

## **Factors that Influence E-Learning Readiness in a Lower Human Development Index Zone: A Case Study of Secondary Schools in Meru County, Kenya**

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### **Abstract**

Although there are many advantages that accrue from the introduction of e-learning, such as time saving, cost effectiveness and flexibility of study plans, Kenya Institute of Curriculum Development, (KICD) has noted that secondary education in Meru County still relies heavily on face-to-face method of instruction. The purpose of this study was to assess readiness of e-learning in secondary schools in Meru County, Kenya. Literature from countries with higher Human Development Index (HDI) than Kenya has not addressed parameters that relate to e-learning readiness, particularly the scale of mobility, communication, science, technology, innovation, and knowledge-sharing. Quantitative and qualitative data were used in this study. A cross-sectional descriptive survey design was adopted. The target population consisted of 358 secondary schools in Meru County. Out of this number, Cronbach method and simple random sampling technique were used to obtain a sample size of 185 schools. Data was collected using questionnaires and both descriptive and inferential statistics were used in data analysis. The findings of the study identified 16 out of the 18 investigated factors were relevant to both the readiness for e-learning, as well as aligning with strategic plans and Kenya's Vision 2030. The study recommended that schools in Meru County to improve technological infrastructure, particularly internet connectivity, room utilization, and exposure to applications and devices, in order to effectively support e-learning initiatives.

***Keywords:*** *Human Development Index (HDI), e-learning, Curriculum, e-learning readiness*

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## 1.0 Introduction

E-Learning refers to an academic system that utilizes electronic media and information technology resources to provide educational content (Ismail, 2017). It is used to develop learning modes that improve traditional learning methods by making them more effective, flexible, innovative, and collaborative. While face-to-face learning remains relevant, e-learning offers several advantages, such as eliminating the need for in-person sessions and cutting down expenses related to travel. There has been a rise in e-learning opportunities in the recent years. Comparatively, developed countries such as Indonesia, Jordan and Turkey have experienced seamless online learning. Kenya has scored 17.8% in the uptake of e-learning, while Jordan, Turkey, and Indonesia have scored 66.8%, 71.0%, and 39.8%, respectively (UNDP, 2020). Notably, secondary education in Meru County is still based on face-to-face learning methods (Kenya Institute of Curriculum Development (KICD), 2017).

The aim of this study was to identify factors specific to secondary schools in the Meru County region, which determine readiness for e-learning. Variables such as scale of mobility, communication, technology, and innovation were investigated in this study. HDI rating puts Kenya at 0.579, lower than comparable regions in Turkey, Indonesia, and Jordan; which had an HDI of 0.72 or higher (United Nations Development Programme [UNDP], 2020). The study concentrated on three principal parameters;

namely, content, environment, and interaction, which were deemed suitable for the research. This is in contrast to existing studies that investigate a broad range of parameters, such as psychological readiness, human resource readiness, sociological readiness, financial readiness, economic readiness, and technology skills. The rationale for narrowing down to these three parameters was because not all aspects within the more extensive parameters have a substantial impact on improving the state of countries with lower HDI scores (UNDP, 2020).

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### Problem Statement

Factors related to e-learning models as noted by Adiyarta et al. (2018), Dursun and Ümit (2017) and Mohammad et al. (2020) in Indonesia, Jordan and Turkey respectively, are attributable to HDI. However, there is scanty literature comparing factors affecting e-learning uptake across different educational institutions in low HDI regions. According to UNDP (2020), Indonesia, Jordan and Turkey had an HDI of 0.707,

0.723 and 0.8 respectively. This puts the aforementioned countries to a higher human development category as compared to Kenya, which has HDI of 0.579.

UNDP (2020) measured the scale in mobility, knowledge, and communication access to automations in 196 countries. The results revealed that Kenya scored 17.8%, while Indonesia, Jordan and Turkey, scored 39.8%, 66.8% and 71.0%, respectively. Kenya's score was lower in comparison to the other three countries. Therefore, the study recognized the need to identify factors that contribute to Kenya's lower HDI. The study identified content, environment, and interaction as common variables that were prevalent in countries with a similar developing HDI class to that of Kenya.

### ***Objective of the Study***

To investigate the factors that influence readiness of e-learning in secondary schools in Meru, County.

### ***Scope of Study***

The investigation was limited to top management, specifically the principals of the selected secondary schools in Meru County. These schools were chosen as a representative sample of all secondary schools in Kenya.

## **2.0 Materials and Methods**

This study employs a narrative review design, and draws upon existing literature and adopts a cross-sectional descriptive design to analyse the collected data.

Quantitative research method was employed to gather comprehensive and reliable data. The main objective was to formulate a practical hypothesis for potential testing in future empirical studies.

### ***Target Population***

The target population for this study was 358 secondary schools in Meru County, as reported by North Imenti Sub-County Education Directors' Office (personal communication, January 20, 2020). Selection of the target population was based on the need to investigate e-learning readiness among secondary schools in the county. The population was considered appropriate since secondary schools represent a significant portion of education system in the county and are potential users of e-learning platforms. The total number of secondary schools in Meru County provided by the North Imenti Sub-County Education Directors' Office formed the basis for determining the sample size.

### ***Sampling Procedures and Sampling Size***

Bhardwaj, (2019) outlines cost and time as limitations to carry out a study on an entire population and thus the need to generate sample size. This study was therefore based on a sample of the total population. A sample is a small set of objects obtained from accessible population (Bhardwaj, 2019). The study used random sampling technique. This method was preferred because all schools had equal opportunities to be included in the study (Hamed, 2016). Cronbach method was adopted in this study to determine the sample size (Cronbach, 1951).

The following formula was used;

$$x = \frac{(N \cdot e)^2}{Z^2 + PQ}$$

Where N= 358, P=0.5, Q=0.5, e=0.05, Z=1.96

N = total population, e = margin of error, Q = significant level; and Z = standard error.

At a significance level of 5%, the sample size from the Cronbach sampling calculation of 358 schools is 185. To ensure that each school had an equal chance of being selected, schools were picked using random sampling without replacement (Bhardwaj, 2019). Only the principals were considered in the data collection and in case of their absence, the deputy principal took the initiative to provide relevant information to the researcher. From a sample size of 185 schools, 185 respondents were selected.

### ***Data Collection***

Data was gathered using two methods: document analysis and surveys. Document analysis involved a systematic examination of reports and articles from previous studies. This analysis helped identify factors that had a significant impact on a country's lower Human Development Index (HDI). These factors were then used to create questionnaires.

The questionnaires were distributed online through a Google form to principals of secondary schools in Meru County. To ensure a high response rate, the researcher made follow-up phone calls to respondents. In addition to the online questionnaire, some respondents were given physical copies of

the questionnaire to fill. The researcher then filled out the forms into the online Google form to ensure that all data was centralized. The questionnaire consisted primarily of closed-ended questions, with a few open-ended ones. This approach allowed for the collection of quantitative data, which was easier to analyze statistically.

### ***Data Analysis and Presentation***

The data collected in this study were analysed using both descriptive and inferential statistics. Descriptive statistic employed focused on mean, while inferential statistic focused on the P-value. The researcher summarized and analysed the responses using chords and scales, which were used to create a coding scheme. The data were then saved in Google Sheets and exported to Microsoft Excel for analysis. The data was then imported to IBM SPSS Statistics 20 (IBM Corp., 2011) whereby binary logistic regression was employed to determine the strength and relationships between the independent and dependent variables. This analysis was necessary because the dependent variable had a binary nature, and binary logistic regression is an appropriate method for analysing binary data. Tables were used to present the findings in a clear and concise manner. The results of the analysis were then discussed in light of the research objective and the relevant literature.

### ***Ethical Considerations***

The protection of respondents' confidentiality was a key consideration during the data collection process. To ensure anonymity and confidentiality, primary data was handled

with care, and the collected data was only used for academic purposes. Respondents were given the option to withhold personal information, including their names. Moreover, respondents were not compelled to provide any information that could harm the reputation of their schools.

### **3.0 Results and Discussion**

This section focuses on describing findings on the variables towards E-learning readiness, specifically factors within content, environment, and interaction. Explanations on the result gathered from various literature that provides possible factors that would influence the readiness of e-learning based on HDI indexing is presented. This explanation would culminate in conceptualization of the field of study and the significance of e-learning preparation in secondary schools. Thus, the explanation will serve as a foundation for comprehending the importance of conducting an e-learning assessment.

#### ***Content Readiness Factors***

According to Glenda (2018), content readiness factors refer to the digital information available for use in online learning. This may include materials such as video files, audio files and digital documents, which are used to illustrate the significance of content in the context of digital transformation. Content readiness can be attributed to various contributing factors, such as electronic content, courses, voice chat, video streaming, file transfer, screen sharing, broadcasting, and gaming (Dursun & Ümit, 2017; Mohammad et al., 2020). The

factors that contribute to the content variable in the conceptual framework have been selected from three models used in this study: (Adiyarta et al., 2018; Dursun & Ümit's, 2017; Mohammad et al., 2020). Despite the broad range of factors provided by the models, only the most relevant ones are selected for inclusion in this study, based on guidance from the UNDP (2020) report, specifically for the context of Kenya.

#### ***Environmental Factors***

Environment readiness factors is indicative of the conducive circumstances that enable online learning. These circumstances encompass source of school electricity, rooms conducive for e-learning, internet service providers and network technology type accessible within school compound which are expounded upon in the conceptual framework (Glenda, 2018). According to Adiyarta et al. (2018), building infrastructure, network, and electricity are commonly recognized as key contributors to environment readiness in Indonesia. The conceptual framework draws upon three models that contribute to this study, including the integrated e-learning readiness model by Adiyarta et al. (2018), as well as models developed by Dursun & Ümit (2017) and Mohammad et al. (2020). However, for the purposes of this study, the factors were narrowed down based on their relevance to the Kenyan context. This process was guided by UNDP (2020).

#### ***Interaction Readiness Factors***

According to Mohammad et al. (2020), effective communication is crucial for

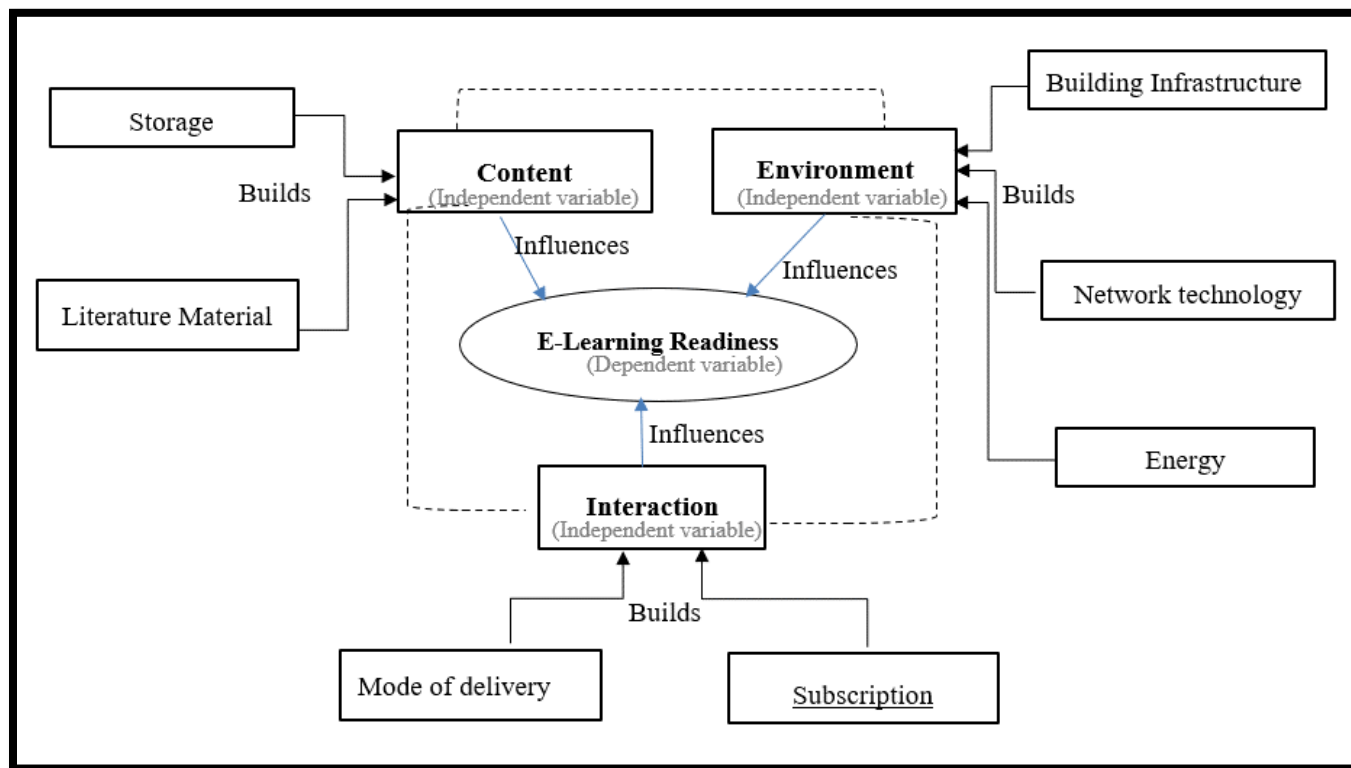
creating interactive e-learning experiences. This can be achieved by ensuring the delivery channel and application interface are in place. Interaction readiness is a key factor in facilitating communication between teachers and students during online learning. A student should be conversant in utilizing the essential technology and applications available such as ZOOM, Skype, computer applications, web portals and mobile application. According to Dursun and Ümit (2017), e-learning systems in Jordan promote interaction readiness by offering access to various interactive modules, including the

internet, web chat, email, discussion boards, and face-to-face meetings. In the conceptual framework, the focus is on interaction readiness, and specific factors within Meru County that contribute to this readiness have been identified.

The conceptual framework below illustrates the possible correlation between the independent variables and dependent variable through a pictorial presentation whereby the factors that contribute to e-learning readiness can easily be comprehended.

**Figure 1**

***Conceptual Framework***



### ***Factors That Influence E-Learning Readiness.***

***Environment*** – Source of electricity, room availability, room used for teaching, subjects taught, internet service provider, network speed.

***Interaction*** – Accessible gadgets to students, accessible gadgets to teachers, e-learning portal subscription, e-learning portal used, number of users accessible to students, number of users accessible to teachers, meeting applications subscription, meeting applications used.

***Content*** - Digital content availability, digital storage availability, digital streaming activity and personal studies.

The attributing factors towards content, environment and interaction were all tested towards the dependent variable e-learning readiness using SPSS, and below is the discussion of the results.

### ***Findings Based on Descriptive Result and Binary Logistic Regression Model***

This section assesses the environmental, interaction and content readiness variables by presenting the mean response from the respective attributing factors and exploring their impact on e-learning readiness using binary logistic regression. This section will also traverse through the respective independent variables to understand the impact of the individual factors towards E-learning readiness.

#### ***Environment Attributing Factors.***

Results from the environment variable was analyzed while considering the attributing factors; namely, source of electricity, usable room, subjects taught, Internet service provider and network speed. The mean positive response and P-value for each of the attributes were analyzed and Table 1 presents a summary of the result.

**Table 1**

#### ***Variables in Environment***

	Response Mean	Variable P-value
Source of electricity	97.3%	0.497
Availability of room	80.0%	0.012
Usable room	71.0%	0.002
Subjects taught in computer room	51.0%	0.006
internet service provider	84.0%	0.004
Network speed	58.0%	0.029

The findings in table 1 reveal that room availability, room used for teaching, subjects taught, internet service provider and network technology type (network speed) were all significantly associated to secondary schools' ability to implement e-learning at 5% significant level, whereas source of electricity was not significantly associated to secondary schools' ability to implement e-learning at 5% significant level. Additionally, 97.3% of schools already had a source of electricity within the school; therefore, it was not gratuitous to pick this attributing factor when the factors are only analyzed independently.

The findings in Table 1 are consistent with the findings established by the literature review, except for the source of electricity. Glenda (2018) found that the source of

electricity was a significant factor in addressing e-learning readiness. However, in the context of Meru County, the source of electricity does not pose a significant challenge to administrative activities.

### **Interaction Attributing Factors.**

The interaction variable was evaluated by considering the contributing factors such as accessible gadgets to students, accessible gadgets to teachers, e-learning portal subscription, e-learning portal used, number of computers accessible to students, number of computers accessible to teachers, Meeting applications subscription and meeting applications used for teaching. The mean positive response and P-value for each of these factors was analyzed, and a summary is provided in Table 2.

**Table 2**

#### ***Variables in Interaction***

	Response Mean	Variable P-value
Accessible gadgets to teachers	45.0%	0.009
Availability of E-learning portal	43.0%	0.000
Functional E-learning portal	26.9%	0.000
computers accessible to students	77.3%	0.180
Computers accessible to teachers	80.0%	0.029
Meeting applications	50.2%	0.000
Used meeting application	34.4%	0.000

The findings in table 2 reveal that accessible gadgets to students, accessible gadgets to teachers, functional e-learning portal, number of computers accessible to teachers,

meeting applications subscription and meeting applications used were all significantly associated to secondary schools' ability to implement e-learning at

5% significant level whereas adequate computers were not significantly associated to secondary schools' ability to implement e-learning at 5% significant level. With reference to table 2, number of computers accessible to students did not explain auspiciously how it will affect e-learning readiness; therefore, it would be gratuitous to pick number of computers accessible to students when the factors are only analyzed independently.

The findings presented in Table 2 align with the conclusions drawn from the literature review, with one exception: the number of computers accessible to students. According to Mohammad et al. (2020), access to computers and computer applications can impact the interaction between tutors and

students. An additional investigation was conducted to explore whether the number of computers accessible to students had a significant influence on e-learning readiness. Surprisingly, the results of the regression test indicated that the number of computers accessible to students did not significantly enhance the effect of having at least one computer for a school to be considered ready for e-learning.

### **Content Attributing Factors**

Content variable was tested while considering the attributing factors: digital content available, digital storage availability, digital streaming activity and personal studies. The mean positive response and P-value for each of the attributes were analyzed and Table 3 is a summary of the response.

**Table 3**

#### ***Variables in Content***

	Response Mean	Variable P-value
Digital storage available	54.0%	0.001
Digital streaming activity	65.4%	0.005
Personal studies	27.5%	0.000
Digital content available	43.0%	0.002

The findings in table 3 reveal that digital content available, digital storage availability, digital streaming activity and personal studies were all significantly associated to secondary schools' ability to implement e-learning at 5% significant level. Therefore, all the factors under content were essential factors that would influence the readiness of e-learning.

This finding is consistent with the results presented by Glenda (2018) and the report by UNDP (2020) in the literature review. Both sources identified various factors analyzed in the regression test that were significantly associated with e-learning readiness in secondary schools in Meru County.

#### **4.0 Conclusion**

The objective of the study was to investigate factors that influence the readiness of e-learning in secondary schools in Meru County. It was discovered that 35% of the schools were involved in e-learning activities, based on the responses obtained from the participants. Further, analysis of the independent variables indicated that several factors supported the findings obtained from the responses. Most of these factors were discovered to be below 50%, providing compelling evidence that e-learning is not widely embraced in Meru region.

During the evaluation of independent variables, it was discovered that sixteen out of eighteen contributing factors were pertinent in gauging the readiness for e-learning in a region with a similar HDI index to that of Meru County, Kenya. However, two of the 18 factors, namely "source of electricity" and "number of computers accessible to students," showed no significant association with the readiness of e-learning when analyzed individually. On the other hand, the remaining 16 factors were deemed crucial and can be considered as key influencers in determining e-learning readiness in regions with a Lower Human Development Index, scoring close to 0.5 HDI Index.

#### **5.0 Recommendations**

The findings of this study on assessing e-learning readiness in Meru County have several implications for practice. Firstly, they highlight the need for schools in Meru and similar regions to improve their technological infrastructure, particularly internet connectivity, room utilization, and exposure to applications and devices, to support e-learning. Secondly, the study shows that there is a need to encourage students to contribute to e-learning study materials and provide more storage for digital content on-premises and off-premises. This may require investing in resources such as internet subscriptions, e-learning applications, and storage devices that would enable them to effectively integrate ICT into teaching and learning.

Additionally, the study suggests that curriculum design and delivery methods should be adapted to suit e-learning, and that support structures such as IT support personnel should be put in place to facilitate implementation and maintenance of e-learning programs. Finally, the study reveals the importance of involving stakeholders such as parents, education policymakers and the wider community in e-learning initiatives, to ensure their support and sustainability. Overall, the findings of this study provide valuable insights into the challenges and opportunities of e-learning in Meru County and similar regions and offer practical recommendations for improving e-learning readiness and implementation.

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