve a specific end (Very Highly Acquired: 101, 36.5%; Highly Acquired: 123, 44.4%; mean=3.35) and ability to define specific information resources needs (Very Highly Acquired: 117, 42.2%; Highly Acquired: 80, 28.9%, mean = 3.25). The implication to be drawn from the result on the identification of information is that there was a high level of information literacy among engineering undergraduates in basic information literacy.

Further, the result on information seeking strategy revealed that the majority of respondents affirmed a high level of skills in information seeking strategy with a weighted mean of 2.84. Specifically, the ability to use search tools ranked highest with a mean score of 3.41(Very Highly Acquired: 90, 32.5, Highly Acquired: 141, 50.9%); decision on where and how to find the information needed had a mean score of 3.17 (Very Highly Acquired: 101, 36.5; Highly Acquired: 123, 44.4%) to rank second; and ability to navigate around the web using live links with a mean score of 3.14 (Very Highly Acquired: 87, 31.4%; Highly Acquired 135, 48.7%) was rated third. Hence, it could be stated that the level of information-seeking strategy of engineering undergraduates in universities under this study was high.

Another construct of information literacy examined was the evaluation of information which had a weighted mean score of 2.89. The response format indicated that the ability to evaluate the nature of information available on the Internet had a mean score of 3.42 (Very Highly Acquired: 117, 42.2%; Highly Acquired 80, 28.9%), ability to sieve resources had a mean score of 2.97 (Very High: 111, 40.1%; High 86, 31.0%) and ability to evaluate the currency, bias, and authority of information reso0urces had a mean score of 2.96 (Very High: 70, 25.3%; High 131, 47.3%). This result pointed to the fact that the level of skills in evaluation of information by engineering undergraduates in universities in Osun State was high.

Discussion of Findings

Research question one sought to find out the types of e-resources available to engineering undergraduates in universities in Osun State, Nigeria. Finding on availability of e-resources for use of engineering undergraduates revealed that e-resources were found to be moderately available for engineering undergraduate students in universities in Osun State but Internet, e-journals and e-books were the types mostly available while e-group discussion, e-research reports, and indexing and abstracting database were rarely available. The finding lends credence to Kenchakkanavar (2014), Bajpai et al. (2016), and Owolabi et al. (2016) that e-resources offer today's students new opportunities not available to previous generations. E-resources are invaluable research tools that complement the print-based resources in a traditional library. This finding is in agreement with Adeleke and Nwalo (2017) that e-resources have brought about a dramatic change in learning, teaching, and research in higher learning institutions.

The study also corroborates Mardhusudhan, (2010), Mwantimwa et al. (2017), and Ternenge and Kashimana (2019) that e-resources are now used to supplement print information sources in the university libraries.

Research question two sought to find out the purposes of the use of e-resources by engineering undergraduates in universities in Osun State, Nigeria. The finding of the study revealed that engineering undergraduates in universities in Osun State made use of e-resources mainly for personal development, gathering materials for examinations, and trending issues in engineering forums while there were several other purposes for which they did not useuse e-resources significantly. This study supports Ekenna and Mabawonku (2013), Kenchakkanavar (2014), Habiba and Chowdhuy (2012) and Edem and Egbe (2016) in that e-resources help undergraduates get the information required free of cost and bridge the digital divide. This finding disagrees with the outcome of the findings of Hussain and Abalkhail (2013), Abiolu (2019), and Jegan and Jayapraka (2019) that the majority of users of the library used the circulation service. The study found that a majority of research scholars consulted the reference books for research work followed by undergraduate students who used the library circulation service.

Research questions three sought to find out the frequency of use of e-resources among engineering undergraduates in universities in Osun State, Nigeria. Another finding on the use of e-resources revealed that the frequency of use of e-resources by engineering undergraduates in

universities in Osun State, Nigeria was moderate with the Internet, e-books, and Web 2.0 is the most frequently used. In other words, the majority of engineering students made use of e-resources for their academic activities on a moderate scale. This finding is in sharp contrast with previous studies by Mani et al. (2019) and Ebijuwa and Mabawonku (2019), in which age influenced the use of electronic library resources by undergraduates in federal universities in South-western, Nigeria while gender and academic discipline did not. The study of Velmurugan and Ramasamy (2014) showed that library users indicated that search engine was frequently used; it can be observed that the majority used 'Google search engine followed by 'yahoo' search engine.

Research question four sought to find out the level of information literacy by engineering undergraduates in universities in Osun State, Nigeria. The present study found that there was a high level of information literacy among engineering undergraduates in universities in Osun State with a high level of skills in identification of information, information seeking strategy, evaluation of information, and applying the information but a low level of skills in acknowledging information sources. Spiranec and Zorica (2010) maintained that information literacy, in its central features, has always been influenced and determined by the current information environment. Badke (2011) also stated that information literacy may be a buzzword on some university campuses.

Conclusion

As revealed in this study, e-resources were found to be moderately available for engineering undergraduates in the universities in Osun State, but Internet, e-journals, and e-books were the types mostly available while e-group discussion, e-research reports, and indexing and abstracting database were rarely available. It was also noted that engineering undergraduates in universities in Osun State made use of e-resources mainly for personal development, gathering materials for examinations, and trending issues in engineering forums while there were several other purposes for which they did not use e-resources significantly. To this end, the frequency of use of e-resources by engineering undergraduates in universities in Osun State, was moderate with the Internet, e-books, and Web 2.0 beingthe most frequently used. In other words, the majority of engineering students made use of e-resources for their academic activities on a moderate scale.

Finally, it was found that the three most significant challenges confronting the use of e-resources by engineering undergraduates were non-availability of relevant electronic information resources, non-reliability of online information and staff unwillingness to assist students in the use of e-resources respectively.

Recommendations

Based on the findings of this study, the following few recommendations were made:

1. Information literacy should be incorporated into the general studies programme on library use which should be made compulsory for all undergraduates in their first year in the University. This should be particularly done in the area of electronic information source utilization.
2. E-resources vendors should be encouraged to provide content relating to engineering information resources in their various fields and easy to operate with minimum information literacy.
3. Information literacy of engineering undergraduates can be improved upon by organising regular and periodic orientation for students and not only the fresh undergraduates.
4. Furthermore, library education and workshops should be organised for existing library users more importantly for engineering students.

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