

**INFLUENCE OF DIGITAL LITERACY ON PERFORMANCE OF HEALTH  
PROJECTS IN KITALE LEVEL 4 DISTRICT HOSPITAL, TRANS NZOIA  
COUNTY, KENYA**

<sup>1\*</sup>Nakitare Mayende Louis, <sup>2</sup>Dr. Godfrey K. Makau, (Ph.D) and <sup>3</sup>Dr. Muchelule Yusuf, (Ph.D)

<sup>1</sup>Scholar, Jomo Kenyatta University of Agriculture and Technology

<sup>2,3</sup>Lecturer, Jomo Kenyatta University of Agriculture and Technology

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**Abstract**

The widespread adoption of Information and Communication Technologies (ICT) has had a profound impact on the way institutions operate. Healthcare institutions have implemented ICT services to enhance service delivery, improve accessibility to healthcare services for patients, and facilitate appropriate service delivery by stakeholders. This study aimed to analyse the influence of digital literacy on the performance of health projects at the Kitale level 4 District hospital in Trans-Nzoia County. The target population included doctors, nurses, pharmacists, health record workers and lab technicians, with a sample size of 96 respondents, which was 30% of the target population as selected using Mugenda (2008) formula. The research used a quantitative methodology, with primary data collected using structured online questionnaires and secondary data obtained from hospital records. Both descriptive and inferential statistics were used for data analysis, and data processing was conducted using version 28 of SPSS. Data was presented mainly in table format, although other statistical tools such as graphs may be used as necessary. The findings from analysis were that telemedicine ( $p < 0.05$ ) as well as ICT policy ( $p < 0.05$ ) are all found to have significant effect on performance of health care projects. The study concluded that digital literacy is a significant predictor of the performance of health projects. It was recommended that the senior management team at Kitale Level 4, District Hospital should invest more resources in telemedicine by having in place stronger network facilities to facilitate the follow of information. The management of Kitale Level 4, District Hospital to regularly review the existing ICT policy in line of the changes in the environment and surrounding. This will enhance health care service delivery and enable the hospital attain its established objectives and objectives.

**Keywords:** *Digital Literacy, Telemedicine, ICT Policy Performance, Health Projects*

**INTRODUCTION**

The transitions that developed communities in the past decades have been detailed in a couple ways, each deriving a certain perspective or prospects of the contemporary order. For some, the emergence of Information and Communication Technology (ICT) are portrayed as pivotal to the progression of asserting values to the society (Kitsuwan & Akaki, 2023). The phrase 'information society' has featured the academic and policy implications, and predominant media, as well as the internet is evident as key production and application of data. The subsequent asserted its emphasis on cultural transitions, arguing that individuals exist in the globe where general and actual reality is not of the essence. However, there is the presence of

many truths and a unit where there is the construction of individual meanings, history, and lifestyles (Okonkwo, 2021).

For a certain period now, the internet has been evident as crucial in patient/consumer empowerment globally. Health related and management sectors in the world now have burgeoned the internet, as they differ in purpose, quality, content, interactivity as well as scope for collaboration. A report by (UNICEF, 2018) indicates only half of the global population can access online services, the report further shows that most affected continents with highest offline population include Asia , a population with the highest number without access while Africa having 88% of the population without connectivity. The study also indicates that some of the main causes of the high number of offline users is poor coverage especially in rural areas, poor quality telecommunications and ICT infrastructure as well as low skill and training for users to navigate on technology and technological devices.

In Africa, Digital health (DH) is considered to be an umbrella term encompassing eHealth and mHealth, as well as emerging and developing computing areas such as artificial intelligence and the internet of things that support healthcare (Bervell & Al-Samarraie, 2019). Whereas technology has also been defined as any product that can be used to create, view, distribute, modify, store, retrieve, transmit and receive information electronically in a digital form. Digital Health Technologies (DHT) widely refer to eHealth technologies that present new or improved ways of delivering healthcare, conducting health promotion activities, and monitoring public health. The technologies are geared towards meeting the growing demand for healthcare services (Adetunji, Olaniyan, Adeyomoye, Dare, Adeniyi, Alex & Shariati, 2022).

The region also has the highest neonatal death rate in the world. However, in recent years, internet access has experienced a faster growth trajectory in Africa, while mobile phones have risen to become the commonest technological device in the history of the continent in a short time, and they are still growing. Moreover, mobile phones and internet have brought various innovations (Kouton, Bétila & Lawin, 2021). As a result of these, a variety of innovations that integrate mobile phones and the internet into healthcare have been developed at local, national, and regional levels in Africa. For example, in many parts of the continent, the use of mobile phones and ICT technologies to improve disease surveillance in public health has been reported, including Zambia, Madagascar, Uganda, and Kenya (Ibeneme, Karamagi, Muneene, Goswami, Chisaka & Okeibunor, 2022). Additionally, the researchers Kanjo, Hara and Kaasbøll (2019) found that use of electronic medical records (EMRs) eased patient record handling but demanded that health workers have IT skills. This calls for digital literacy since reports show poor IT skills and computer illiteracy amongst the many healthcare workers in Africa and especially in Malawi. Computer training will improve IT skills that would enhance EMR usage in health facilities and improve healthcare service provision.

Hagel, Paton, Mbevi and English (2020) reports on SDGs progress report that indicated a mixture of both manual and electronic collection of data through the KHIS. For the manual methods its mostly done in registering of data on paper while electronic methods involve capturing of primary data with electrical gadgets which is then conveyed to a digital platform called DHIS2. One of the key aspects of digital literacy is the ability of using information of digital platforms to make health related decisions. Chirchir, Aruasa and Chebon (2021) quoted the open-data decision making report which demonstrated that through proper interpretation of covid-19 data, the G.O.K was able to effectively budget and allocate funds prioritizing health. The main indicators include increased foreign financing by 1%, reduced domestic funding by 3% during the financial years 19/20 and 20/21 respectively, other indicators showed a reduced government recurrent, development and county allocations expenditure by almost 5% as well as increased health funds allocations by 20%. The statistics

inclinations are due to the fact that the government needed more budget to save lives and cushion its citizens from the pandemic impact.

However, limited statistics has been published on how digital literacy has influenced the performance of health projects in -Trans-Nzoia County Referral hospital. A report by Vihiga County on use of GIS in equitably mapping county resources to various wards, showing reduced fatalities of pregnant women by 95% within 6 months (Moturi, Suiyanka, Mumo, Snow, Okiro & Macharia, 2022). This project uses electronic communication to send messages to pregnant women to the nearest health facilities, which had already been mapped by GIS. In cases where services are not available, voluntary health workers were sent to offer services, this project is a good example of an E2E digital health literacy capacity development as well as telemedicine application. The Vihiga GIS project, through AMREF was extended to Trans-Nzoia County, however, there seem to be no up-to-date statistics on the outcomes of the project on digital media, this could be contributed by the fact that the county may be still uses manual data registries or its health information system is not yet matured.

However, a study by Rono, Bastawrous, Macleod, Mamboleo, Bunywera, Wanjala, Gichuhi and Burton (2021) found out that, by use of mobile wireless devices, 61% of patients with eye problem were able to access health services from primary service providers. This is a positive indicator because it helped decongest secondary health providers as well as patients could be attended to at the right time. The fact that appointments by patients are done using electronic is indicative of an improved digital literacy index, consequently decongesting secondary health services.

### **Statement of the Problem**

In contrast, there have been mixed results in previous studies of healthcare staff attitudes towards ICT. Previous studies have identified that nurses, physicians, social workers, dietitians, unit clerks and patient attendants hold positive attitudes towards ICT in healthcare progressions. In various studies, healthcare professionals stated that ICT assisted them to do their job, improve the safety and quality of patient care, avoid duplication, increase ease of access, and assist with quick decision-making and increase efficiency (Chen, *et al.*, 2020). However, Khan, Siddique and Lee (2020) noted that healthcare professionals in other studies have identified frustrations with utilization of ICT programs, with healthcare staff disagreeing that IS improve patient care and increase efficiency and healthcare staff citing ICT to be technically cumbersome and time-consuming.

Although studies around healthcare staff digital literacy levels and attitudes towards ICT have been conducted, there is lack of literature and statistical evidence of digital health programs within Trans-Nzoia county, however, a study on using m-health services as an intervention to quick access to primary eye health services in Kenya, conducted in Trans-Nzoia county found out that 61% of patients who sought for services from secondary health care could actually be treated at primary health care facilities (Rono *et al.*, 2021). From the study, mobile devices were used to monitor patients with eye problem. Using a special algorithm to suggest the correct health unit(s), there was a constant communication to patients reminding them to seek for services from these facilities and this was attributed to improved digital health access. This shows that, the levels of digital literacy are commendable considering that the target population consisted of elderly people. Thus, the primary aim of this study was to assess both the County Referral healthcare staff and patient's digital literacy levels and how it has impacted the performance of health projects.

### **Objectives of the Study**

The general objective was to investigate the influence of digital literacy on the performance of health projects in Kitale Level 4 District Hospital in Trans Nzoia County. The specific objectives were;

- i. To find out the influence of the use of telemedicine on the performance of health projects in Kitale Level 4, District Hospital in Trans Nzoia County.
- ii. To examine the influence of ICT policy on the performance of health projects in Kitale Level 4, District Hospital in Trans Nzoia County.

## LITERATURE REVIEW

### Theoretical Review

#### Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT suggests that the actual use of technology is determined by behavioural intention. The perceived likelihood of adopting the technology is dependent on the direct effect of four key constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions. The effect of predictors is moderated by age, gender, experience and voluntariness of use (Khechine, Lakhali & Ndjambou, 2016). The UTAUT is quite applicable in this study as it will aid in improving the efficacy of digitalization of health processes from record keeping, policy formulations, use of remote sensing as well as capacity development, currently, even the health data management has not been utilized fully, because it is not easy to access meaningful information on the county website on health projects, and this could be attributed to low digital literacy level that propels use of old methods of doing things.

#### Technology Acceptance Model (TAM)

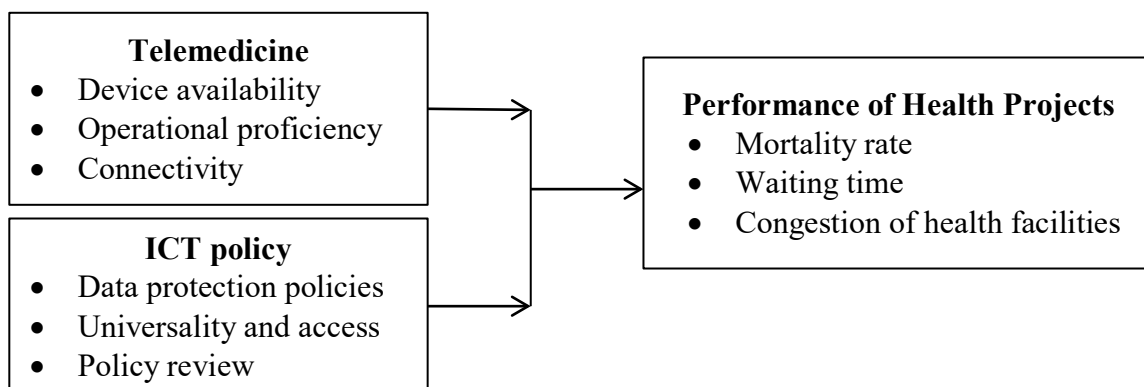
The acceptance and the use of information technologies can bring immediate and long-term benefits at organizational and individual levels, such as improved performance, financial and time efficiency and convenience (Haq & Ghouri, 2018). The potential of technology to deliver benefits has long motivated ICT management research to examine the willingness of individuals to accept innovative technology (Wienert & Zeeb, 2021). The research on the adoption of technology became of primary importance in the 1980s, which coincided with the growth of the use of personal computers. However, a major stumbling block at the development of the research on the adoption of personal computing was the lack of empirical insight into user(s) response(s) to the information system performance. Before the development of TAM, various technological and organizational perspectives had aimed to advance ICT-related research (Alam & Saputro, 2022).

#### Conceptual Framework

A conceptual framework is described as a hypothesized construct that speculates the model under study as well as the interrelation between subjects (Chaudhary, 2018). The independent variables are Telemedicine, and ICT policy, while the dependent variable is the performance of Health projects.

#### Independent Variables

#### Dependent Variable



**Figure 1: Conceptual Framework**

**Source: Researcher (2023)**

## **Empirical Review**

### **Telemedicine and Performance of Health projects**

Telemedicine is published by Stephenson (2020) as an observation element which enables a progressive ECG, RR, SpO2 speculation while the sick remains active with no constriction of being referred to a bedside cardiac monitor. The sick personnel calling for telemetry are kids diagnosed with certain or uncertain arrhythmia, kids exposed to arrhythmia, or those ascertained to be under the risk of immediate cardiac failure. However, it should be acknowledged that telemetry is not and will never be a replacement for examination and visualization of the sick.

The accuracy of this model depends on skin preparation, electrode and lead assertion, equipment management, monitoring of the ill personnel and carrying out various educational and trainings. Al-Thani (2022) argues that with proper education in place for the ill individuals and family, their safety is guaranteed and any sort of anxiety about monitoring is cut down completely. Nurses who cannot evaluate and tell whether there is an ECG abnormality are in no better position to assess and offer immediate profound action that will reduce on patient complications. Gajarawala and Pelkowski (2021) shares that the use of telemetry that has audio and video elements in its technology enables healthcare workers to provide basic care to patients and especially to those who are in rural and marginalized regions.

### **ICT policy and Performance of Health projects**

The lively health environment with increasing competition, limited resources, sociological, economic and political transitions, make institutions to revitalize and enhance their performance. Proper policies can spur economic performance which in turn will increase the performance of the health projects (Hinloopen, 2019). Currently, healthcare projects are really experiencing massive drawbacks such as shortage of medical human resources, rising costs both in primary care and hospitals, and vibrant policies controlling the uptake of services using ICT has been evident by (Othman *et al.*, 2023) to have the capabilities of either increasing or reducing the prevalence of chronic illness as well as non-communicable disorders.

In this perspective therefore, ICT policy has been evident fundamental in controlling and contributing to vibrant processes of treatment and of value in screening the patient's illness and provision of better services thereafter. The prevalence of ICT utility could aid reducing on health projects expenses by enhancing efficiencies in the healthcare units and motivate further prevention via behaviour change interrelationships (Hinloopen, 2019). The policy seeks to advance clinical care and public health services by offering health professional progression and communication and lessening health disparities by engaging new strategies to better the health of isolated individuals as argued by Stephenson (2020).

## **METHODOLOGY**

The research applied a descriptive study design.

The study targeted a population of 421 employees of Trans Nzoia Kitale level 4 District hospital and will be categorized as doctors (24), Nurses (287), Pharmacists (39), Clinical Officers (33), Laboratory Technicians (21), Health Records Workers (17).

The researcher applied the sample determination methods used by Mugenda (2008) formula and obtained the sample size of 96 respondents.

The formula is detailed as below;

$$nf = \frac{Nn}{n + N}$$

Where: nf = the desired sample size (where the population is less than 10,000 people); N = estimated population and n = the desired sample size (30% of 421 = 126)  
= 421\*126

$$\begin{aligned}
 & 126 + 421 \\
 & = \frac{53,046}{547} \\
 & = 96
 \end{aligned}$$

From the above perspective, the sample size of this study comprised of 96 participants as workers at the Kitale level 4 District Hospital in Trans-Nzoia County.

Stratified sampling was asserted to denote the departments of participants in the referral hospital. It is after this that a simple random sampling technique was used to give a representative sample for each department.

Primary data was collected using closed-ended questions in questionnaires form which were administered in an online platform,

Quantitative analysis with both descriptive and inferential statistics were used for data analysis where, descriptive statistics included distribution, the central tendency as well as variability, while inferential statistics were used to establish correlation analysis that provided information on the relationship between the independent variable and the dependent variable. To test the impact of independent variables on the dependent variable, a regression model was used.

## FINDINGS AND DISCUSSION

### Response Rate

From the 96 questionnaires that were administered to employees of Trans Nzoia Kitale level 4 District hospital, 79 of them got dully filled up and returned which in turn translated to a response rate of 82%. This response rate was adequate and consistent with Höhne (2019) who was of the view that an above 80% response rate is excellent to support analysis of findings in a survey study.

### Descriptive Statistics

#### Telemedicine

The study determined the level of knowledge of respondents regarding telemedicine and whether they had used the same and the established findings are as indicated in Table 1.

**Table 1: Knowledge of Telemedicine**

Category	Classification	Frequency	Percentage
Knowledge of telemedicine	Yes	47	59.5%
	No	32	40.5%
Use of telemedicine	Yes	39	49.4%
	No	40	50.6%

The findings in Table 1 indicate that while 59.5% agreed on having knowledge regarding telemedicine, 50.6% had not used it. Thus, much of this knowledge on telemedicine could have been acquired by most of the respondents through the internet bit it had not been put in practice. A number of statements were further provided on telemedicine and respondents were asked to indicate the extent of their agreement with each of them. The results were established and summarized as indicated in Table 2 below:

**Table 2: Perceptions of Respondents regarding Telemedicine**

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The hospital has made smart devices available for use	0.0%	41.4%	21.5%	34.2%	2.9%
There is good network coverage at the hospital facility	0.0%	21.4%	35.4%	36.7%	6.5%
The device prices are affordable	5%	36.3%	27.8%	24.4%	6.4%

All the staff have received training on telemedicine	0.0%	41.4%	17.7%	34.6%	6.3%
Health data on the smart devices is safe	0.0%	36.3%	17.7%	39.6%	6.3%
The telemedicine platform is complex making it difficult to use	5.1%	27.7%	16.5%	38.0%	12.8%

The findings in Table 2 indicate that while 41.4% of the respondents disagreed on whether the hospital had made smart devices available for use, 41.4% further disagreed on whether all the staff had received training on telemedicine. Furthermore, 38.0% and 36.7% of the respondents agreed that telemedicine platform is complex making it difficult to use and that existence of a good network coverage at the hospital facility respectively. It was noted from the findings that 36.3% and 36.3% disagreed on whether the device prices were affordable or health data on the smart devices was safe respectively. The implication of the findings in Table 2 is that on overall, although the respondents had knowledge of telemedicine, its limited adoption by the studied hospital had also challenged its widespread application by employees of the institution that was covered.

### ICT Policy

The findings of descriptive statistics on ICT policy were established through percentages and a summary of the same is as indicated in Table 3.

**Table 3: Existence of policies on use of electronic health records and their effective communication**

Category	Classification	Frequency	Percentage
Existence of policies on use of electronic health records	Yes	45	59.5%
	No	34	40.5%
Effective communication of policies on use of electronic health records	Yes	41	49.4%
	No	38	50.6%

The findings in Table 3 are that while 59.5% of the respondents were in agreement that their existed policies on use of electronic health records, 50.6% of other respondents however noted that these policies were not effectively communicated among employees. Several Likert based questions were provided for respondents to indicate the extent of their agreement. Table 4 is a breakdown of the findings.

**Table 4: Perceptions of Respondents Regarding ICT Policy**

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The hospital has digital health literacy policies that allow knowledge transfer to newer systems	0.0%	32.5%	29.1%	24.4%	13.9%
The hospital policy dictates that all systems be protected using passwords	1.3%	31.3%	35.4%	20.6%	11.4%
The hospital regularly updates the digital health literacy policies and regulations	0.0%	43.9%	16.5%	30.8%	8.9%
The ICT policy in place is regularly reviewed	2.5%	28.5%	17.7%	39.2%	12.1%
The policy is easy to read/understand and adopt	0.0%	45.2%	8.9%	39.6%	6.3%

All staff can access the ICT policy to expand their knowledge on the policies	10.0%	43.9%	8.9%	30.8%	6.5%
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The results in Table 4 are that while 45.2% of the respondents disagreed on whether the policies were easier to read/understand and adopt, 43.9% disagreed on whether all staff could access the ICT policy to expand their knowledge on the policies and the other 43.9% of respondents further disagreed on whether the hospital regularly updated the digital health literacy policies and regulations. The study noted from 39.2% of respondents who agreed that the ICT policy in place was reviewed on a regular basis. It further emerged from analysis that 32.5% and 31.3% of the respondents disagreed on whether the hospital had digital health literacy policies that allowed knowledge transfer to newer systems or the hospital policy dictated that all systems be protected using passwords respectively.

### Regression Results

Multiple regression analysis was conducted to establish the influence of digital literacy on the performance of health projects in Kitale Level 4 District Hospital in Trans Nzoia County.

**Table 5: Regression Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.894 <sup>a</sup>	.800	.789	.53051

The results in Table 5 indicate the value of adjusted R-square as 0.789, this implies that 78.9% change in performance of health projects in Kitale Level 4 District Hospital in Trans Nzoia County can explained by the digital literacy endeavours that have been put in place. Table 6 is an overview of the findings of ANOVA:

**Table 6: ANOVA Findings**

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	83.072	4	41.536	51.8907	.000 <sup>b</sup>
Residual	60.827	74	0.8001		
Total	143.899	78			

From the findings in Table 6, the values of f calculated and p- are 51.8907 and 0.000 respectively. Since the p-value is lower than 0.05, it follows that the overall regression model embraced in this study was significant and thus fit for use. The findings of beta coefficients were determined and summarized as indicated in Table 7.

**Table 7: Coefficients and Significance**

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	4.779	1.737		2.751	.007
Telemedicine	.461	.137	.399	3.364	.001
ICT Policy	.601	.169	.463	3.556	.001

The findings of the study from Table 7 are that improving telemedicine by a unit with other factors held constant can lead to 0.461-unit improvement in performance of health projects. At 5%, the study noted that telemedicine with a p-0.001 was a significant predictor of performance of health projects. This finding is corroborated by Gajarawala and Pelkowski (2021) who shared that the use of telemetry that has audio and video elements in its technology enables healthcare workers to provide basic care to patients and especially to those who are in rural and marginalized regions.



The findings in Table 7 further indicate that a unit change in ICT policy with other factors held constant would result into 0.601-unit improvement in performance of health projects. At 5%, the study noted that ICT policy ( $p < 0.05$ ) had significant effect on performance of the health projects. This finding is consistent with Stephenson (2020) who argued that an ICT policy is found potential to advance clinical care and public health services by offering health professional progression and communication and lessening health disparities by engaging new strategies to better the health of isolated individuals.

## **CONCLUSION AND RECOMMENDATIONS**

### **Conclusion**

The study sought to find out the influence of the use of telemedicine on the performance of health projects in Kitale Level 4, District Hospital in Trans Nzoia County. In regard to the findings from regression analysis, it can be concluded that effective use of telemedicine has significant effect on performance of the health care projects.

The last objective of the study sought to examine the influence of ICT policy on the performance of health projects in Kitale Level 4, District Hospital in Trans Nzoia County. On the basis of regression analysis, it is concluded in this study that an improvement in ICT policy would lead to an increase in performance of the healthcare projects.

### **Recommendations of the Study**

The study noted existence of positive and significant effect between telemedicine and performance of health care projects. In view of this finding, this study recommends that the senior management team at Kitale Level 4, District Hospital should invest more resources in telemedicine by having in place stronger network facilities to facilitate the follow of information.

From the conducted analysis, the findings showed that an ICT policy is a significant driver of performance of the health care projects. Thus, this study recommends to the management of Kitale Level 4, District Hospital to regularly review the existing ICT policy in line to the changes in the technology and business environment. This will enhance health care service delivery and enable the hospital attain its established objectives, meeting its mandate.

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