

Human Capital Development and Data Literacy Skills of Cloud Computing Services by Administrators of ICT Polytechnics in Ogun State, Nigeria

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Abstract: *Cloud computing service provides easier and quicker information retrieval and discovery, allow students to store and share documents, offer a more flexible environment by enabling ubiquitous access to materials, and facilitate interaction among students and instructors. However, it is worthy of note that administrators of ICT Polytechnics in Ogun State, Nigeria have been battling with problems of poor technological advancement and implementation due to ineffective staff training and poor data literacy skills. This prompted this study to investigate Human Capital Development and Data Literacy Skills of the Quality of Cloud Computing Services among Administrators in ICT Polytechnics in Ogun State, Nigeria. The descriptive and cross-sectional survey design methods were adopted in this study. The population of the study was 186 administrators of ICT Polytechnics in Ogun State, Nigeria. The study adopted a structured questionnaire. Validity of the instrument was carried out by supervisor and other professionals in the field. The reliability test of the questionnaire was 0.904 Cronbach Alpha coefficient. A total of 186 copies of questionnaires were administered and 126 was recovered which represent 67.7% response rate. Descriptive and inferential statistics was used in data analysis. Findings revealed that the human capital development and data literacy skills have positive and significant influence on the quality of cloud computing services of administrators in ICT Polytechnics, Ogun State, Nigeria ($Adj. R^2 = 0.560$, $F(2, 123) = 80.694$, $p < 0.05$). This study concluded that human capital development and data literacy skills influence the quality of cloud computing services among administrators of ICT Polytechnics in Ogun State, Nigeria. Administrators in ICT Polytechnics should continually improve on the quality of cloud computing services provided.*

Keywords: *Cloud Computing Service, Administrators, Human Capital Development, Data Literacy Skills.*

Introduction

Cloud computing in simple terms means storing and accessing data and programs over the Internet instead of our computer's hard drive. In a computer network the internet is typically represented as a cloud. Cloud Service Providers (CSPs) (e.g., Google, Microsoft, Amazon) are vendors who provide to their customers the facilities of cloud computing resources and services that are dynamically utilized based on customer's demand according to a certain business model (Ali, 2021). Quality services in different areas such as business, education and governance are provided to the customers online and are accessed via internet using a web browser, while data and software programs are stored on the cloud servers located in the data centres. Cloud computing has made a major breakthrough in the IT sector depending on its quality. With its emergence it has truly revolutionized the IT sector. It has played an important role in catering for the increasing demands for storage and infrastructure (Ali, 2020). The exceptional capability of cloud is its ability to provide resources like hardware and software over a network. Cloud computing service is related to requirements for installation and use of cloud computing applications by administrators (AlKhunzain, 2021). Therefore, there is no requirements, no quality. There are many factors that will affect the quality of a system or application such as reliability, tangibility, responsiveness, assurance and empathy of the quality of cloud computing practices in ICT polytechnics in Ogun State (Enayati, 2013). Reliability of cloud computing practices is the ability to be relied on or depended on as for the quality of cloud computing application accuracy, honesty or achievement. Tangibility is the appearance of physical facilities, equipment, personnel and communication materials that improve the cloud computing practices. Responsiveness is the willingness to use cloud computing services by administrators of ICT polytechnics in Ogun State to use the available equipment to perform their duty exceptionally. Assurance is the knowledge and courtesy of administrators and their ability to convey trust and confidence in their service delivery. And empathy is the care and individualized attention administrators provide to the academic community with the use of cloud computing applications. Administrators' services in ICT polytechnics in Ogun State are not quality enough due to the inefficient use of cloud computing application available in the school. Thereby, these services can be acquired through proper

development of human capital; development of administrators has become the Holy Grail to some organizations. The efficiency with which organizations manage, develop, motivate, involve and engage the willing contribution of those who work in them is a key determinant of how well these organizations perform. The significance of developing administrators in the application of cloud computing technology for information management has become more obvious given the growing complexity of the work environment, the rapid change in organizations and technological advancement which further necessitates the need for training and development of employees to meet the challenges.

Data literacy skill is the ability to read, understand, create and communicate data as information; it focuses on the competences involved in working with data. Data literacy is the ability to understand and use data to inform decisions and is an interdisciplinary field lying at the intersection of data science, quantitative reasoning, and authentic context (Mandinach, 2006). In addition to specific abilities, data literacy is characterized by habits of mind such as curiosity, resiliency, and ethical decision making. Data literacy is becoming more common place in formal and informal and is addressed in various efforts to reform undergraduate science education. The capacity to critically gather, handle, assess, and use data is known as data literacy. Administrators are involved in maintaining databases relating to students and their academic progress. When administrators manage students' data and information appropriately through the application of cloud computing technology with quality services, it makes information and data access an easy one. However, preliminary investigation and close observation have revealed a decline in the quality of cloud computing technology in ICT Polytechnics in Ogun State. As a result, information and data management has been poor which has call for acquisition of data literacy skills on the path of the school administrators. The purpose of cloud computing technology is to manage students and staff information effectively but due to inability of the administrators to be able to use it, there is decline in information access and use and it will eventually lead to poor development on the nation's economy and infrastructural development because poor access to information is detrimental to student and institution's progress. Administrators of ICT Polytechnics in Ogun State, Nigeria were perceived not to be able to make use of cloud computing technology in managing information and data mostly due to the fact that there is no provision for regular training in this sector which has reduced the development of administrators. This study tends to investigate the influence of human capital development and data literacy skills of quality of cloud computing services among administrators of ICT Polytechnics in Ogun State, Nigeria. The hypotheses tested in this study (as illustrated in Figure 1) is H_01 which is the significant influence of human capital development and data literacy skills on quality of cloud computing service provided by administrators in ICT Polytechnic, Ogun State.

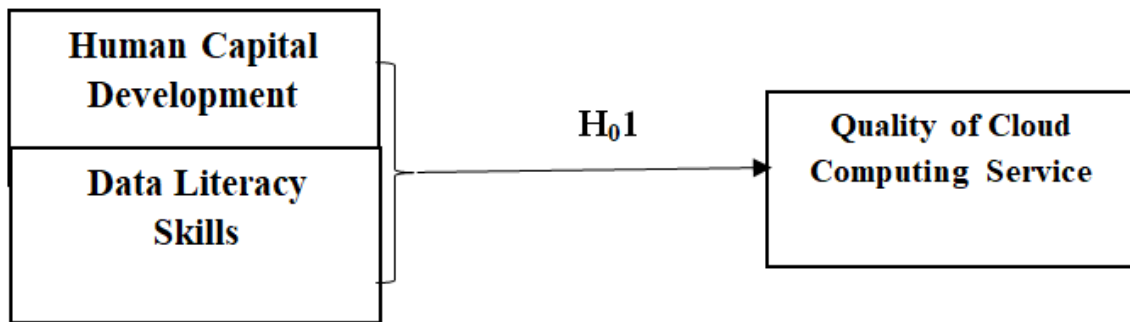


Figure 1; Conceptual Model Framework Illustrating the Influence of human capital development and data literacy skills on quality of cloud computing service provided by administrators in ICT Polytechnics, Ogun State. (Researcher's Conceptual Framework, 2023)

The study focused on the influence of human capital development and data literacy skills on cloud computing services among administrators in ICT Polytechnics across Ogun State, Nigeria. The measures of cloud computing services are reliability, tangibility, responsiveness, assurance and empathy of the services. The measures of human capital development are personal talent of administrators, behaviour of administrators, effort of administrators and time used by administrators on computing services while the measures of data literacy skills are data application, data collection, data evaluation, data management and conceptual framework of data. The geographical scope covers Gateway (ICT) Polytechnic, Saapade, Abraham Adesanya (ICT) Polytechnic, Ijebu – Igbo, D.S. Adegbenro (ICT) Polytechnic, Itori and Gateway (ICT) Polytechnics, Igbesa. The respondents were office secretaries, faculty officers and other administrators in ICT Polytechnics across Ogun State, Nigeria. ICT Polytechnics across Ogun State were chosen as the study area because the targeted problem is observed among administrators in the institutions.

Background Study

According to (Pratoom, 2018), human capital development is a way to fulfill the potential of people by enlarging their capabilities and enabling them to participate actively in their own development. Yet, the availability of a competent and effective labour force does not just happen by chance but through an articulated recruitment exercise based on merit and technical competence. It is along this line of thought that a researcher uses the larger political economy to admonish that: Human Resources, not capital, not income or material resources constitute the ultimate basis for the wealth of nations.

Data Literacy Skills

Data is beginning to replace some of the functions that traditional media have provided in terms of connecting people and ideas (Baishya, 2019). This and other statements amply demonstrate the level of interest that data generates. It is obvious that data-intensive science is growing. Any information that can be saved digitally, such as text, numbers, photos, video or movies, audio, software, algorithms, equations, animations, models, simulations, etc., is referred to as data. Data might be experimental, computational, or observational because there are many different types of data. The results of any systematic investigation that includes a process of observation, experimentation, or the testing of a hypothesis are known as research data. Data also originates from literary and artistic creations, cultural heritage artifacts, and the big data phenomenon. Enormous data is influenced by the interaction of cultural, technological, and intellectual events. It is not just enormous data; it is also defined by the ability to explore, aggregate, and cross-reference large data sets.

Human Capital Development and Data Literacy Skills on Quality of Cloud Computing Service

Manzoor (2018) analyzed the impact of how individual users perceive cloud computing applications. The researchers presented a framework centered on the correlation between a number of factors (IT self-efficacy, perceived cloud ease of use, computer anxiety, and users' perception of the usefulness and effectiveness of cloud computing applications) that affect how students at a university in Southeast Michigan perceive cloud computing technology. The Technology Acceptance methodology (TAM) was also used to examine how students adopted cloud computing. Despite the TAM's continued importance in technology appraisal after its implementation, there are few explanatory factors and no useful values. The TAM was also utilized by a researcher to look into the causes and effects of higher education's embrace of cloud computing for knowledge management. A Turkish university's undergraduate students were given a questionnaire, which was then evaluated using structural equation modeling. The results demonstrated that educational institutions encourage the use of cloud computing through raising knowledge management awareness. Although this study was effective, one problem was its lack of explanatory power. Tinofirei (2018) suggested a hybrid computing model that enables Saudi Arabia's higher education institutions to share knowledge and carry out various research projects. The suggested model enhances the efficiency and caliber of instruction by offering assistance with regard to readings, tests, and projects. Additionally, it delivers a wealth of knowledge in one location and saves organizations money on updating with the newest IT. However, the scholar's suggested model did not take security concerns into account. According to a report, cloud computing continues to have a substantial impact on higher education in the contemporary world (Ali, 2021). Cloud computing services are being adopted by higher education due to financial benefits, increased productivity, better learning methodologies, and increased knowledge penetration. However, there is disagreement about a variety of topics, including ownership, integrity, and privacy of data. Additionally, there aren't enough modern security methods for institutions to utilize cloud computing.

Theoretical Framework

While conducting researches using ServQUAL in industries, the proponents of this model popularly referred to as PZB identified ten potentially overlapping dimensions or criteria that customers used while judging service quality. These original ten dimensions - tangibles, reliability, responsiveness, competence, courtesy, credibility, security, access, communication and understanding of customers were identified (Enayati, 2013). Responsiveness measures the "willingness of organization's staff to help customers and provide them with prompt services". This refers to the timeliness and promptness at which administrators attend to the students and staff of the institutions. Assurance measures knowledge, competences and courtesy of employees and their ability to convey trust and confidence in customers towards the service firm. In an administrative work and information science profession, this conveys approachability, ease of contact with providers and the readiness to give listening ears to query of user. Most of the findings on quality services revealed that reliability and responsiveness were valued above every other dimension, while other respondents showed preference for tangibility, assurance or empathy.

Methodology

This study adopted a cross sectional survey research design and the purpose of the design is to address the state of affairs as it exists. The cross sectional survey research design was used to describe events in relation to human capital development and data literacy skills on quality of cloud computing services among administrators of ICT polytechnics in Ogun State, Nigeria. The population of this study consists of all the 186 administrative Staff of ICT Polytechnics in Ogun State, Nigeria: These are Gateway (ICT) Polytechnic, Saapade, Abraham Adesanya (ICT) Polytechnics, Ijebu – Igbo, D.S. Adegbenro (ICT) Polytechnics, Itori and

Gateway (ICT) Polytechnics, Igbesa. The registry staff comprises administrative officers in the Registry Department of these tertiary institutions. To test the hypothesis formulated, the inferential statistics through multiple regression analyses was used. The data collected for the study were analyzed using Statistical Package for Social Sciences (SPSS), version 25. The hypothesis in the study was tested at level of 0.05 significance.

Results and Discussion

The null hypothesis which states that there will be no significant influence of human capital development and data literacy skills on quality of cloud computing service provided by administrators of ICT Polytechnics in Ogun State, Nigeria was tested using multiple regression analysis. In the analysis, the values for the quality of cloud computing service of administrative staff were regressed on the values of human capital development and data literacy skills. The data for human capital development and data literacy skills (independent variable) was generated by summing responses of all variable items respectively while that of quality of cloud computing service of administrative staff in ICT Polytechnics, Ogun State, Nigeria (dependent) was generated by adding responses of all items used to measure the variable. The regression test results are presented in Tables 1 (a to c).

Table 1: Model Summary of the Influence of Human Capital Development and Data Literacy Skills on Quality of Cloud Computing Services of Administrative Staff of ICT Polytechnics in Ogun State, Nigeria

a. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.753 ^a	.567	.560	.40427

a. Predictors: (Constant), Data literacy skills, Human capital development

b. ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	26.377	2	13.188	80.694	.000 ^a
	Residual	20.103	123	.163		
	Total	46.479	125			

a. Predictors: (Constant), Data literacy skills, Human capital development
b. Dependent Variable: Quality of cloud computing services

c. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.027	.253		.106	.916
	Human capital development	.412	.083	.332	4.936	.000
	Data literacy skills	.555	.070	.537	7.968	.000

a. Dependent Variable: Quality of cloud computing services (Field Survey, 2023)

The results of the null hypothesis are presented in Table 1. As shown in Table 1a, human capital development and data literacy skills have high and positive correlation (R = 0.753) with quality of cloud computing service provided by administrators of ICT Polytechnics in Ogun State, Nigeria. Also, human capital development and data literacy skills explain 56.0% (Adj. R² = 0.560) of the total variance in quality of cloud computing service provided by administrators in ICT Polytechnic, Ogun State, Nigeria. Factors not investigated in this study explained the other 44% variation in quality of cloud computing service provided by administrators in Ogun State ICT Polytechnics. In addition, Table 1b presents the overall significance of the model which indicate that human capital development and data literacy skills have significant influence on quality of cloud computing service provided by administrators of ICT Polytechnics in Ogun State, Nigeria (F(2, 123) = 80.694, p < 0.05). Also, Table 1c shows that for the



combined influence on the quality of cloud computing services provided, at 95% level of confidence, if all other factor are constant, a unit change in human capital development will lead to 0.412 increase in the quality of cloud computing service provided by administrators in ICT Polytechnics in Ogun State, Nigeria ($B = 0.412, p < 0.05$). Likewise, for the combined influence on the quality of cloud computing services provided, given that all other factors remain constant at 95% level of confidence, a unit change in data literacy skills will lead to 0.555 increase in the quality of cloud computing service provided by administrators in ICT Polytechnics in Ogun State, Nigeria ($B = 0.555, p < 0.05$). Therefore, on the strength of the results of the regression analysis, the null hypothesis three is reject which states that there is no combined significant influence of human capital development and data literacy skills on quality of cloud computing service provided by administrators in ICT Polytechnic, Ogun State, Nigeria. The results of the hypothesis suggest that human capital development and data literacy skills significantly influenced quality of cloud computing service provided by administrators in ICT Polytechnics, Ogun State, Nigeria. The connection between human capital development, data literacy skills and quality of cloud computing service had been made earlier in the empirical study carried out in investigating. Human development of administrators in ICT polytechnics will help to ensure that organizational members possess the skills, knowledge and abilities to apply cloud computing technology in everyday activities of administrators so as to enhance their performance. Human capital development presupposes investments, activities and processes that produce cloud computing knowledge, skills, and abilities (David, 2004). Human capital developments is a process of increasing human skill, ability and knowledge in the use of cloud computing applications for increase in productivity and stimulate resourcefulness of trainees. Manzoor(2018) analyzed the impact of how individual users perceive cloud computing applications. The researchers presented a framework centered on the correlation between a number of factors (IT self-efficacy, perceived cloud ease of use, computer anxiety, and users' perception of the usefulness and effectiveness of cloud computing applications) that affect how students at a university in Southeast Michigan perceive cloud computing technology. The Technology Acceptance methodology (TAM) methodology was also used to examine how students adopted cloud computing. Despite the TAM's continued importance in technology appraisal after its implementation, there are few explanatory factors and no useful values. The TAM was also utilized by a researcher to look into the causes and effects of higher education's embrace of cloud computing for knowledge management.

Conclusion

The research concluded that human capital development and data literacy skills influence the quality of cloud computing service among administrative staff of ICT Polytechnics in Ogun State, Nigeria. Accordingly, data gathered from the administrative staff in the investigated institutions revealed that, there is need to enhance technology services which is critical because it is key to better administrative activities that would increase staff productivity to satisfy customers/clients, retains administrative and eventually attain overall academic success. Proper human capital development and exposure of data literacy skills also helps in proper administrative services which ease their jobs and enhance their performance. The study recommended that Administrators in ICT Polytechnic should continually improve on the quality of cloud computing services provided to ensure an all-round innovative service on administrative activities.

References

- Ali A. & Alourani A. 2021, An Investigation of Cloud Computing and ELearning for Educational Advancement. *IJCSNS*, 21(11), 216-222.
- Ali A. 2020, Cloud computing adoption at higher educational institutions in the KSA for Sustainable Development. *International Journal of Advanced Computer Science and Applications*, 11(3):413-419.
- Ali A., Manzoor D., & Alouraini A. 2021, The implementation of Government Cloud for the Services under E-Governance in the KSA. *Science International Journal*, 3(3): 249- 257.
- AlKhunzain A., & Khan R. 2021, The Use of M-Learning: A Perspective of Learners' Perceptions on M-Blackboard Learn.
- Baishya D., & Maheshwari S. 2019, WhatsApp Groups in Academic Context: Exploring the Academic Uses of WhatsApp Groups among the Students. *Contemporary Educational Technology*, 11(1), 2019, 55-70.
- David P., & Lopez J. 2004, Knowledge, capabilities and human capital formation in economic growth. Treasure Working Paper 01/13. In Nafukho FM, Hairston N, Brooks K. Human capital theory: *Implications for human resource development, Human Resource Development International*. 2001; 7(4): 545-551.
- Debrulle J., & Maes J. 2014, Start-up absorptive capacity: Does the owner's human and social capital matter. *International Small Business Journal*. 32(7): 777-801.
- Delaney J. T., & Huselid M. A. 1996, The impact on human resource management practices on perceptions of organizational performance, *Academy of Management Journal*, 2018; 39. 949-969.
- Enayati T. 2013, Measuring Service Quality of Islamic Azad University of Mazandara Using ServQUAL Model, *Iranian Journal of Management Studies (IJMS)* 6 (1), 101-118.
- Mandinach E.B., Honey M., & Light D. 2006, A theoretical framework for data-driven decision making. *In annual meeting of the American Educational Research Association (AERA), San Francisco, USA.*

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- Manzoor, Ali A., & Ahmad A. 2014, Cloud and Web Technologies: Technical Improvements and Their Implications on E-Governance. *International Journal of Advanced Computer Science and Applications*, 5(5): 196-201.
- Nafukho F. M., Hairston N., & Brooks K. 2004, Human capital theory: Implications for human resource development, *Human Resource Development International*; 7(4): 545-551.
- Pratoom K. 2018, Validating the Reputation Quotient Scale: Human Resource Management Perspective. *International Business Management*, 4(4), 243-249.
- Tinofirei C. 2018, The unique factors affecting employee performance in Non Profit Organizations. Unpublished Magister Technologiae dissertation, University of South Africa, Pretoria.
- TygelA., & Kirsch R. 2016, Contributions of Paulo Freire for a Critical Data Literacy: A Popular Education Approach. *The Journal of Community Informatics*, 12(3), 108- 121.
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