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The Nature of Information Products for Supporting Digital Learning in Selected International High Schools in Mombasa County

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Abstract

The learning institutions' libraries are expected to provide diverse online products and services for academic excellence. Nevertheless, there has been poor library support for effective implementation of digital learning systems in international schools in Kenya. The study had a purpose of examining the nature of equipment and facilities available in the library for supporting digital learning in international high schools with particular reference to Aga Khan Academy and Oshwal Academy Senior School Libraries in Mombasa County. The study used a descriptive research design. Information was gathered from principals, teachers, librarians and heads of departments. Descriptive statistics such as mean, percentage and frequency were utilized. Linear regression analysis and Pearson Correlation analysis were used in this study. The study discovered that information products and services supported digital learning in international high schools. The institutions were doing their best however, there were shortcomings related to lack of adequate finances, appropriate e-learning providers and cyber insecurity concerns. The study concluded that the schools were unable to keep tabs with change in technology. This was because it was a challenge in always purchasing computers, installing more faster internet and other expenditures whereas the institution has other expenditures such as salaries, food and beverages, repair and maintenance among others. The recommendations were that the international school management should come up with fresh methods of sourcing for more funds from well-wishers, corporates and stakeholders so that they are able to have enough resources to fund digital learning. The management should liaise and enter partnership with various corporates such as Safaricom, Telcom and Airtel for supply of 5G internet at subsidized rates. The partnership should cover for installation and frequent update of ICT infrastructure at low costs.

Keywords: *Nature of information products, digital learning, international high schools*

1.0 Introduction

Digital learning is the process of education whereby the parties involved use ICT or has a set of instructions that guide on how to effectively use ICT (Chung, 2020). Adoption of digital learning in high schools is highly characterized by presence of ICT support tools such as computers, reliable internet, databases, e-resources, servers for huge storage capacities, computer classes, digital learning orientation programs, software and applications related to

digital learning, simulations, e-models, e-graphics, animations, e-quizzes, e-games (Organization for Economic Co-operation and Development [OECD], 2018).

In Asian countries such as China, Japan and Korea, high schools have been battling problems that include broken Digital Object Identifier [DOI] and Uniform Resource Locator [URL] links. In addition, there has been a lack of current subscriptions to e-books related to high school curriculum and; a lack of variety of various digital learning platforms that offered library products and services (Almaiah & Almulhem, 2018; Almaiah & Alyoussef, 2019; Narad & Abdullah, 2016).

In South Africa and Namibia, high schools have been challenged by exposure to adult content and cyberbullying to high school students due to constant interaction with internet and lack of restrictions on their devices; and lack of computer foundational skills among students making it a challenge for library staff and teachers to orient them into digital learning (Aguayo et al., 2020; Kaisara & Bwalya, 2021; Mpungose, 2020).

Locally in Kenya, lack of timely updating of institutional software related to digital learning apps and websites causing constant hanging or unexpected shutdown; lack of compatibility of school's digital learning systems whereby students cannot replicate the knowledge gained to access other similar apps that have additional e-resources; complicated e-library portals; and poor internet connection in schools stand out to be the leading problems in high schools (Mabeya, 2020; Mutisya & Makokha, 2016).

Problem Statement

The learning institutions are expected to provide diverse online products and services such as e-books, e-magazines, e-syllabus, e-exams, and e-newspapers in the repositories and further offer e-support services seamlessly (Yan et al., 2016). The provision of these products and services should be accompanied by intensive orientation and training on how to search, filter, retrieve and utilize relevant resources from the e-repositories (Nyabuto, 2019). Nevertheless, there has been poor library support for effective implementation of digital learning systems in international schools in Kenya (Council of International Schools [CIS], 2019). This inconsistency has delimited international high school students who compete with other students from developed countries. The library's support for digital learning in high schools is dependent on information products, supportive services, nature of equipment and facilities available in the library (CIS, 2019). Ineffectiveness in these areas disadvantages, learners to a great extent (Chung, 2020). This has resulted in students doing guess work or simply using the commonly available e-resources when doing their school assignments, class discussions or personal studies (Goldie, 2016).

Research Objective

The objective of this study was to determine the nature of information products available in the library for supporting digital learning.

Research Hypothesis

H_0: The nature of information products available in the library does not significantly support digital learning.

2.0 Literature Review

Information products entail knowledge passed through books (print and non-print), databases, and conventional library services that a learning institution offers to its users (van der, 2020). There are different types of information products such as journals, theses& dissertations, print

books, e-books, e-magazines, e-newspapers, e-notes, and e-past examinations papers among others (MasterCard Foundation, 2020). This study examined the availability of these products in international high schools' libraries for supporting curriculum delivery (MasterCard Foundation, 2020). An epitome information product should be relevant in the area of the study, and current to provide information that is highly needed in reading, doing assignments and for recreational purposes (Merga, 2020).

Various studies on information products were reviewed. A report by OECD (2018) provided various information sites that both National and IHSs learners have been using to progress with their education, especially after the closure of schools due to covid-19. In the same platforms, their libraries directly add their choice of online tailor-made e-resources through which students and teachers can access to complement their digital learning process. European Commission examined the digital milestones in European national and IHSs. The report stated that various European nations such as Romania have developed textbooks whereby publishers produce both hard copies and e-copies of the same textbooks.

Tam et al. (2017) established that Croatian schools had international children's digital libraries that had e-books, ICDL, OPAC, and picture books. On Hong Kong's library webpage, they had e-books, a digital storytelling platform, audible books, a book quiz called e-book adventure, and a digital learning portal for poetry writing. The library programs had several problems such as a lack of library lessons timetable, poor teacher support, librarian contribution to information products not recognized by the school management, and low funds towards purchasing more information products. The choice of Tam et al. (2017) to use a very small sample of 5 librarians makes it hard for the study to be generalized.

In Rwanda, International Trade Center [ITC] documented a study on various digital learning platforms that were being used by high schools to provide key information resources to teachers and students. According to ITC (2021), Rwanda schools have been using O' Genius Panda which is a software that provides students and teachers a platform to access information products such as e-books, e-notes and online science experiments. In addition, there has been a webinar to help students connect online with their teachers.

Locally, there are Opala (2017) investigated how Kenyan international high schools' libraries were marketing their information resources. The study was a case study of Agha Khan School in Nairobi. It used a stratified sampling method to group the respondents into six categories of 6-top management, 8 head of departments, 36 teachers, 2 library staff, 18 non-teaching staff and 185 students. Opala found that the various information resources that were being marketed included: curriculum and information resources such as e-books, e-journals, e-exams, and e-magazines. The various ways of marketing were through word of mouth, conferences and seminars, school and parent meetings, social media platforms, and media.

3.0 Methodology

The study used a descriptive survey research design. This enables the study to collect data without influencing the normal operation of the respondents. In addition, it permits the study of relationships between the compared variables and reporting their characteristics and their values as they appear (Sileyew, 2019). The study was conducted in Mombasa County which is located in Coastal region of Kenya. Mombasa County is a very attractive destination to foreigners due to the presence of the Indian Ocean. According to ICT Authority in Kenya (2021), Mombasa County schools were among the first beneficiaries of the digital literacy program initiated by the government. In this study, the target population was all international schools in Mombasa County. The principals and librarians were sampled using purposive

sampling method. This ensured that each principal and as well as the school head librarian. Therefore, it resulted in one principal and a librarian in each school. The head of departments was sampled using inclusion and exclusion criteria. The study also used a simple random sampling technique to sample students. Vasileiou (2018) agreed that appropriate sample size should be 30 percent of the teachers and students. This percentage is adequate for populations below one thousand. When applied to Agha khan senior school, it will result in a sample size of 2 HODs and 201 students while in Oshwal, the sample size will be 2 HOD's and 146 students. Data was collected using an interview guide, questionnaires, and observation guides. Descriptive statistics was utilized to analyze the quantitative data in this study. The descriptive statistics included: mean, percentage and frequency. The findings were presented by using tables and thorough explanations that also stressed the inscribed texts. Linear regression analysis and Pearson correlation analysis was used in this study to test the relationship between the variables under examination.

4.0 Results and Discussions

Response Rate

The research intended to collect data as follows: a total of 150 from Oshwal senior school and 205 from The Agha Khan senior school. The response rate was recorded as follows 1 principal, I librarian, 1 HOD, and 124 students from Oshwal senior school. This was a total of 127 respondents which translated to 85% From the Agha Khan senior school, the response rate was 1 principal, 1 librarian, 2 HOD, and 201 students hence a total of 205. The study was able to collect data from 1 principal, I librarian, 1 HOD, and 175 students. This was a total of 178 respondents which translated to 87%.

Demographic Information

The study explored how long the respondents had served as part of the demographic information sought. This question was asked to principals, librarians, and HODs in both the interview guide and questionnaire respectively. Table 1 indicates the respondent's feedback on the same.

Table 1: General Information

Job Position	Less than one year	1-3 years	3-5 years	5-10 years	Above 10 years
Principals	0	0	0	2	0
Librarians	0	0	1	1	0
HOD	0	0	1	0	1

According to Table 1, both principals had served for a period between 5-10 years. Further, one librarian had served for 3-5 years while their counterpart had served for 5-10 years. One of the HOD indicated that they served above 10 years while their counterpart had served 3-5 years. Based on Table 1, it was clear that all the senior management had served for over 3 years in their role. This meant that they had served for a lengthy period; hence, they were well-versed in digital learning processes. Being well-versed poised had an advantage offering guidance on nature of information products available in the library for supporting digital learning to library users.

Results on nature of information products available in the library

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The nature of information products available in the library was the first independent variable of the study. It had indicators such as e-exams, e-books, e-magazines, e-newspapers, audiovisuals, and videos. The study asked questions informed of questionnaires, interviews and observations from various respondents. On the questionnaires, they had a five-point Ordinal Likert Scale of between 1-5. Where; 1-strongly disagrees=; 2- disagree; 3-neutral; 4-agree and 5- strongly agree. The results are indicated in Table 2.

Table 2: Digital Statistics of Nature of Information Products Available in the Library

Statements N=305	**1**	**2**	**3**	**4**	**5**	**Mean**
Utilization of library resources	0(0%)	23(8%)	8(3%)	59(19%)	215(70%)	**4.53**
System notification of new e-resources.	0(0%)	20(7%)	8(3%)	58(19%)	219(71%)	**4.56**
Well-known procedure for accessing information products	0(0%)	19(6%)	0(0%)	46(15%)	240(79%)	**4.66**
Adequate funds allocation to the library department	95(31%)	111(36%	8(3%)	33(11%)	58(19%)	**2.64**
Partnership with various suppliers of information products	0(0%)	60(20%)	16(5%)	169(55%)	60(20%)	**3.75**
Awareness of various information products	0(0%)	62(21%)	17(5%)	170(56%)	56(18%)	**3.72**

According to Table 2, 240 (79%) respondents strongly agreed that there were well laid down procedures for accessing information products and 219(71%) strongly agreed that there was system notification of new e-resources hence means of 4.66 and 4.56 respectively. This means that the institutions had erected a reliable structure that could be used by various users in accessing library resources. These structures are related to processes and website notifications on various new e-resources available. However, 95 (31%) and 111(36%) of the respondents also strongly disagreed and disagreed respectively that there was adequate funds allocation to the library department hence an overall mean of 2.64. A department such as library had so

much in store as far as plans related to digitalizing the whole operations which required hefty financing. However, this was not the only key department in the school hence financing was an issue.

The school management balanced every expenditure in departments and also compares the returns emanating from the same. Therefore, as much as they would wish to fully fund the budgeted item in library department to support digital learning, it was not possible. This is because technology keeps on changing whereby the computers used in five years are slowly being phased out by computers with more storage and high processing elements. Additionally, the 4G internet that was in use before is being replaced by 5G in the current period. This would be a challenge in always purchasing computers, installing more faster internet, and other expenditures whereas the institution has other expenditures such as salaries, food, beverages, repair, and maintenance among others.

Zongozzi (2020) also revealed that funding for digital learning in South Africa can never be enough since technology keeps on evolving hence the financial needs. According to Zongozzi (2020), the digital libraries' budget keeps on escalating thereby creating a need to draw a line on the intervals in which funding should occur. California State Library (2021) disagrees by indicating that financing digital libraries does not have to be an expensive affair as long as the school has reliable e-learning partners just as they did in rolling out K-12 e-learning. However, looking at the two studies the former is done in Africa where there are limited e-learning partners while the latter is based in a nation where technology partners such as Microsoft and Apple are based hence the presence of plenty of e-learning partners. What that means is that the latter has unlimited access to cost-friendly e-learning partners due to high supply vis-à-vis the demand while in African nations, it becomes very expensive since there is more demand than supply on e-learning platforms/partners.

The study interviewed the principals and the librarians as part of data collection. The study labeled them from respondents A to D. The first question required them to highlight the various information sites that learners have been using to progress with their education, especially after the closure of schools due to covid-19. The information sites included Class Dojo and Purple Mash to facilitate digital learning. According to International Schools Database (2021a), Class Dojo and Purple Mash were part of the recommended digital learning platforms in Kenyan International Schools.

The second question required them to elaborate on the kind of challenges experienced in ensuring information products are adequate and relevant. The challenges named included keeping up with the technology, having reliable e-learning partners that have e-products tailor-made for their students, and lack of adequate financing. Respondent C was quoted saying,

''Having to complement physical teaching with online has not been easy, especially finding a suitable online resource provider since most of them require a lot of funds with the provision of few e-resources''

In Rwanda, a report by International Trade Center (2021) also revealed that matching the education needs with e-learning platforms and the funding of the same proved difficult in rolling out the Edu-tech platform in the nation's education system.

The third question required them to highlight the various sources of funds used to equip information products in the library for supporting digital learning. The sources named included school fees, donations, sponsorships, and grants. Kaisara and Bwalya (2021) also found out that as a measure of countering challenged in implementing learning in a covid-19 era, the Namibian high schools sourced funds from donations, grants, government, and sponsorships.

However, the school fees as a source of financing became an issue since most parents were struggling financially due to economic hardships and job loss.

As part of data collection process, the study checked for common and available e-resources in this school. The study observed resources that included e-resources included e-exams, e-books, e-magazines, e-newspapers, and audiovisual. A report by the Department of Education- UK (2019) assessed the threats linked to incorporating technology into education. The report revealed that technology has furnished education sector with numerous online books, examinations, newspapers, and audiovisuals to name but a few. However, there poses a danger of leaving regulation of the contents of digital resources to individual schools.

The second observation practice involved checking on the existence of hard disks, digital video disks, flash disks, and compact disks in the library that contains e-exams and e-books. The observation made was that there were flash disks and hard disks that were commonly used to store e-exams Gopal, et al. (2019) discovered that for BINUS e-learning to positively impact student's learning, it required effectiveness in many areas such as storage, retrieval and their compatibility in the learning process. In terms of storage, Gopal, et al. (2019) advised that BINUS e-resources should be stored on servers, hard disks, and flash disks as compared to compact disks since they were prone to damage and takes more time in retrieval of information process such as extensive loading time.

The third observation process involved checking on password generated system that allowed one to access information products in the digital library. The study observed that there was a library portal on the school's main websites. This portal required the potential user to indicate their username and password to access digital learning. In case someone was not registered, there was a tab to request the librarian to register them as long as they had a school registration number. Other visitors were not allowed to access the digital learning platform but redirected to the general website. The results agree with International Baccalaureate (2020) that for purposes of planning how e-learning would be rolled out in teaching and general education, there was a need to pay attention to the number of users who access the database. This information would provide reliability on the strength, weaknesses, opportunities, and threats [SWOT] that online learning possesses to the school. To achieve that, there was a need to have a system guided by usernames and passwords.

Further on, the study provided further analysis of various precepts related to the percentage that the nature of information products had on digital learning and in answering the hypothesis. This was done through a model summary and ANOVA as shown in sections 4.7.1 and 4.7.2 respectively.

Model summary of nature of information products available in the library

The study conducted bivariate linear regression analysis. The model summary on nature of information products available in the library was generated and the results are indicated in Table 3.

Table 3: Model Summary of Nature of Information Products Available in the Library

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.864[a]	.747	.737	2.06429

According to Table 3, the R-value of 0.864 shows that nature of information and digital learning was strongly correlated to each other at 86%. Adding to that, the R-square value was

0.747 indicating that nature of the information product predicted 74.7% of digital learning whereas 25.3% were other factors not investigated in this study. This indicated that the choice which an institution makes pertaining to information products in the library will play an important role in establishing digital learning.

Analysis of Variance of Nature of Information Products Available in the Library

The study was guided by a null hypothesis that the nature of information products available in the library does not support digital learning. To examine whether the null hypothesis would stand or not, evaluation was done using ANOVA. The results are indicated in Table 4.

Table 4: ANOVA of Nature of Information Products Available in the Library

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	118.501	1	118.501	12.620	.000[b]
	Residual	2845.139	304	9.390		
	Total	2963.639	305			

a. Dependent Variable: Digital Learning
b. Predictors: (Constant), Nature of Information Product

According to Table 4, the significance level of nature of information products was 0.000 which was less than 0.05. This fact enabled the study to reject the null hypothesis that nature of information products available in the library does not support digital learning. Merga (2020) also established that the variety of e-resources that an institution possesses positively impacted its digital learning process.

5.0 Conclusion

Based on the nature of information products available in the library results, the study concluded that the schools were unable to keep tabs with change in technology. This was because it was a challenge in always purchasing computers, installing more faster internet and other expenditures whereas the institution has other expenditures such as salaries, food and beverages, repair and maintenance among others.

6.0 Recommendations

The recommendations made on the nature of information products available in the library are that the international school management should come up with fresh methods of sourcing for more funds from well-wishers, corporates and stakeholders so that they are able to have enough resources to fund digital learning. The management should liaise and enter partnership with various corporates such as Safaricom, Telcom and Airtel for supply of 5G internet at subsidized rates. The partnership should cover for installation and frequent update of ICT infrastructure at low costs.

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