DIGITAL LITERACY AND RESEARCH COMPETENCE OF STUDENTS IN THE FEDERAL POLYTECHNIC, ILARO

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Abstract

The purpose of this study was to determine the impact of digital literacy on research competence of students in The Federal Polytechnic, Ilaro, Ogun State. The study employed the survey approach involving the use of questionnaire and the population comprised all students of The Federal Polytechnic, Ilaro at the time of this study. Multi-stage sampling technique was used to select 250 Higher National Diploma students as the sample. A structured questionnaire designed on a 4-point likert rating scale was used as the instrument of data collection. Data collected were presented in tables and analyzed with frequency count and linear regression. The results indicate that digital literacy has significant impact on research competency of students of Federal Polytechnic, Ilaro in terms of information search, data analysis and documentation skills. Hence, it was concluded that digital literacy is essential to the pursuit of any meaningful research exercise by the students. It was recommended, among others, that efforts should be made by management, academic planners and lecturers in the Federal Polytechnic, Ilaro towards equipping the students with necessary and up-to-date skills in the use of digital tools especially for the purpose of research.

***Keywords**: Data analysis, Digital literacy, Information search, Research competence, Research documentation*

Background to the Study

The objectives of tertiary education all over the world is not only to equip students with the ability to read and write but also to cover competencies and abilities in other areas that could guarantee functional capabilities and productivity of the students. Education at this level goes beyond the ability to read, write and comprehend text, it encompasses the ability to master and solve problems using appropriate approach.

The core activities common to all forms tertiary institution are teaching learning and research. Both trainers and learners in this type of education are constantly engaged in these three activities that are central to the mandate of tertiary institutions. Research work is an integral part of the mandates of higher educational institutions and a fundamental requirement for the award of degrees and diplomas. Undergraduates are therefore expected to have and manifest knowledge of concepts, tools and design of research, the procedure for conducting research and experimental works, familiar with scientific and technical literature on research subjects.

According to Delumn (2016), research is a fundamental human need to the knowledge of the world. It is an active process of systematic and deliberate knowledge of objective reality that uses scientific methods and means, and which ends with the formation of knowledge about the object. Research in academic life is designed to add to an organized body of scientific knowledge and does not necessarily produce results of immediate practical value but is primarily concerned with the formulation of a theory or a contribution to the existing body of knowledge. The major aim of research is to obtain and use the empirical data to formulate, expand or evaluate theory or the discovery of knowledge solely for the sake of knowledge. In carrying out research, lecturers and students employs carefully planned methods and approaches and deploy necessary resources including expertise and competence not only to complete the research but to fulfil the requirement for the award of diplomas or degrees (Alexander, 2015),

Research competence refers to the integrative, dynamic property of a person, expressed in the unity of psychological, scientific-pedagogical and practical readiness for diagnostic-analytical and design activities, the implementation of research activities and the introduction of research results in their practical work (Belyanina, 2018). The term denotes "quality of personality, totality of knowledge, valued orientations, necessities and experience of research activity showing up in readiness and ability to execute the functions of her subject" (Belianina & Ushakova, 2018). According to Alexander (2015), research competence is a complex, stable, multi-formation skill in the psyche of an individual, which is acquired during a specially crafted learning process, to allow for objective reality through scientific methods, procedures and tools. It is a multifaceted skill hosting complex phenomenon which

includes individually-oriented and practical activity, requiring the ability of a person on a specific activity at a high level. Olawale (2016) sees research competence as the facility or potential of individuals, organizations, and systems to undertake and disseminate effectively and efficiently high quality research. It includes institutional consideration that covers the incentives, the economic, political and regulatory context as well as individual capacity to pursue a research undertaking using appropriate approach, tools, data and technologies.

The need for students in higher education who are ready for active participation in innovative educational processes, the development of new ideas, and the solution to research problems, shows the significance of literacy in the use of digital tools and applications for research purposes (Udokwo, 2016) as most of the stages of research essentially require the application and extensive use of digital technologies and the competence of the researcher in using such technologies (Argentin, et. al., 2014).

Cornell (2019) submits that digital literacy is an individual's ability to find, evaluate, utilize, share and create content using information technologies and the internet. According to European Commission (2015), digital literacy or competence involves the confident and critical use of information technology for work, leisure and communication and it underpins the basic skills in information and communication technology to search, retrieve, assess, store, produce, present and exchange information, to communicate and participate in collaborative networks via the internet and other IT applications. Digital literacy encompasses a wide range of skills, all of which are necessary to succeed in an increasingly digital world. The ability to conduct basic information search and data collection activities is part of being digitally literate (Ngozi, 2012).

Research competencies are viewed from different perspectives (Castillo-Martínez & Ramírez-Montoya, 2021). Mogonea and Remus (2019) see research competence in terms of the ability for the acquisition of new knowledge, the identification of educational problems, synthesis and argumentation, metacognition, knowledge of new research methods, the possibility of developing research tools and the interpretation and dissemination of results. Gess et al. (2017) consider the skillfulness in finding and defining a research problem, planning a research project and analyzing and interpreting data as required competencies for research engagement while Castillo-Martínez and Ramírez-Montoya (2021) posit that research competence covers the aspects of methodological domain, information gathering, literature search and the management of document-writing norms and use of technological tools. In this regard, a range of digital skills and tools can be deployed for conducting and sharing research findings (Institute for Academic Development, 2021).

In Nigeria polytechnics like other institutions of higher learning, research is one of the basic requirements expected of a student for the award of both National Diploma and Higher National Diploma. Hence, it is required that every student at the final stage of the completion of the programme should have the competence to carryout research. students at this level encounter a number problems in their research endeavour, one of which is the inability to effectively carry-out the research work as a result of lack of required competence for such exercise. In this regard, the teaching of research is aimed at enhancing the students' abilities for general, cultural and professional competencies, to promote the development of students' creativity, their research abilities, and the formation of functional research skills. However, students' manifest varying level of competence in their research endeavours and there have been series of challenges encountered by students in the conduct and completion of research exercises.

Over the last few decades, digital literacy and digital competence have been used more frequently and are increasingly discussed particularly in policy documents and policy-related discussions relevant to "what kind of skills and knowing people should have in a knowledge society, what to teach young people and how to do so (Ilomaki, Paavola & Lakkala, 2016; cited by Spante, 2018). Students' digital literacy therefore becomes important to promote learning and research in ways that facilitates timely sourcing, processing and analysis of data and information (Touron, et. al., 2018).

Current trend in information and knowledge management in tertiary education feature tremendous shift to the use of technology-enabled platforms for information search, processing, storage and transmission, as such institutions of higher learning are adopting digital tools and platform for information sharing and management of knowledge as seen in library operations of most tertiary institutions. Hence, a study on digital literacy and research competence of undergraduates becomes significant. In this study, the focus is on those competencies that allow for successful engagement of students in research. Hence, competence in information gathering, data analysis and interpretation and documentation are considered. The objectives were to determine the impact of digital literacy on literature and information search competences, data analysis/information processing and research documentation skills among the students of the Federal Polytechnic, Ilaro.

Methodology

The population of the study comprised all students of The Federal Polytechnic, Ilaro at the time of this study. For the purpose of this study, Multi-Stage Sampling Technique was used in selecting the sample. Purposive sampling was used to select students with knowledge of research work, that is students in Higher National Diploma classes. The researcher narrowed the population to select 50 HND II students from each of the schools/faculties in the Institution to make a total of 250 students. Simple Random Sampling Technique was however used in the selection of students from each school. The questionnaire used was designed with 4-point likert rating options. Input items for digital literacy were drawn from Digital Literacy Scale of Abas, et al., (2019) and Adenekan and Jimoh (2021) with options - Highly Skilled (HS); Skilled (S); Fairly Skilled (FS) and Not Skilled (NS). Items for research competence were built from IT skill-related areas that could enhance successful engagement of students in research and were presented on 4-point likert type options Highly competent (HC), Competent (C), Fairly Competent (FC) and Not Competent (NC)

In line with the objectives of this study, the following null hypotheses were raised:

$H_0$1: Digital literacy does not have any significant impact on literature and information search competences of students in The Federal Polytechnic, Ilaro, Ogun State.

$H_0$2: Digital literacy does not have any significant impact on data processing and analysis skills of students in The Federal Polytechnic, Ilaro, Ogun State.

$H_0$3: Digital literacy does not have any significant contribution to research report documentation skill among students in The Federal Polytechnic, Ilaro, Ogun State.

Results

In other to test the hypothesis, the use of regression analysis was employed in other to verify the relationship and impact of the independent variables on the dependent variables.

Hypothesis I

H_0: Digital Literacy does not have any significant impact on literature and information search competences of students in the Federal Polytechnic, Ilaro, Ogun State.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.730[a]	.533	.528	1.282

The result presented in table 1 indicates that there is a strong positive relationship between digital literacy and literature and information gathering skill with correlation coefficient of 0.730 and about 53.3% of the variation in literature and information search competences could be attributed to digital literacy.

Table 2: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	182.074	1	182.074	110.840	.000[b]
	Residual	407.464	248	1.643		
	Total	589.538	249			

Furthermore, the ANOVA table indicates F-statistics of 110.840 with p-value less than the 5% significance level, which is an indication that the model is sufficient and adequate in relating the dependent and the independent variable.

Table 3: Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	44.008	.806		54.603	.000
	Digital Literacy	.480	.192	.730	10.528	.000

The result in table 3 shows that every unit increase in digital literacy will result in about 48% increase in literature/information search competence of the students with t-value of 10.528 and the p-value less than the 5% significance level. Hence, we conclude by rejecting the null hypothesis and accepting the alternative hypothesis that digital literacy has significant impact on literature and information search competences of students in The Federal Polytechnic, Ilaro.

The result points to remarkable digital competence of the students and corresponding abilities to search for relevant scholarly material in their research efforts. The result specifically indicated that a good knowledge in ICT usage helps the students in identifying authentic sources of information and in downloading scholarly materials online. In addition, the students' ability to surf the internet and use web content aids in accessing and harnessing information from different sources. These findings corroborate Ngozi (2012) and Cornell (2019) that the access to online materials for research purpose is largely dependent on the researcher's ability to use digital tools and applications

Hypothesis II

H_0: Digital Literacy does not have any significant impact on data processing and analysis skills of students in The Federal Polytechnic, Ilaro, Ogun State.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.264[a]	.070	.060	1.810

The result as presented above in table 4 indicates that there is a weak positive relationship between digital literacy and literature search competence and about 6% variation in data processing and analysis could be attributed to digital literacy.

Table 5: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.747	1	23.747	7.251	.008[b]
	Residual	812.2	248	3.275		
	Total	835.947	249			

The result in table 5 is the ANOVA table with F-value of 7.251 and p-value less than the 5% threshold of significance, indicating that the test is significant; hence the model is adequate and sufficient in relating the variables.

Table 6: Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	44.863	2.799		16.030	.000
	Digital Literacy	.141	.052	.264	2.693	.008

From table 6, it is observed that every unit increase in digital literacy will result in about 14.1% increase data processing and analysis competence among the students. With t-value of 2.693 and p-value 0.008 which is less than the 0.05 significance level, the alternative hypothesis is accepted and we conclude that digital literacy has significant impact on data processing and analysis competence of students in The Federal Polytechnic, Ilaro, Ogun State. The result revealed a fairly high digital literacy in relation to data analysis in terms of coding, processing and arrangement of data as well as the use of descriptive and inferential statistical tool. This implies that the respondents' digital skills in these areas are relatively low to adequately utilize data analysis tools on digital devices.

Hypothesis III

H_0: Digital Literacy does not have any significant contribution to research report documentation skill among students in the Federal Polytechnic, Ilaro, Ogun State.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.628[a]	.394	.388	1.460

From table 7, there is a strong positive relationship between digital literacy and research documentation with correlation coefficient of 0.628 and about 39.4% variation in the research documentation could be attributed to digital literacy.

Table 8: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	134.607	1	134.607	63.136	.000[b]
	Residual	528.736	248	2.132		
	Total	663.343	249			

Further result as presented in table 8 indicates F-value of 63.136 with p-value less than the 5% significance level, showing that the model is adequate and sufficient for relating the dependent and the independent variables.

Table 13: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	41.919	1.325		31.631	.000
	Digital Literacy	.376	.299	.628	7.946	.000

The result as contained in table 13 shows that a unit improvement in digital literacy will result in about 37.6% increase in research report documentation expertise. The t-statistics is 7.946 with p-value 0.000 less than the 5% significance level. Hence the alternative hypothesis is accepted and it is concluded that digital literacy has significant contribution to research report documentation skill of students in the Federal Polytechnic, Ilaro, Ogun State. The result implies that digital literacy of the students is critical to facilitate their expertise in the documentation of their research report. The result indicates that the level of digital literacy of the students will determine their ability to arrange their research report appropriately, apply the approved referencing style and project writing format, among others.

Conclusion and Recommendations

Based on the findings, it is concluded that digital literacy has significant relationship and contributions to the research competence of students in the Federal Polytechnic, Ilaro. Digital literacy is critically important to the pursuit of any meaningful research endeavour in tertiary institutions. It can be concluded that digital literacy has significant contributions to information search, data analysis skill and research documentation skill of students in The Federal Polytechnic, Ilaro, Ogun State.

Based on the findings of this study, the followings recommendations are made:

- Efforts should be made by the management and academic planning organ of the Federal Polytechnic, Ilaro to further advance the digital literacy of the students.
- Research methodology curriculum should be redesigned to allow for extensive use of digital tools for the purpose of exploring the possibilities offered by such tools.
- Use of digital applications for data processing and analysis should be given more attention by both teachers and students to adequately equip students with the necessary skill in these areas
- Students should make personal efforts to keep themselves abreast of importance digital offerings that could enhance their research activities and other learning goals.

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