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Forward

On behalf of the editorial board to present the Volume three (3) of Machakos University Journal of Science and Technology to our readership. This issue presents pieces of research work drawn from diverse disciplines including Science, Technology, Agriculture, Arts, Business and Engineering.

The manuscripts published herein have undergone through a peer-review and editorial process to ensure the Journal quality requirements and other guidelines are met. The Journal is published in both print and online forms. On behalf of the editorial team I acknowledge the authors for choosing to share their research work through the Machakos University Journal of Science and Technology. The Journal envisages and commits to continue providing unique window through which researchers, academicians and professionals can share and disseminate the outputs of their research engagements.

I commend and acknowledge the efforts, commitment and quality work exemplified by members of the editorial board towards actualizing the publication of this volume.

Prof. Peter N. Mwita

The Chief Editor

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Influence of Project Technical Skills on Performance of Community Based Human Immuno Deficiency Virus Projects in Kiambu, Kenya

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Abstract

Identifying factors that are critical for the success of HIV projects not only leads to initiating mechanisms for efficiency and effectiveness in projects, but also for implementation of projects on time. This study sought to establish how project environment factors influence performance of HIV projects that are based at the community level in Kiambu, Kenya. The International community has committed to end AIDS by 2030, but this remains a big concern for the 160 Countries under the United Nations Joint Programme on AIDS (UNAIDS) on how to reach this target and achieve the Sustainable Development Goals. HIV prevalence in Kenya has stabilized at 6% for the last ten years, hence the need for more innovative ways of implementing projects. With 53% of HIV financing being channeled through extra budgetary allocation to Not for Profit Organizations to implement community based HIV projects, there is need to identify CSF that will lead to value for money for every HIV intervention. With only half of Africa's development projects succeeding, and with majority of the projects failing to be delivered within schedule, cost, and quality, it is of essence that critical success factors that influence community based HIV projects are established. These factors relate to efficiency, effectiveness, relevance and sustainability. The scope of the study was NPOs in Kiambu, Kenya. The study used descriptive survey research method and adopted stratified random sampling to identify a sample size of 151 respondents out of the target population of 249 NPOs implementing HIV projects in the 12 sub-Counties in Kiambu. A structured questionnaire with closed and open ended questions collected primary data. A pilot study to test the reliability of the research instrument using Cronbach's alpha and validity using Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity was undertaken. The primary data collected was edited, cleaned and analyzed using descriptive statistics with the aid of Statistical Package for Social Science (SPSS 21.0). Correlation and regression was used to determine the relationship between project technical skills and performance of Community based HIV projects. Data was presented in tables and figures. The study found that technical skills were found to have a positive and significant relationship with project performance. The study recommends that project managers and the project team should possess professional qualifications and training in monitoring and evaluation, and effective communication skills. The projects should also have a monitoring and evaluation plan, and a communication plan or strategy targeting each stakeholder. Lessons learnt should be identified and documented as the project progresses rather than waiting to identify them at key milestones or at the end of the project as the team may have forgotten them or may be focused in closing the project rather than documenting lessons learnt.

Key words: *Kenya, Kiambu, critical project success factors, project performance, community based HIV projects, project technical skills*

INTRODUCTION

Background of the Study

Critical Success Factors define key areas of performance needed by the project to achieve its objectives. These key areas if made explicit to all in the organization provide a focus where the project must focus on to achieve its mandate. The concept of CSFs has evolved from primary measures of efficiency (time, scope and budget) to long term measures related to effectiveness and outcome (Muller, 2016). Project success was initially associated with achieving the project objectives and the intended results within time, cost and quality. However, with more research, this golden triangle was identified as insufficient to define project success (Beleiu *et al.*, 2014). With time, project success criteria have grown from quantifiable triangle of cost, schedule and scope which measure efficiency to an improved perspective of quantifying impact and effectiveness (Bryde, 2005; Muller, 2016). The concept of CSF has generated considerable interest in project management as CFS support management to strategize, manage, monitor and achieve project goals (Ika, 2012). The concern with project success is relevant as the number of projects failing is rising with over 30% of projects not meeting their objectives (PMI, 2013).

Critical success factors relate to all projects whether they are in Information Technology, Physical projects such as the construction and engineering; or social projects such as health, or education. Critical success factors are important in any project, hence the need to identify, analyze and prioritize them based on their contribution to the project performance. The critical success factors have in its underlying assumptions that for all projects to be successful, they must be within cost, schedule and quality. Prabhakar (2008) disagrees with this view and argues that most projects experience low performance in terms of time, scope and budget but are perceived successful while others are within this triangle but have been considered failed as they didn't address sustainability issues and community participation during the project cycle.

Research in Critical success factors has not yielded a complete list that meets the needs of all projects (Ika, 2009) as there is variance between projects based on their scope, uniqueness, and complexity (Wateridge, 1995). Despite each project's uniqueness, there is need for stakeholders to agree on what constitutes CSFs. Development of CSFs ought to take into account the various stages of the project cycle from conceptualization to closure. If these factors are identified before project commencement, project failure is minimized. Mobey and Parker (2002) noted the importance of the entire project team understanding the project CSF at initiation and across the project cycle.

Most of the CSFs studies have been global and context specific making it difficult to apply them locally, hence the need for CSFs specific to community based HIV projects in Kenya. HIV has been identified under the Kenya Government's Universal Health Coverage agenda as one of the diseases requiring accelerated prevention, care and treatment, and stigma reduction. The Kenya Vision 2030 and the three Medium Term Plans (MTP) identified HIV under the social pillar and set to reduce Kenya's prevalence. The country has from the two completed MTPs not been able to meet its target of reducing HIV prevalence (NACC, 2016a). This calls for innovative

implementation of HIV projects especially at the community level. Most of the HIV interventions at the community level are undertaken through projects by NPOs. Donor funding for HIV and AIDS is channeled either through the government budgetary system or donor administered programs by NPOs. Donors' extra budgetary allocation to NPOs is greater than the government on-budget support and has been increasing gradually (Kelly *et al.*, 2005). In reality, the performance of community HIV projects has been poor as evidenced by the high HIV prevalence, budget overruns, delay in project completion and inability to meet beneficiary expectations.

Statement of the Problem

Projects are vectors for change and for the implementation of strategies and innovations that can bring competitive advantages to companies (Osorio *et al.*; 2014). They contribute to organizations achievement of their strategic goals and objectives. Toor & Ogunlana (2009) observes that there is evidence of poor project performance across various industries and types of projects, with the failure going unnoticed and suppressed, often with serious consequences. The performance of community HIV projects has been poor as evidenced by the high HIV prevalence, budget overruns, delay in project completion and inability to meet beneficiary expectations. With threats of reduction in donor funding for HIV, and with international sources accounting for 63% (NACC 2014), the need for efficiency and effectiveness in these projects is paramount. The International community has committed to end AIDS by 2030, but this remains a big concern for the 160 Countries under the United Nations Joint Programme on AIDS (UNAIDS) on how to reach this target and achieve the Sustainable Development Goals. Africa has the highest epidemic, with Kenya having the second highest burden globally. (Toefy, 2017). Though there are disparities across counties, 65% of new infections can be traced to 9 out of the 47 counties (NACC *et al.*; 2013). HIV therefore remains a disease of concern as it continues to burden households and health systems as well as causing morbidity and mortality. Kenya made a commitment under the Millennium Development Goal six (6) to halt and begin to reverse the spread of HIV and AIDS by 2015 (NACC, 2016a). However, the HIV estimates for 2015 indicated that the national prevalence was 5.9%, an increase of 0.8% from 2012, with 77,647 new infections recorded in 2015 (NACC, 2016a). To accelerate the reduction in HIV infections, Kenya adopted a multi-sectoral response by bringing on board all stakeholders to respond to HIV within their context (NACC, 2014). The community was engaged to address HIV prevention, stigma reduction and support for those infected and affected. Community based interventions were expected to yield highest return on investment as communities understand their problem better and respond appropriately within their local context.

HIV financing in Kenya is either through the government budgetary system or donor administered programs by NPOs. Donors' extra budgetary allocation to NPOs is greater than the government on-budget support and has been increasing gradually (Kelly *et al.*, 2005). Kenya's expenditure on HIV for the period 2009/10 – 2011/12 totaled 2,466 Million US\$, with 70% of this resource coming from donors. Out of this amount, 49%-53% accounted for resources that the NPOs utilized in the HIV response in the 3-year period. (NACC KNASA, 2014). Though the World Bank has spent close to US 5 \$ Billion in the last 20 years on 700 projects in Africa, 50%

of these failed (Duggar, 2007), a failure rate that is above the 40% recorded in other poor regions in the world. With 50% success rate, the African projects are therefore lagging behind (Chauvet *et al.*, 2010) translating to projects failing to deliver on quality, schedule and cost. Due to the economic and social impact of HIV on communities, HIV projects should deliver on expected results within schedule and cost. This is especially since 53% of HIV financing in Kenya is channeled through community based projects (NACC KNASA, 2016). However, the amount of donor aid supporting HIV has not translated to proportionate reduction in new HIV infections, stigma and AIDS related deaths. The lack of expected results amounts to financial loss and stakeholder dissatisfaction. There is need therefore for more innovative ways of running these projects. To address this gap where efforts of project stakeholders do not translate to results, it is important to identify critical success factors that the project team should focus on. Since donors have strict limitation on budgets, scope and schedule for HIV projects, the need to identify CSFs that lead to successful projects that meet donor and beneficiary expectations need to be prioritized.

Objective of the study

This study sought to evaluate the influence of project technical skills on performance of community based HIV projects in Kiambu, Kenya.

REVIEW OF LITERATURE

Theoretical Framework

Two theories have been discussed in this paper. These are human capital theory and skills theory.

Human Capital Theory

Human Capital as a theory was proposed by Schultz (1961). In 1981 he further developed on this term arguing that human abilities are either inborn or acquired, and these abilities transform into human capital when developed further (Armstrong, 2009). Fisher *et al.*, (2003) and Bontis *et al.*, (1999) observes that human resource which include intelligence, skill and mastery is most important in organizations, and how this resource is managed gives the project a competitive edge. Armstrong (2009) notes that human capital includes intellectual, social and organizational capital, with knowledge, networks and interactions and stored information being key. Human capital remain a valuable asset in projects and is key in determining their performance. Fugar *et al.*, (2013) supports this view that human capital remains core in projects and determines their competitiveness and profitability. Specifically, the project manager ought to have well developed communication skills, be able to manage people, time and resources well, be able to resolve conflicts and be willing to take risks (Sudhakar, 2012). The theory recognizes people as assets and the need for an organization to realize so and invest in them to generate returns. This theory supports project manager competence and technical skills as critical factors for performance of community based HIV projects. Though the human capital theory addresses the project team

skills aspect, it does not address their attitude which could affect acceptance of the project and consequently its implementation.

Skills Theory

Skills theory focuses on what characteristics make leaders effective. This theory was proposed by Robert Katz in 1955 and Michael Mumfords in 2000. According to the leadership approach the skills, knowledge and abilities of a leader determines their effectiveness. A leader can learn skills and accomplish more after achieving competency and proficiency (Northouse, 2007). Therefore, the degree of importance of each skill whether conceptual, human or technical is a correlation of the project team member's position in the project (Katz, 1995). This theory lays more emphasis on learned skills as a determinant of performance than traits. Mumford *et al.*, (2000) observes that an effective leader should have personal attributes, competencies, experience, leadership skills and ability to handle environmental influences. A leader's performance is therefore influenced by their knowledge and skills. Skills theory places leadership performance on learned skills rather than on personal traits. Therefore, any person could learn and adapt to a specific set of skills to become a leader.

Empirical Literature

Shair (2016) studied the role of project technical skills on success of Kazi Kwa Vijana government projects in Kenya. Using a descriptive research survey design, he administered a questionnaire to 217 respondents after selecting the sample using simple random sampling from a population of 500. Using SPSS, descriptive and inferential statistics were generated and study findings presented in charts and tables. The results were that recruitment of KKV employees wasn't informed by similar projects and that since there was no regular trainings, the employees couldn't transfer the gained knowledge. Further, the project lacked internal systems to monitor finances leading to poor budgeting. Similarly, the project lacked schedule and activity tracking and as such project progress evaluation and reporting wasn't done. This study supported the research by identifying technical skills as project CSFs.

Serhan and Draganov (2016) study aimed at exploring how the project manager as a leader is communicating with the different stakeholders in order to reach the sustainable goals of his/her project. Primary data was collected using a questionnaire that was sent to project managers from different countries, that are working with projects focusing on implementation of sustainability in their projects and project managers that are not focusing on sustainability in their projects. A comparison between the answers of the different project managers was made, in order to determine in each phase of the project, if there is a difference in the stakeholder engagement and use of communication skills, when it comes to project managers working on construction projects with a focus on sustainable development. Communications skills are essential for

addressing the sustainable aspect of a construction project, because it is more complex. Therefore, communication is essential for solving the sustainable challenges of a project.

Bwoma (2011) undertook a study on the influence of technical skills on performance of youth projects in Kisii. Using a descriptive survey, he targeted a population of 1400 youths. He sampled 302 youths and administered questionnaires to 21 youth groups. He used quantitative and qualitative techniques to analyze the collected data. The findings were that the youth groups required training on entrepreneurial skills including financial management, leadership skills and business and marketing skills. This study supported the current research by identifying technical skills as influencing performance. Rotich *et al.*, (2014) administered a questionnaire and interview schedule to 36 project managers from 7 NGOs in Uasin Gishu County. Their research identified planning, leadership and monitoring as affecting project performance. Though this research contributes to CSFs in the NGO sector, it failed to put into consideration stakeholder participation and community ownership of the project. Doherty (2011) in his study of CSF for IT projects administered a questionnaire to 519 project managers with experience on IT projects and who were members of Project Management Institute (PMI). He proposed six critical success factors which included top management, clear project goals, project manager skills, expertise of the project team, realistic project schedule, and obtainable project requirements. While this research informs the present study, it did not address stakeholder involvement and environmental factors.

Mbawi and Muchelule (2015) identified planning, management support and social capital, communication, monitoring and evaluation as CSFs for performance of public universities in Kenya. They administered a questionnaire to 12 project managers and 124 team members. Their study supports the current study for search for CSFs by identifying planning, governance and technical skills but failed to address stakeholder involvement and environmental factors. Mwaura and Karanja (2014) administered a questionnaire to 52 respondents from Community Based Organizations in Kisii County on performance of their projects. They identified project governance, project management, financial management and community participation as critical factors for project performance of CBO projects. This study contributed to the search for CSFs for community projects. It however did not address top management and project goals as CSFs.

In their study of CSF for International Development projects in Maldives, Yamin and Sim (2016) received 41 responses to a questionnaire administered to a project team. They observed that coordination; monitoring; project design; institutional environment; and training were ranked as the most important project CSFs. Their study identified monitoring and environmental factors, but failed to consider stakeholder support and acceptance by beneficiaries. Its main focus was only on organizational internal factors thus ignoring CSF associated with factors external to the organization. Wang and Hu (2012) undertook a study on role of communication on project performance. They collected data using questionnaires which was analyzed using SPSS. They

found that communication was positively and significantly related to project completion on schedule, hence overall performance. Phiri (2015) studied influence of monitoring and evaluation on project performance. The study conclusion was that monitoring and evaluation had a positively and proportional influence on project performance. The study noted that there was need for the project to have an M&E plan before commencing implementation.

RESEARCH METHODOLOGY

This study used a descriptive survey to determine the relationship between project technical skills and performance of community based HIV projects. Proportionate stratified sampling was used to generate a sample from each of the 12 sub counties in Kiambu County. The total population of NPOs implementing HIV community based HIV projects is 249. A sample size of 151 was generated with the sample size of each stratum/sub county being proportionate to the population size of the same stratum/sub county. The number of NPO in each strata/ sub-county was listed and a random number generator used to identify the NPOs in each stratum who would form the sample size. A structured questionnaire with closed and open ended questions collected primary data. A pilot study to test the reliability and validity of the data collection instrument was done. Cronbach’s alpha α assessed the reliability coefficient of the research instrument. The Cronbach's Alpha was above 0.7 making the study reliable. Study validity was tested using The KMO and Bartlett’s Test of Sphericity (BTS). The KMO value was above 0.5 and BTS below 0.05 making the study valid. The questionnaire data was tabulated using computer excel package and analyzed using IBM Statistical Package for Social Science (SPSS) version 21.0. Descriptive statistics, measure of central tendency, measure of dispersion and inferential statistics comprising of coefficient of determination, ANOVA, correlation and linear regression model were used to study the relationship between the independent and dependent variables. Data was presented in tables.

RESULTS AND DISCUSSION

Descriptive analysis

Descriptive analysis was conducted on the statements on project technical skills. The results are shown in Table 1. To interpret the results, totally agree was combined with agree to be agree and totally disagree was combined with disagree to give disagree.

Table 1: Descriptive Statistics for Project Technical Skills

Statements	totally disagree	disagree	not sure	agree	totally agree	Mean	Std. Deviation	CV
Progress against objectives	1.50%	3.80%	0.00%	54.60%	40.00%	4.28	0.79	0.18
Progress against budget	2.30%	5.40%	4.60%	45.40%	42.30%	4.20	0.93	0.22
Project status report	3.10%	3.10%	3.80%	36.20%	53.80%	4.35	0.93	0.21
Project monitoring plan	2.30%	6.90%	3.80%	36.20%	50.80%	4.26	0.99	0.23
End of project report	2.30%	0.80%	9.20%	29.20%	58.50%	4.41	0.87	0.20

Stakeholders updated	3.10%	5.40%	5.40%	46.90%	39.20%	4.14	0.96	0.23
Effective communication	0.80%	1.50%	0.00%	49.20%	48.50%	4.43	0.66	0.15
Lessons learnt	1.50%	6.20%	6.90%	43.80%	41.50%	4.18	0.92	0.22
PMIS used	4.60%	6.20%	29.20%	31.50%	28.50%	3.73	1.08	0.29
Communication plan	33.80%	21.50%	16.90%	13.10%	14.60%	2.53	1.44	0.57
Average						4.05	0.96	0.25

Results in Table 1 indicated that majority respondents at 94.6% (55.6%+40.0%) agreed with the statement that the organization routinely track progress of the project activities to ensure that objectives are met. The statement had a mean score of 4.28 and a standard deviation of 0.79 implying that majority respondents agreed to the statement with low response variation. The results also showed that majority respondents totaling 87.7% (45.4%+42.3%) agreed to the statement that the organization routinely track progress of the project activities against budget. The statement had a mean score of 4.20 and a standard deviation of 0.93 indicating majority respondents agreed to the statement with low response variation. Further, the results indicated that majority respondents at 90% (36.2%+53.8%) agreed to the statement that the project manager submits project status reports to management. The response had a mean score of 4.35 and standard deviation of 0.96 implying that majority respondents agreed to the statement with low response variation. Furthermore, the results showed that majority respondents at 87% (36.2%+50.80%) agreed with the statement that project monitoring plan is developed prior to implementing project. The statement response had a mean of 4.26 and standard deviation of 0.99 implying majority respondents agreed with the statement with low response variation. Additionally, the results indicated that majority respondents at 87.7% (29.2%+58.50%) agreed that end of project report is used for decision making to inform future projects. The statement had a mean of 4.41 and a standard deviation of 0.87 implying majority respondents agreed to the statement with low response variation. This is in line with Luke (2014) who found out that monitoring tracks project progress against time, resources and performance schedules, and identified areas requiring attention and action. This tracking of progress against targets ensures the project completion is within schedule and budget. Monitoring is a short term continuous assessment and takes into consideration project activities and outputs while evaluation looks at outcomes and impact. In addition, results indicated that majority respondents totaling 86.1% (46.9%+39.2%) agreed with the statement that project stakeholders are well informed on project progress as necessary. The statement had a mean of 4.14 and a standard deviation of 0.96 indicating majority respondents agreed to the statement with low response variation.

Moreover, results revealed that majority respondents at 97.7% (49.2%+48.50%) agreed to the statement that project manager is able to communicate effectively with the team and top management. The statement had a mean of 4.43 and a standard deviation of 0.66 which indicates that majority respondents agreed to the statement with low response variation. The results also revealed that majority respondents at 85.3% (43.8%+41.5%) agreed that the project team

regularly documents lessons learnt and best practices to inform future projects. The statement had a mean of 4.18 and a standard deviation of 0.98 meaning that most respondents agreed to the statement with low response variation. The results equally revealed that majority respondents at 60% (31.50%+28.50%) agreed that documents/information sharing and storage is done using Project Management Information System (PMIS). The mean of the statement was 3.73 and the standard deviation was 1.08 meaning that majority respondents agreed to the statement with low response variation. Finally, majority of the respondents 27.7% (13.1%+14.6%) agreed that there is a project communication plan for communicating with stakeholders. The statement response mean was 2.53 and the standard deviation was 1.54 implying majority respondents agreed to the statement with low response variation. This concurs with Larson & Gray (2014) who noted that since communication involves giving and receiving feedback, it is critical in the project cycle. The success of the project will largely depend on how the project manager communicate with the project team, stakeholders and the beneficiaries. A communication plan is important as it outlines information flow to the project stakeholders and forms part of the project plan. Overall, the average mean of the responses was 4.05 indicating that majority of the respondents agreed to the statements in the questionnaire on project technical skills. The standard deviation was 0.96 indicating that responses clustered around the mean response. Nazari and Nurbakhshian (2016) found that communication skills are effective in improving the management process of managers and to achieve the organizational goals. Serhan and Draganov (2016) found that communications skills are essential for addressing the sustainable aspect of construction projects due to their complex nature.

Pinto and Slevin (1987) notes that the typical project manager is charged with successful project results within constraining power, budget and people. They note the need for the project manager to have requisite tools to help transition from strategic to tactical aspects throughout the project cycle. To further succeed, the project manager requires technical and administrative skills as well as good rapport with top management (Pinto & Slevin, 1987, Morgan, 2012). Project success is affected by the level of autonomy and authority that the project manager exerts on the project. Larson and Gray (2014) observes the need for the project manager to have autonomy and authority to make project decisions.

Content Analysis

The respondents were asked to give reasons why they consider project monitoring and evaluation as critical in project performance. The results are presented in table 2.

Table 2: Importance of Project Monitoring and Evaluation

Monitoring and evaluation	Themes	Frequency (%)
1	Tracking of budget progress	19
2	To inform future projects	16
2	Identifying problems	10
4	Evaluation of objectives	42
5	Effective resource utilization	13
Total		100

Majority of the respondents (42%) indicated that project monitoring and evaluation is important in determining if the project objectives are being met. Otieno (2000) observed the important role of project monitoring and evaluation when it is timely and professionally done. Since each project is unique, the project monitoring and evaluation plan should be agreed on during the planning phase. According to Mahaney and Lederer (2010), the role of monitoring is to ensure that the project is within expected budget, schedule and quality.

Respondents were asked to provide information on channels of communication available to the project team and stakeholders, and the barriers to effective communication. The results are presented in Table 3 and Table 4.

Table 3 Channels of communication

Channels of communication	Themes	Frequency (%)
	1 Meetings	10
	2 Emails	7
	3 SMS	42
	4 Reports	17
	5 Cell phone calls	24
Total		100

Majority of the respondents (42%) indicated that SMS is the major channel of communication. Each stakeholder requires an effective communication channel as success of a project largely depends on how efficient its communication network is. This communication process that is clear, concise, effective and efficient ought to be available during the project cycle to stakeholders and the team. According to Rajkumar (2010), only 7% of our communication is verbal with 93% being nonverbal and inclusive of tone of voice, posture and facial expressions. As such, the project manager should be aware of both the communications content and the unspoken messages. Project expectations or targets at every project stage should be communicated in an open and honest manner. Hvyari (2006) found that communication significantly contribute to project performance. The PMI reported that among companies with highly effective communication, 80% of projects met their goals, compared to a 52% success rate for those with minimally effective communication. The more effective communicators

enjoyed much higher rates of on-time and on-budget performance, as well. Such communication as status meetings should have a regular schedule while others may be impromptu as need arise. A communication plan should clearly detail the communication requirements of each stakeholder, which include what is to be communicated, when, by who, and how it is to be done based on the stakeholder interest and influence in the project.

Respondents were also asked to list down the barriers to effective communication in the community based HIV project. The results are presented in Table 4

Table 4: barriers to effective communication

Barriers	Themes	Frequency (%)
1	Language barrier	43
2	Fear of victimization	10
3	Culture	5
4	Age	7
5	Time	11
6	Literacy level	24
Total		100

Language barrier was found to be the major barrier encountered in communication as indicated by majority of the respondents who were 43%. Some of the identified barriers to effective communication according to Rani and Amat (2017) include; logistics, language, technical capability, experience and workload.

Correlation analysis for project technical skills

Table 5 Correlation analysis between project Technical Skills and performance

Variable		
Project Technical Skills	Pearson correlation	.730**
	Sig. (2 tailed)	0.000

Results showed a positive relationship between project technical skills and project performance ($\rho = 0.730$). Phiri (2015) noted that monitoring and evaluation has a directly proportional influence on project performance hence a need for project monitoring and evaluation plan.

Regression Results for Project Technical Skills

Table 6 presents the model fitness for used for regression model in explaining the study phenomena.

Table 6: Model Fitness for Project Technical Skills

R	R Square	Adjusted R Square	Std. Error of the Estimate
.730a	0.534	0.53	0.36273

The results in table 6 show that project technical skills were found to be satisfactory in explaining project performance. This is supported by coefficient of determination also known as the R square of 53.4%. This means that project technical skills explain 53.4% of the variations in the dependent variable which is project performance. Phiri (2015) showed that technical skills have directly proportional influence on project performance. Table 4.7 presents the ANOVA results for project technical skills

Table 7: ANOVA Results on Project Technical Skills

	Sum of Squares	df	Mean Square	F	Sig.
Regression	19.27	1	19.27	146.456	0.000
Residual	16.841	128	0.132		
Total	36.111	129			

Table 7 provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant. Further, the results imply that project technical skills as the independent variable is a good predictor of project performance. This was supported by an F statistic of 146.456 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level. Serhan and Draganov (2016) noted that technical skills such as communication is essential for solving the sustainable challenges of a project. Table 8 presents the optimal model for project technical skills.

Table 8: Optimal Model for Project Technical Skills

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.605	0.271		2.23	0.027		
Technical skills	0.799	0.066	0.73	12.102	0.000	1.000	1.000

Regression coefficients in Table 4.8 revealed that there was a positive and significant relationship between project technical skills and project performance ($r=0.799$, $p=0.000$). This was supported by a calculated t-statistic of 12.102 which is larger than the critical t-statistic of 1.96 (Kothari, 2013). These results agree with Phiri (2015) that monitoring and evaluation influence project performance. Larson and Gray (2014) noted that communication is important in the project cycle as it involves giving directions and receiving feedback. The success of the project will largely depend on how the project manager communicates with all project stakeholders and beneficiaries. A communication plan is important as it outlines information flow to project stakeholders and forms part of the project plan.

The model for project technical skills is

$$Y=0.605+0.799X_1 +$$

Where:

Y= Project Performance
X₁= project technical skills
= Error term

Hypothesis testing for project technical skills

The hypothesis to be tested was

H₀₁: Technical skills have no significant influence on performance of community based HIV projects in Kenya.

The hypothesis was tested using simple linear regression (Kothari, 2013) and determined using p-value (Table 4.8). The acceptance/rejection criteria were that if the p value is greater than 0.05, the null hypothesis is not rejected, but if it is less than or equal 0.05, we reject the null hypothesis. The null hypothesis is that critical skills have no significant influence on performance of community based HIV projects in Kenya. Results in Table 4.8 show that the p-value was 0.000. This was supported by a calculated t-statistic of 12.102 which is larger than the critical t-statistic of 1.96. The null hypothesis was therefore rejected. The study therefore adopted the alternative hypothesis that technical skills have a significant influence on performance of community based HIV projects in Kenya.

CONCLUSIONS AND RECOMMENDATIONS

The objective was to determine the influence of project technical skills on the performance of Community based HIV projects in Kenya. The findings were that project technical skills satisfactorily explained project performance. The ANOVA analysis results showed the model as statistically significant. Results indicated project technical skills as the independent variable is a good predictor of the dependent variable. Overall result showed a positively significant relationship between project technical skills and project performance.

Conclusion

The study concluded that technical skills have a positive and significant relationship with project performance. Monitoring and evaluation as well as communication skills are an essential component of project implementation. A project manager who effectively communicate with the project team and stakeholders will achieve a successful project as correct, adequate and timely information reaches the audiences. Effective communication channels should be used based on the beneficiaries' literacy level, culture, age and available resources. Monitoring and evaluating of the project's progress should be done in order to identify problems that may arise, and solve them timely. Monitoring and evaluation also ensures that allocated resources are efficiently and effectively utilized and project's objectives are achieved.

Recommendations

Based on findings that technical skills positively affect project performance, the study recommends that project managers and the project team possess professional qualifications and training in monitoring and evaluation, and effective communication skills. The projects should also have a monitoring and evaluation plan, and a communication plan or strategy targeting each stakeholder. These should be agreed upon before project execution. Project managers and top management should make communication a priority by developing a communication strategy for the project to address who needs what information and when. Stakeholders should be kept updated on the project progress and these updates should be clear and concise, with clear information on what is expected of them and the timelines. There is also need for a feedback mechanism from the project manager to the team and stakeholders and vice versa. Open communication including clearly articulating setbacks and problems in the project and possible solutions also be done. What's more, communication channels should be diverse including emails, face to face updates, phone calls, short messages to keep the message recipient interested and for them to pay attention to the details. Project managers should strengthen monitoring the project throughout the project cycle to provide timely updates on the project progress, to measure the progress made in achievement of objectives and use of the project budget. Lessons learnt should be identified and documented as the project progresses rather than waiting to identify them at key milestones or at the end of the project as the team may have forgotten them or may be focused in closing the project rather than documenting lessons learnt. Furthermore, documentation of lessons learnt should be included in the projects standard procedures or templates.

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Contribution of Education Technology to Continuation of Teaching and Learning During Covid-19 Disruption

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Abstract

Covid-19 pandemic brought about unprecedented challenge to in person learning in secondary schools all over the world. This disruption affected between 1.2 -1.5 billion learners. To ensure that access to secondary education continued, learning in secondary schools transited to e-learning. It was realized that continuing to deny learners opportunity to continue with their education would be catastrophic. It would lead to dropouts and other undesirable outputs. In this desktop study, the researchers sought to consolidate from various literature published in order to find out how education technology contributed to teaching and learning in secondary schools in developed and developing countries. Literature shows that immediately world health organization declared Covid-19 as pandemic, developed countries such as United Kingdom switched their learning systems from in person to digital. Literature also shows that during the period, there was very high demand for e-learning platforms in developing countries such as Bangladesh. Most of the developing countries did not possess a ready e- learning system to cater for majority of learners in secondary schools and therefore were not prepared for this disruption. After preparations they adopted e-learning through platforms such as radio and television. Literature highlights that during the adoption of e-learning systems in both developing and developed countries several challenges were experienced such as lack of infrastructure. The study recommended that developing countries should put in place e-learning systems in secondary schools to be used alongside in person learning so that whenever there is a challenge like what was and is being witnessed during Covid 19 disruption they can quickly switch to e-learning.

Keywords: *education technology, digital education, e-learning and covid-19, online learning, disruption*

INTRODUCTION

Emergence of Covid-19 in early 2021 contributed to massive disruption of face to face teaching and learning in secondary schools all over the world (UNESCO, 2020). In person learning could not go on as it was suspended to control the spread of the corona virus which was killing people in their thousands especially in countries like Italy (World Health Organization, 2020). This disruption affected between 1.2-1.5 billion learners all over the World.

Because of significance of secondary education to socio-economic development of various countries, education authorities in most countries sought for a way out of the quagmire. Majority of the countries in the world have invested heavily in secondary education due to its importance and allowing teaching and learning to cease until the disease is eradicated could result in

unprecedented losses. Therefore, there was need to have secondary education continue through some other reliable system (Cathy and Lalani, 2020).

There was need for a rapid education response and therefore there was a need to quickly switch to educational technology or provide remote learning, distance learning, online learning to help solve the problem brought about by COVID-19. According to Mwila and Mhagama (2020) education technology exists to help solve educational problems. COVID-19 disruption of teaching and learning was therefore a problem which educational technology could be used to solve so that teaching and learning in secondary schools could continue albeit remotely. Without some intervention the future of these learners would be destroyed. Through education technology, teachers could continue to facilitate learning through various channels such as radio, television, social media such as face book, WhatsApp, and twitter among others. These channels would allow teachers to interact with learners who had now shifted to their homes (Starkey et. al., 2021).

Munoz-Najar (2021) explains that World Education Technology an organization working under United Nations worked with ministries of education in member countries to provide technological assistance to countries so that they could roll out virtual learning. It is not the first time educational institutions were using educational technology to facilitate school activities. Educational technology which is defined as application of scientific processes in solving educational problems has been in existence for many years. It involves application of various media such as broadcast technology to solve education problems. At this juncture it is worthy to note that the use of educational technology in solving education problems had not been taken so passionately until this pandemic emerged. This shows that education technology can be very beneficial during normal and during crisis.

According to Zhang and Aikman (2007) information and technology which are the main enablers of education technology have been developing very quickly in recent years and have opened new directions in the area of education. The authors emphasize that education has to go with technological change to cope with the current world changes. Education has not been left behind it too has been impacted with information and communication technology.

METHODOLOGY

The current study which is a desktop study seeks to find answers from literature on what role educational technology played during Covid-19 disruption. Specifically, the study seeks to find answers to questions such as how educational technology was deployed to support teachers' roles, how education technology was used to support learning and identify any challenges which were experienced. Lessons drawn from the study in form of recommendations should help educational actors to make educational technology more effective in future.

RESULTS AND DISCUSSION

Contribution of Education Technology to Teaching and Learning

Onyango and Tangi (2020) indicate that the major role of a teacher is to facilitate learning. This is a process which is facilitated through effective communication which traditionally involves face to face interaction. Emergence of covid-19 which resulted in secondary schools being closed

could not allow this face to face interaction to go on. So how was educational technology used to support teaching and learning during the closure of secondary schools?

There was partial and complete closure of schools, this led to the rise of e- learning. This means that schools shifted to online platform. Cathy and Lalani (2020) indicates that in countries such as South Korea, China, Singapore, USA, UK, France and Denmark secondary schools were closed immediately in March, 2020. Learning in secondary schools in these countries immediately shifted to online platform. Cathy and learning observes that prior to COVID-19 outbreak, most of the developed countries had invested heavily in educational technology. It is estimated that the investment in educational technology was worth \$18.66 billion by 2019.

It is further observed that during the onset of covid-19, demand in e-learning was massive until the suppliers could not match the demand. In countries such as India, there was a huge demand for education technology. Learners requiring the platform to continue with their learning were so huge. In China about 250000 students were initially involved. In China online learning platforms such as Ten cent were extensively used to deliver learning materials to both teachers and students. In Singapore Lark, an online learning platform which is a collaborative suite began offering teachers and students unlimited video conferencing time and auto translation. Ding talk an online learning platform also supported large scale learning. It tapped into Alibaba cloud technology to deploy more than 100000 new cloud servers in just a short period to support online learning in China. This rapidly expands within a short period to meet the demand (Munoz-Najar, 2021).

In USA secondary education is decentralized. In order to roll out online learning, the school districts formed partnerships in order to benefit from economies of scale. These partnerships were unique. In districts such as Los Angeles, various school districts came together and agreed on how they would use educational technology to continue with teaching and learning in their districts (Cathy and Lalani, 2020).

Similarly, Prestridge and Cervera (2021) explains further how technology supported teaching and learning by arguing that that through educational technology teachers were able to teach at a distance. Educational technology enabled a synchronous and synchronous communication with classes and groups of learners. It also enabled teachers to access to learning materials and interactive collaborative materials.

This shows that education technology was able to play its role effectively by allowing students to participate in learning. It allowed teachers to engage learners in productive learning process. Education technology is supposed to connect teachers to learners if used remotely. This connection enables teachers to communicate with learners this allows interaction and hence learning. In some countries through technology learners collaborated. Learners also learnt to use digital equipment such as smart phones. They were able to use applications such as WhatsApp and Twitter to form their own study groups. This is good for their future as some of the competencies gained during this period could be used in future to establish small scale enterprises. This happened in countries such as Kazakhstan and others which deployed educational technology. In Kazakhstan, secondary school teachers were required to prepare content and disseminate it online. Media such as TV and social media solutions were used. Some countries which had partial closures used a blended program which involved face to face learning and some technology (Munoz-Najar, 2021).

It is also significant to note that during the crisis, some governments enhanced their support for teachers. In Nigeria, the government introduced coaching program for teachers. This enabled the teachers to support each other through collaborations and partnerships. In Estonia hotlines were established to support teachers who needed support. This was done through information technology foundation for education they were able to solve all problems related to use of technology in teaching (Baron et al., 2021).

Countries in Africa were also affected by COVID-19 disruption. After a call by UNESCO for African countries to ensure that learning in secondary schools was not disrupted by Covid-19 outbreak, Ministry of Education in Tanzania launched e-learning platform. This was done through media such as radio and Television. Programs were distributed to various public and private media in the country. This was done so as reach as many students as possible who were scattered all over the country. These programs were prepared by Tanzania Institute of Education (TIE). Speaking about the lessons a student in Tanzania had this to say: ` we have normal lessons from 7.45am to 2.00pm and have a break at 1.00am and 12 pm. All of this is done through online learning`. The programs involved all the subjects which are offered in secondary education curriculum. Some private schools in Tanzania developed their own programs and used the same support teaching and learning in their schools during the covid-19 disruption (UNESCO, 2020).

In Kenya, Kenya Institute of education also developed programs which were aired over radio and television. Parents were encouraged to ensure their children participated in this program especially those students were due to sit for their final examinations. Private schools in Kenya also tapped into educational technology and used it to continue learning. This enabled the schools to complete the syllabus on time. Some of the private schools which used technology expect do well in forth coming national examinations as compared to their colleagues who never deployed this innovation (Njenga, 2020).

Challenges Experienced

This section discusses challenges which were experienced. The first challenge which was experience is availability of infrastructure to support use of education technology. Schools that required computers to support the technology did not have adequate computers some even lacked a single computer to help them participate in the program. In some countries internet availability was a problem especially in rural areas and therefore learners in this areas could not fully participate in on line learning. In some areas where there was internet the signal was so weak and therefore very slow. This made it hard for teachers and students to participate. High cost of acquisition and maintenance of ICT equipment such TV screens, Ipads was a barrier that constrained adoption of education technology during COVID-19 education crisis. Another problem was lack of stable electricity in some areas during the period, irregular power supply made the situation dire (Baron et al., 2021).

Readiness was another problem. Transition from in person learning to virtual learning was a night mare in some countries. In fact, it was a shock to many teachers and learners. This was experienced in many ways for example in some countries teachers lacked ICT skills, others could not produce content to be aired and some could not operate the equipment used due to technological illiteracy while on the other hand there was no adequate time to procure ICT devices for effective use of technology during the crisis. This made it the situation difficult for teachers and learners (Ngwacho, 2021; Njenga, 2020).

CONCLUSION AND RECOMMENDATIONS

Conclusion

This section presents information about the conclusion of the study. The study sought to find out from literature on how education technology contributed to teaching and learning during COVID 19-Pandemic. Literature shows that education technology contributed to continuation of teaching and learning in secondary schools as it enabled the teachers to access their secondary school students through various channels such as TV, radio among others. This enabled the teachers to engage learners through online chats, live discussions. Teachers were able to give assignments through these channels and even mark the assignments and give feedback. Demand for e learning resources increased rapidly this is good for the future of teaching and learning in secondary schools.

In some countries the crisis led to enhanced partnerships between school districts in USA in building teacher capacity this is good for the teaching profession. The crisis enabled teachers and students to learn to use ICT resources such as phones in learning this has contributed to adoption of ICT in self-learning. This has made majority of the learners to be independent and learn on their own. In a long run, it will reduce over-dependence on teachers by secondary school students all over the world if it is effectively blended (Baron et al., 2021).

Availability infrastructure is a major factor which also affected the utilization of education technology during COVID 19 crisis. This is to say that with the absence of software and hardware teachers and learners could not take part effectively in online teaching and learning. The study shows that there was a digital inequality between developing and developed countries. Schools in developed countries switched immediately while those ones in developing countries could not due to numerous challenges related to infrastructure.

Recommendations

Based on the conclusions, this study recommends that there is need to gradually grow infrastructure that supports education technology such as internet connectivity, electricity, acquisition of necessary hardware and software. Governments in developing countries need to acquire hard ware and software to support education technology. There is need to invest more in technology especially in improving teacher effectiveness. There is need to equip teachers with necessary skills so that they can comfortably use technology. This will enable teachers to access right materials and come up with innovative ways of engaging learners during the use of educational technology, for example, during live discussions. There is need for countries to join initiatives such as technology for teaching this will benefit their teachers. COVID-19 crisis in education called for full adoption of education technology in secondary schools, this could not work effectively due to some of the challenges mentioned above. Most of the programs were more centralized; Tanzania and Kenya are good examples. The radio and TV programs aired by some local radio and TV channels followed a certain schedule. Teachers and learners had to learn how to divide their time. There is need to decentralize these programs so that flexibility can be achieved. There is need to adopt blended teaching and learning where face to face teaching is used alongside technology and this would prepare schools for other crises such as COVID -19. There is need for researchers in educational technology to come up with systems which will

incorporate instructional design principles and principles of teaching such as respect for diverse talents rather than treating learners uniformly.

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Assessing the Influence of School Environmental Programmes on the Environmental Attitudes and Behaviour Among Secondary School Students in Muranga County, Kenya.

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Abstract

Environmental degradation is a major challenge which requires appropriate strategies to reverse the situation. One of such strategies is experiential environmental education among high school students who, through change of attitudes and behavior, are able to participate in various environmental management activities. In this study the pro-environmental attitudes and behavior of high school students in Murang'a County, Kenya were examined to assess how environmental education programmes among the students affected environmental issues of waste management, water resources management, natural resources management and climate change in the schools. Nine hundred and sixty-one (961) students from nineteen (19) high schools from two sub-counties in the County was used in the study. The Likert type questionnaire and the 2-MEV Scale were used to collect the required data. The t-test statistic was applied to determine any differences between the variables. Results showed significant differences in pro-environmental attitudes and behavior with regard to solid waste management, water resources management, natural resources management. There were significant differences with regard to solid waste management, natural resources management, climate change and environmental concerns between members of Environmental Clubs and non-members. Pro-environmental attitudes and behavior were influenced by current membership of the Clubs rather than past membership. It is concluded that experiential environmental programmes improve the student's pro-environmental attitudes and behavior hence environmental management within the schools. It is recommended that appropriate policies be formulated to enhance the implementation of school experiential environmental programmes to ensure capacity building of the learners to effectively manage environmental issues in the schools.

Key words: *Environmental Education, Experiential Environmental Programmes, Pro-environmental Attitudes and Behaviors*

INTRODUCTION

Environmental degradation is a growing problem both locally and internationally, and will continue to be an issue in the future (Joldersma, 2017). This is because of the belief that “natural and physical resources are free and inexhaustible, and that the environment can assimilate all our wastes, leading to unsustainable use of resources” (Yarime *et. al* ,2012). Indeed, conservation scientists now posit that the earth is facing a sixth mass extinction (Johnson 2017). The on-going degradation can be attributed directly to human activity which has contributed significantly to the increasing crisis (Joldersma, 2017).

Therefore, since human action is at the heart of environmental issues, sustainable development ultimately depends on changing human behavior (Zelenika *et. al*, 2018). Notably, it has been noted that environmental degradation has been preceded by a long-standing erosion of environmental values from the human value system (Sanrakshan, 2014), which means it can also

be managed by changing relevant behavior. Indeed, according to Glázar *et. al* (1998), negative attitudes towards the environment and a low level of environmental awareness among the population are variables that can have a great social impact, highlighting the need for education for sustainable development.

Solutions to environmental issues acknowledge that environmental problems are not only problems of development, but basically problems of knowledge and education that go beyond learning about the environment, and that also have to do with the way in which environmental problems are understood and addressed (Sharma, 2016). Subsequently, coping with these problems requires education and engagement (Dillon, 2016), making environmental education increasingly important (Wals, 2014).

Environmental education is thus the key catalyst (Kaur, 2020), for the needed change, and a primary means of achieving environmental protection (Sharma, 2016). It is among the most effective strategies that does not require a large enough cost to change people's perspectives and attitudes towards the environment (Habibie, 2020).

To halt and reverse the ongoing degradation therefore requires appropriate mechanisms and strategies that promote environmental education, including policy formulation at both global, national and local levels, and upscaling of best practices. One other strategy to address this issue points at experiential environmental education among high school students who, through change of attitudes and behavior, are able to participate in various activities that conserve the environment.

In Kenya, environmental education (EE), both formal and informal, has been introduced to change students' attitudes and to appreciate environmental concerns (GoK, 2013). Kenya has incorporated environmental education considerations in the school curriculum (Kenya Institute of Education, 2002) and integrated it in the teaching of various subjects, both in the sciences and social subjects. This teaching of environmental education in Kenyan schools aims to develop in the students an appreciation of the environment, create positive attitudes and thereafter facilitate positive behaviors which will lead to the effective management and conservation of the environment (Kenya Institute of Curriculum Development, 2016). Subsequently, the knowledge and education among the students should be made manifest through positive environmental attitudes and behavior in society, leading to sustainable environmental management in the country.

However, despite environmental education being implemented in schools, the anthropogenic environmental impacts continue to increase in scale, which implies that the results on EE have not been seen (Kristalinawati, 2019). This means that EE as taught in schools does not seem to have the desired impact of promoting environmental conservation and instilling pro-environmental values and behavior. As such, the ongoing environmental degradation challenges have not been adequately addressed with most Kenyan citizens exhibiting poor environmental attitudes made manifest through negative environmental behavior

To boost environmental literacy and pro-environmental behavior, several experiential programmes are run in schools through clubs and societies. The purpose of this study was to investigate whether students' engagement in these experiential environmental programmes, which provide direct learning and conservation experiences among secondary school students,

positively impacts on instilling pro-environmental attitudes and behavior among learners in Kenya and Muranga county in particular. The study compared environmental knowledge, attitudes, and practices of secondary school students in their final year of secondary education who have participated in such experiential environmental programmes, so as to assess pro-environmental behavior which is an indicator of environmental education success (Hidayah, 2017).

METHODOLOGY

The study sites were located in two sub-counties in Muranga County, one of the 47 counties in Kenya. The county is in Central Kenya and is located in the Upper River Tana region. The County was selected because learners here have a higher chance in engaging in environmental management activities. The site also gives two different eco-systems – one that is semi-arid in the lowlands, and another that is humid in the highlands, and which mirrors the Kenya country context with regards to highlands and Arid and Semi-Arid lands (ASALs), meaning that study results from the study can be cascaded to reflect the situation in the country. The study sample was drawn from 19 secondary schools, of which 9 were from Kahuro (in the highlands) and 9 in Muranga South (in the ASALs) sub-counties. The total number of students sampled were 961, of which 44% were from Kahuro and 56% from Murang'a South. In terms of gender, female students were 58.8% and male were 41.2% of the total sample.

The study used quantitative methods in the collection of knowledge, attitudes and practices among the secondary school students. The questionnaire used tailored and based on the Environmental Attitude/Awareness Scale of Hassan Taj Environmental Attitude Scale; the 2-MEV Scale; "Attitude Scale for Environmental Issues" developed by Saraç and Kan (2015); and standardized tool of Environmental Behavior Scale (EBS) by Urmila Verma and Archana Singhal (2012). The questionnaire focused on knowledge, attitudes and practices, and avoided questions of an academic nature.

RESULTS AND DISCUSSION

Participation of Students in Clubs and Societies

There was good student membership in clubs and societies with an environmental component among the students sampled, with 51% of students being members, while 49% were non-members. In terms of sub-county, 47.5% of students in Murang'a South Sub-county were members of environmental clubs, while in Kahuro Sub-county, membership stood at 53.9%. With regard to gender, 52.9% of male students are members of environmental clubs while female membership stood at 48.9%. Membership of clubs and societies is voluntary in most schools. Students are usually attracted to those Clubs and Societies that are active and this is the main reasons that would explain the student membership in Clubs. Activity in the Clubs and Societies depended on school support, with regards to having a Patron who was active and supportive, and financial and material support from the school administration.

Scouts had the highest percentage of participants at 23 % of student Club members; followed by Wildlife clubs (22%); environmental clubs 21%; and Young farmers (19%). Other main clubs were: School Greening; Health club; while the smaller clubs included the Presidential Awards Scheme, Red Cross, and Peace Club, who were all engaged in some environmental activities.

Categories of Environmental Knowledge, Attitudes and Practices Among Respondents

The level of environmental knowledge, attitudes and practices was assessed in various environmental contexts and included: Solid wastes management; water resources management; hygiene; climate change and energy; natural resources management; and environmental concerns.

Solid Wastes Management

26% of the sampled students said they litter around when no one is watching. Of this group 15% did so because bins or they were far away; 8% because there were no bins; 15% of students did it sub-consciously; while 13% claimed it was due to ignorance coupled with carelessness.

When they get waste on the ground, 59% of the students sampled said they always picked it and placed it in trash bins; 7% always left it where it was; 25 % sometimes picked it up and put it in the trash bins, while 6% sometimes left it on the ground. When they finished eating something with some form of packaging while in a *matatu* (public transport vehicle); 27% of the sampled students tossed it out of the vehicle window; 7.5% threw it on the vehicles floor; 26% put it in the vehicles trash basket; and 36% kept it for later disposal in a trash bin.

The results of the study show that 45% of the sampled students had done some form of wastes recycling. Of these, 45% did it to keep the environment clean and for minimizing wastes generation; 36% did it for utility reasons as they were able to re-use the said products; while 19% did it for economic reasons such as saving monies or generating some money. Reasons given for not recycling were: Lack of technology (1.5%); lack of knowledge and know-how (1%); while 1% considered it a waste of time; and 0.5% saw no value in the waste to warrant recycling.

The findings of the study show 83% of students said they would willingly volunteer for a public clean-up exercise, while 17% said they would not. This is important to note because conservation work, and other pro-environmental practices are regarded lowly, and even regarded as punishment, or work for the lowly in society, thus creating a negative attitude among students about these pro-environmental activities. Ability to volunteer is thus an indicator of positive environmental attitudes.

Of the 'Yes' students, 64% said they would do so to keep the environmental clean; 15% said they would consider it as a community service; 8% for hygiene purposes and avoid diseases; 5% for environmental awareness creation within the community; and 3% as part of club activities. Among the 'No' students, 56% said they were busy and lacked time to volunteer; 23.4% said they were not interested; 13.3% said it was not their responsibility to clean; while 5.5% said it was risky with regards to their health. 83% of the students supported the ban on plastic bag carriers. Of these, 73% said they did so because the bags are agents of pollution (solid wastes and littering, air pollution when burnt); 21% because they are non-biodegradable; 2% because they block the drainage systems; and 1.2% because they can cause human diseases and animal deaths. Among those who did not support the ban (17%), the reasons given were that the bags were affordable (19%); the bags were re-usable (14%); have multiple uses (13%); and due to lack of good alternatives (12%). 23% consider school cleaning as part of punishment because it's mainly undertaken by wrongdoers; they came to school to study not to work (20%); its tiresome and time wasting (17%) and cleaning should be done by school support staff (7%). For those who did not consider cleaning of the school as punishment (76%); school cleaning was part of

ensuing a clean and habitable environment (49%), as part of conservation work and part of their responsibility (23%); and as a duty that moulds better future behavior (11%).

Table 1: T-Test Results for Solid Wastes Management

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Solid Wastes Management	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 6.99 K = 7.11	-0.441	0.197	-0.122	0.454
	Gender: Male (M), Female (F)	M = 6.65 F = 7.31	-0.986	-0.343	-0.665	0.000
	Membership of environmental clubs: Yes (Y); No (N)	Y = 7.20 N = 6.88	0.009	0.644	0.327	0.044
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 7.13 N = 6.87	-0.080	0.598	0.259	0.134

After undertaking the comparison of means by use of t-tests, as shown in Table 1, it was determined that:

- 1) There is a significant difference in behavior on solid wastes management between male and female students in Murang'a county with the female students exhibiting better pro-environmental behavior. This is because girls are more conscious of their surroundings and are also generally cleaner. They also like to be associated with cleanliness than boys. This is in line with Stern *et. al.* (1993) who found that women have stronger beliefs about the harmful consequences of poor environmental conditions for others, the biosphere, and self and that these beliefs predicted more pro-environmental behavior.

- 2) There is a significant difference in behavior on solid wastes management between members of environmental clubs and non-members in Murang'a county. The difference in pro-environmental behavior can be attributed to the fact that most of the environmental clubs in school are engaged in aspects of cleanliness, including provision and emptying of bins. The students are also involved in improving the aesthetics of the schools by planting flowers and trees and maintaining them. The clubs thus seem to have reinforced the student's pro-environmental behaviors with regards to solid wastes management. The first-hand experience in cleanliness is an important influencing factor to getting students interested in nature, and positively influences students' beliefs towards their natural environment and eventually leads to pro-conservation behavior (Sharma, 2016). The question is "how do we create first-hand experiential opportunities for school students to learn about the natural environment?"

Water Resources Management

When they find a tap running, 88% of sampled students said they would turn it off; 2% said they would leave it open; 6% would sometimes leave the tap open (and close it other times). With regards to showering, 16% of students said they would take the shortest time possible; 36% would save water as much as possible by closing taps when soaping; 25% closed taps after use; and 19% said they take the longest time possible. When brushing teeth, 7% would leave the tap running as they brushed; 85% saved water by closing taps and only opening water when they required it; while 5% used cups/glasses to save on water.

Table 2: T-Test Results for Water Resources Management

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Water Resources Management	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 4.00 K = 4.06	-0.210	0.104	-0.053	0.506
	Gender: Male (M), Female (F)	M = 3.83 F = 4.13	-0.406	-0.088	-0.247	0.002
	Membership of environmental clubs: Yes (Y); No (N)	Y = 4.09 N = 3.96	-0.021	0.295	0.137	0.089
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 4.03 N = 4.01	-0.152	0.195	0.021	0.808

After comparison of means using t-tests (Table 2), the following was determined:

- 1) There is a significant difference in behavior on water resources management between male and female students in Murang'a county. The difference between the means is -0.247 (95%CI -0.406, -0.088), with the higher one being among the female gender. This means that the female students have significantly more pro-environmental behavior than among male students. The female gender role of fetching water or assisting mothers at home do so means they appreciate the difficulties associated with water access and supply and therefore can be better stewards of the resource. This is in line with Hines *et al.* (1987), who suggests that female students were observed to more likely engage in responsible environmental behavior than the males.

Hygiene

After going to the toilets, 45% of students said they washed their hands with water and soap; 4% do not wash hands; 15% sometimes washed hands with soap; and 32% washed hands without soap. For those not washing hands with soap and water, 7% gave lack of running water as the

main reason; 2% blamed broken wash basins; while 6% said wash basins are far off. For those not using soap, 40% said that no soap was provided; soap was usually stolen (6%); and wash basins were far off (2%). Within the schools, the responsibility of washing toilets was with students 92%; staff (3.9%); and in some cases, both groups shared the responsibility.

Table 3: T-Test Results for Hygiene

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Hygiene	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 2.80 K = 2.88	-0.013	0.176	.082	0.090
	Gender: Male (M), Female (F)	M = 2.77 F = 2.90	-0.226	-0.038	-0.132	0.006
	Membership of environmental clubs: Yes (Y); No (N)	Y = 2.88 N = 2.81	-0.029	0.166	0.068	0.170
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 2.85 N = 2.83	-0.082	0.130	.024	0.658

Following comparison of means using t-test (Table 3), it was determined that:

- 1) There is no difference in behavior in hygiene between students in Murang'a South and Kahuro sub counties. This is because the difference between the agro-ecological zones does not impact on hygiene education.
- 2) There is a significant difference in behavior in hygiene between male and female students in Murang'a County. The difference between the means is -0.132 (95%CI -0.226, -0.038), with the higher mean being for female students who exhibit more pro-hygienic behavior. As with cleanliness, girls are usually more conscious of their hygiene than boys and will thus take more trouble to ensure adherence to hygiene practices than boys. Zelesny *et. al* (2018) explained this by positing that females had higher levels of socialization to be other oriented and socially responsible. This is reinforced by Stern *et. al.* (1993) who found that women have stronger beliefs about the harmful consequences of poor environmental conditions for others, the biosphere, and self and that these beliefs predicted more pro-environmental behavior.
- 3) There is no difference in behavior in hygiene between members of environmental clubs and non-members in Murang'a County. This is because the behavior on hygiene is mainly affected by external factors, e.g. distance to taps and lack of soap in schools.

The students had noticed change in the weather and climate patterns. 28% of them had noticed more rain; 3% less rain; 36% more unpredictable rains; 35% changes in weather patterns; 2% more drought; and 3% more floods. The reasons given for climate changes were that they were acts of God (42%); natural changes (31%); because of use of fossil fuels (15%); due to environmental degradation (7%); and anthropogenic activities (6%).

When leaving a room last in the evening, 80% of students said they would put off the lights; 15% said they would sometimes leave the lights on; while 5% said they would always leave the leave lights on. This compares well with the behavior of students who find un-needed lights on in a room. 80% of students said they would turn the lights off; 14% would sometimes leave the lights on as they found them; while 6% would always leave the lights on. When taking a hot shower 16% of the sampled students said they take shortest time possible while 27% enjoy the shower for as long as possible. 23% of the students said they close taps after use, while 28.5% said they tried to save power as much as possible.

Table 4: T-Test Results for Energy and Climate Change

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Energy and Climate Change	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 5.92 K = 6.19	-0.509	-0.030	-0.270	0.027
	Gender: Male (M), Female (F)	M = 5.98 F = 6.08	-0.340	0.145	-0.098	0.429
	Membership of environmental clubs: Yes (Y); No (N)	Y = 6.18 N = 5.90	0.034	0.519	0.276	0.026
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 6.08 N = 5.99	-0.200	0.340	0.070	0.610

To determine the impact of student's locality, gender, current and past membership of environmental clubs, means were compared by use of t-tests (Table 4) and the following determined:

- 1) There is a significant difference in behavior in the area of energy and climate change between students in Murang'a South and Kahuro sub-county. The difference between the means is -0.270 (95%CI -0.509, -0.030) with the higher one being Kahuro sub-county. This means that student in Kahuro have significantly higher levels of understanding and behavior with regards to energy and climate change than those in Murang'a South. This can be explained by the fact climate change in Murang'a has been explained more with regards to rain – increase, decrease, and unreliable rains. With more rain in Kahuro, aspects of climate change were thus clearer to the students who were also able to explain the links of this to human behavior.

- 2) There is no difference in behavior in the area of energy and climate change between male and female students in Murang’a County
- 3) There is a significant difference in behavior in the area of energy and climate change between members of environmental clubs and non-members in Murang’a county. The difference between the means is 0.276 (95%CI 0.034, 0.519) with the higher one being for members of environmental clubs. Most of the issues associated with pro-environmental energy and climate change understanding and behavior have to do with responsibility and leadership qualities which are among the key attributes that school administrations tie to being in the various environmental clubs. The skills learnt in the clubs are thus expressed by the responsible behavior of the students in their pro-environmental actions.

Natural Resources Management by Students

78% of the students said they had engaged in tree planting in the last one year, while 22% had not. 56.4% of the students planted the trees as individuals while 31% did it as part of a larger group. Of the students who had undertaken tree-planting, 60% said they had planted trees at home; 39% in School; 14% in churches; 4% in the forest; 1% along riverine; 0.8% in hills and parks; and 0.6% in other places. 80% of students had planted 1 – 20 trees; 21-50 trees (11%); 51 – 100 trees (4%); 101 – 200 trees (3%); and 1% students planting over 200 trees. Other than tree planting, 73% students said they further tended for the seedling planted. The tending aspect had thus increased the tree survival rates with 91-100% survival rates being observed by about 28% of the students; 71-80% survival by 20% of students, and 41-50% survival by 11% of students. The main reason for not planting trees was: Lack of interest (6%); lack of land (4%); lack of seedlings (9%); others will do it (2%); lack of opportunity to plan 91%); lack of time (0.6%) and; and 0.5% lack of support.

Table 5: T-Test Results for Natural Resources Management

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Natural Resources Management	Sub-county: Murang’a South (MS) and Kahuro (K)	MS = 5.63 K = 6.99	-1.737	-0.985	-1.361	0.000
	Gender: Male (M), Female (F)	M = 6.63 F = 5.94	.0302	1.077	0.690	0.001
	Membership of environmental clubs: Yes (Y); No (N)	Y = 6.59 N =5.85	0.350	1.125	0.737	0.000
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 6.35 N =5.96	-0.033	0.818	0.392	0.71

After comparison of means using t-tests (table 5) it was determined that:

1. There is a significant difference in behavior on natural resources management between students in Murang'a South and Kahuro Sub-counties. This can be explained by the fact that Kahuro lies in the upper zone which has more rain unlike Murang'a South which is drier. The students in Kahuro engaged in natural resources management especially as regards to tree planting and tending thus have a higher chance of success than in Murang'a South where the chances of the trees planted surviving are lower. The engagement of students in the activity is thus tied to its chance of success which can be tied in to the aspect of locus of control which is the degree to which people believe that they have control over the outcome of events. In this regard, students in Kahuro can engage more in natural resources management because they believe it will have an impact as opposed to those in Murang'a South who have less control due to external factors related to the weather and changes of success. As such, the students in Murang'a South may feel that they are 'helpless', without blame, and not in control of their success or failure as regards engagement in natural resources management. This shows that people only behave in an environmentally responsible manner when they are sufficiently motivated and are capable of generating qualitative changes - optimistic attitudes leading to positive practices and vice-versa (Zheng, *et. al.*2018)
2. There is a significant difference in behavior on natural resources management between male and female students in Murang'a county. The difference between the means is 0.690 (95%CI 0.302, 1.077), with the male mean being higher at 6.63. This means that male students are more fully engaged in natural resources management than their female counterparts.
3. There is a significant difference in behavior on natural resources management between members of environmental clubs and non-members in Murang'a county. The difference between the means is 0.737 (95%CI 0.350, 1.125), with the mean being for those participating at 6.63. This means that students participating in environmental clubs are significantly more active in natural resources management than those who do not participate.

The students' participation in natural resources management by the students in Murang'a county was impressive. With an average 10 trees planted per student, and at least 50% survival on average, this translates to about 5 surviving trees per student. With about 100,000 secondary school students, this means that Murang'a County students are able to plant and grow about half a million trees in a year, which is about 1% of the 500 million trees, the country plans to plant (note, not grow) this year as it tries to meet the 10% tree cover in the country. This means that the country can actually target secondary students to grow about 30% of the planned annual tree growing, and if it goes down to primary schools, assuming the same tree growing potential, the whole target would actually be met by the students.

Environmental Concerns by Students

Table 7: T-Test Results for Environmental Concerns

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Environmental Concerns	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 5.711 K = 6.521	-1.0181	-0.6028	-0.8105	0.000
	Gender: Male (M), Female (F)	M = 6.309 F = 5.900	0.1991	0.6193	0.4092	0.000
	Membership of environmental clubs: Yes (Y); No (N)	Y = 6.189 N = 5.945	0.0184	0.4686	0.2435	0.034
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 6.113 N = 5.978	-0.1085	0.3781	0.1348	0.277

With regard to environmental concerns by students, it was determined through the comparison of means using t-tests (Table 7), that:

1. There is a highly significant difference in environmental concerns between students in Murang'a South and Kahuro sub-counties due to the high significance level of $p = 0.000$. As outlined in the concerns, deforestation and soil erosion are more likely experienced frequently in the upper of the agro-ecological zones than in the lower areas.
2. There is a significant difference in environmental concerns between male and female students in Murang'a county. The difference between the means is 0.4092 (95%CI 0.1991, 0.6193) with the higher one being for male students.
3. There is a significant difference in behavior in environmental concerns between members of environmental clubs and non-members in Murang'a county. The difference between the means is 0.2435 (95%CI 0.0184, 0.4686) with the higher one being for male students. This shows that it is the environmental attitudes and individual's sense of responsibility towards the environment that really shape environmentally friendly behavior (Chen 2016).

Overall Findings

Table 8: T-Test Results for Environmental Knowledge, Attitudes and Behavior

Attribute	Variables being compared	Means	95% Confidence Interval of the Difference		Difference of means	P value
			Lower	Upper		
Total scores	Sub-county: Murang'a South (MS) and Kahuro (K)	MS = 31.13 K = 33.66	-3.4255	-1.6433	-2.5344	.000
	Gender: Male (M), Female (F)	M = 32.22 F = 32.26	-0.9459	0.8624	-0.0417	0.928
	Membership of environmental clubs: Yes (Y); No (N)	Y = 33.13 N =31.34	0.8734	2.7050	1.7892	0.000
	Participation in environmental clubs before: Yes (Y); No (N)	Y = 32.54 N =31.64	-0.1169	1.9198	0.9014	0.083

When all the scores for the various aspects of knowledge, attitudes are combined, it was determined that:

1. There is a significant difference in in environmental knowledge, attitudes and behavior between students in Murang'a South and Kahuro sub counties with higher pro-environmental behaviour in Kahuro
2. There is no difference in behavior in environmental knowledge, attitudes and behavior between male and female students in Murang'a County. This agrees with Zelezny, *et. al* (2000) who indicated that while women report stronger environmental attitudes and behaviors than men, as a single variable, the effect of gender on pro-environmental behavior was consistently stronger than on environmental attitudes. This has been seen to be true on behavior, with attitudes being lower than males, resulting to a net zero difference.
3. There is a significant difference in behavior in environmental knowledge, attitudes and behavior between members of environmental clubs and non-members in Murang'a county. This shows that the clubs, through their experiential learning expose students to an active process of learning, where there is interaction between the learner and the environment, making leaning enjoyable (Anderson, 1987). The hands-on approach leads to heightened awareness and ultimately action (Chawla, 2015). The ultimate aim of education is to change human behavior (Harold, 2015) which is key to tackling and preventing environmental degradation. It can also be concluded that it is difficult to teach the values of conservation and preservation to persons who do not appreciate the natural world around them or who are afraid or loathe to venture into it (Chawla, 2015).

4. There is no significant difference in behavior in environmental knowledge, attitudes and behavior between students who have participated in environmental clubs in the past and those who have not in Murang'a county. This re-affirms that past membership has no impact on pro-environmental behavior, unlike that of current membership.

CONCLUSIONS AND RECOMMENDATIONS

The findings have established that environmental programmes actually improve student's pro-environmental behaviour and thus contribute to environmental literacy. This is because students who participate in school environmental clubs with aspects of environmental conservation have significantly more pro-environmental attitudes and behaviour than those students who do not participate in such clubs. The effectiveness of the clubs in promoting environmental literacy is due to the experiential learning methods where students learn by engaging in environmental activities which in turn transform their knowledge into action as regards environmental conservation.

Across the different aspects of environmental attitudes and practices, namely, with regard to solid wastes management; water resources management; hygiene; climate change and energy; natural resources management; and environmental concerns; students participating in the school environmental programmes were seen to be significantly different with regards to pro-environmental attitudes, and behaviour and therefore overall environmental literacy as their knowledge had transformed into action.

Female students had significantly higher knowledge, attitudes, and behaviour than their male counterparts in the areas of solid wastes management, water resources management, and hygiene. The reverse was however true in the areas of natural resources management, and environmental concerns where male students had significantly better pro-environmental behaviour and attitudes and thus higher environmental literacy. In the area of climate change and energy, there was no significant difference in knowledge, attitudes and behaviour based on gender.

Overall, pro-environmental attitudes and behaviour and overall environmental literacy was also different based on the students agro-ecological zones, and also with regards to climate change and energy; natural resources management; and environmental concerns with students in Kahuro exhibiting better environmental literacy and as such better pro-environmental attitudes, and behavior. This was due to the fact that Kahuro lies in the upper zone which has more rain unlike Murang'a South which is drier. The students in Kahuro engaged in pro-environment activities more due to the fact that they had higher chances of success, which can be tied in to the aspect of locus of control which is the degree to which people believe that they have control over the outcome of events. In this regard, students in Kahuro can engage more in natural resources management because they believe it will have an impact as opposed to those in Murang'a South who have less control due to external factors related to the weather and chances of success. This shows that people only behave in an environmentally responsible manner when they are sufficiently motivated and are capable of generating qualitative changes - optimistic attitudes leading to positive practices and vice-versa (Zheng, et. al.2018). As outlined in the concerns, deforestation and soil erosion are more likely experienced frequently in the upper of the agro-ecological zones than in the lower areas. There was no significant difference with regards to hygiene, solid wastes management, and water resources management.

The clubs and programmes, having been seen as boosting environmental literacy, should thus be encouraged and supported. Leeming et al., (1993) reported that participation in nature-related activities led the students to appreciate the nature and accept the environmental issues. Their curiosity is also aroused, and their subsequent participation in the natural activities, helps develop individuals' sense of responsibility and motivation to take environmental action. This has started in a way through the Competency Based Curriculum which is being implemented in the lower primary classes at the moment. Ways to initiate a policy for informal environmental education in the current 8-4-4 system that is gradually being phased out should also be undertaken so that those who are already in the system do not lose out with regards to environmental literacy whose success should be measured once it is translated to pro-environmental attitudes and behaviour.

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The Effects of Inquiry-Based Science Teaching Approach on Task Competence of Secondary School Physics Students in Kitui County, Kenya

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Abstract

The purpose of this study was to investigate the effect of Inquiry-Based Science Teaching Approach on learners' task competence of secondary school physics students in Kitui County, Kenya. It adapted a mixed methodology and a Quasi Experimental Research Design and in particular the Solomon's Four Non-Equivalent Control Group Research Design. The target population of the study was 1600 form four Physics students from 40 Extra-County secondary schools in Kitui County. Stratified random sampling was used to select four Extra-County schools (2 Girls and 2 Boys). Purposive sampling was used to select 40 students from each of the four schools and a Physics teacher from each of the two sampled schools; giving a sample size of 160. A Physics Task Competence Test (PTCT) was the research instruments. A reliability coefficient of 0.847 was obtained. The descriptive analysis was by means of frequencies, means, standard deviation and percentages. Inferential analysis was through Analysis of Variance and the Least Significant Difference (LSD) technique at a significance level of coefficient alpha $\alpha=0.05$. The findings showed a statistically significant difference in task competence between students taught using IBSTA and those taught by the conventional methods. The study established that Students from the experimental groups outperformed the ones from the control group in the results obtained. This showed that IBSTA had a positive effect on their task competence. There was a significant difference in the post-test (PCBT) on task competence mean scores between students in the experimental groups who were taught Physics using IBSTA than those in the control groups taught by conventional methods. Consequently, the study concludes that IBSTA is effective in enhancing students' task competence. Finally, the study makes recommendations key among them the creation of an enabling environment for IBSTA adoption in schools.

Key words: *Achievement, Inquiry-Based Science, Teaching Approach, Learning outcome, Self-concept and Task competence.*

INTRODUCTION

Background to the Study

Inquiry-Based Science Approach teaches concepts, facts or skills that lead learners to formulate their own questions or problem thereby enhancing outcome (Bulbul, 2012). Inquiry-Based Teaching Approach is positively associated with outcomes when it incorporates teacher guidance, and negatively when it does not (Aditomo & Klieme, 2019). In another study conducted in South Africa by Baloyi (2015) on the effect of Inquiry Based Science method in teaching practical in Physics, learners developed better understanding of science concepts when using this method than the use of traditional methods. According to Chelangat (2014) in his study on effects of

practical on investigation and scientific creativity amongst secondary school Biology students in Kericho sub-County, Kenya, indicated that the use of practical laboratory investigation approach and integrating it with Inquiry-Based Approach enhances creativity amongst secondary school Biology students. Njoroge, Changeiywo & Ndirangu (2014) observed that students taught using Inquiry-Based Teaching Approach in Physics outshined students taught using the traditional method. This aspect suggests that the general poor performance in physics in Kitui County may benefit from a change of teaching methodology. However, Njoroge et.al did not show evidence that they investigated aspects of: task competence.

Statement of the Problem

Persistent poor performance in KCSE Physics at both the Nationally and Kitui County in particular has been greatly attributed to factors such as Conventional instructional method, inadequate facilities, poor mastery of teaching and learning content on the part of the teacher, lack of interactive forums for learners and shortage of teachers among others (KNEC reports: 2014 to 2019). Several initiatives have been put in place to improve performance in this subject. The Government of Kenya in collaboration with Japanese Government introduced the Strengthening of Mathematics and Science Education (SMASSE) in Secondary Schools. This programme may have put more emphasis on hands-on rather than mind-on approach. Despite such effort, the performance of learners in K.C.S.E Physics continues to decline. The impact of this trend on task competence among students has been inadequately investigated. If there will be no attempt to solve the problem this worrying trend will continue. There is currently limited information on the effects of IBSTA in physics especially in Kitui County. In an attempt to bridge, this gap the current study investigated the effects of Inquiry-Based Science Teaching Approach on task competence of secondary school physics' students in Kitui County, Kenya.

Objective of the Study

The objective of the study was to determine the difference in task competence between students taught by Inquiry-Based Science Teaching Approach and those taught using conventional methods.

Research Hypotheses

The hypothesis was tested at $\alpha= 0.05$ level of significance.

H₀₁: There is no statistically significant difference in task competence to learning Physics between students exposed to Inquiry-Based Science Teaching Approach and those exposed to conventional methods.

LITERATURE REVIEW

Theoretical Framework

Dewey's (1938) Constructivism Theory guided this study. The constructivism theory of learning upholds that knowledge is actively constructed by organizing subjects not passively received from the environment (Lerman, 2012). Piaget and Bruner who viewed constructivism in slightly different approaches adopted Vygotsky's Theory of Constructivism. Piaget based his examples on philosophy and epistemology while Bruner focused on cognitive structure, which he called

mental schema (Culata, 2019). A person's education is an element of related involvements, mental structures, and convictions that are utilized to translate articles and occasions (Bredo, 2014). In constructivist, learning, repeated manipulation of objects and ideas enables learners to construct meaningful concepts that can be transferred to logical abstract reasoning in a formalized manner.

The rationale for using this theory is that, student learning using inquiry were based on the fact that the majority of students have difficulty engaging in constructive learning because they fail to make adequate connections that are necessary in arriving at a desired understanding without hypothesizing and questioning as is the practice in physics classrooms currently thus will motivate the learner.

Empirical Literature

A study carried out in Mexico by Llewellyn (2013) indicated that Inquiry learning is a scientific process of active exploration that uses critical, logical and creative thinking skills to answer questions by teacher guidance hence learner achievement is obtained. His argument is in line with a study conducted by Ural (2016), who observed that through inquiry learning, significant improvement occurs in all aspects of student's motivation and their task competence. In a research study in USA by Bittinger (2015) on the impact of an Inquiry-Based Approach on attitude and learners task competence in a high school physics laboratory, the finding indicated that inquiry learning in a laboratory setting improves task competence and motivation.

Harrison (2014) studied how teaching in Europe adapts to a change in pedagogy as teaching shifts from a deductive to an Inquiry Approach. The finding indicated that Inquiry activities allow teachers to collect more evidence of student performance by observation during the experiment because instead of teaching the instruction, teachers could listen to conversation for misconceptions and perform formative assessment. In a research done in Turkey by Demirbag & Gunel (2014) on effect of Inquiry-Based learning on science achievement, writing and argument skills, the findings indicated that the experimental group outperformed the control group in terms of their quality of argument given and their task competence

Inquiry-Based Learning Approach is a method that arouses learners' creativity in mathematics and science and it enhances achievement for the learner. This is according to a study in Nigeria by Abayomi (2013). According to a research carried out in Uganda by Ssempala (2017) on science teachers' understanding and practice of Inquiry-Based Instructions, it was observed that some of the teachers are conversant with the use of Inquiry-Based Science Approach yet they do not use it in teaching in their stations thus performance is still poor in sciences

According to a research by Mwanda (2016), instruction by Inquiry Approach has positive influence on learners' achievement in Biology. Munene (2015) observed that the main factor that leads to poor performance in learning Physics in Gatundu secondary schools is the use of conventional learning since the approach is teacher-centered. Conventional learning has also been observed to be commonly used in teaching physics in private and public schools in Kitui County (SMASSE Kitui county Report 2014)

RESEARCH METHODOLOGY

The study used Mixed Methodology that combines quantitative and qualitative research approaches for the aim of breadth and depth of apprehension and certification.

Research Design

The study applied Quasi-experimental research in which the researcher used Solomon’s Four, Non-Equivalent Control Group Design. Quasi-experimental designs identified a comparison group that was as similar as possible to the treatment group in terms of characteristics.

Table 1: Solomon’s Four Non-equivalent Control Group Design (as Adapted from Shuttleworth, 2009)

Group	Design Group	Pre-test	Treatment	Post-test
I	Experimental	E1	O ₁	X O2
II	Control	C1	O ₃	- O4
III	Experimental	E2	-	X O5
IV	Control	C2	-	O6

Sampling Procedure and Sample Size

Stratified random sampling technique was used to select 2 Extra-County Boys Schools and 2 Extra-County Girls Schools out of the 40 Extra-County Schools in Kitui County. Purposive sampling was employed to select Form Four students taking Physics at KCSE level in each of the selected schools. Simple random sampling was used to assign groups to experimental groups (E₁ & E₂) each with 40 students and control group (C₁ & C₂) with 40 students each. Purposive sampling was used to select a teacher each from two of the sampled schools. These two teachers taught only the control groups using the conventional methods.

Research Instruments

Physics Competence-Based Test (P.C.B.T.)

Student’s task competence in both experimental and control groups in the study were evaluated using the researcher created Physics competence-Based Test (P.C.B.T). Two Physics Task Competence Test: Pre-test and Post-test, were constructed and used. Pre-test was administered to the respondents in the first week of the study to assess their pre-treatment Physics academic levels. Pre-tests are administered as formative evaluations to assess students’ pre-treatment Physics academic levels (Creswell, 2005).

The pre- test was test that was used to measure students’ learning outcomes in learning Current Electricity II in secondary school Physics course. The Physics test was extracted from the K.C.S.E. past papers therefore they were already standard. A test consisted of twelve structured questions carrying a maximum of 30 marks. The items tested included knowledge, comprehension and application of material learnt. They were scored at different levels along the process of answering statement questions and solving physics problems relative to respondent’s ability. The marking scheme was prepared and modified to maintain the validity of the test. The

researcher assisted by the Physics teachers did examination administration, supervision, marking, scoring and recording. The Researcher analyzed the marks by calculating their mean per group.

Data Analysis

Both the pre-test and post-test Physics Competence-Based Tests (PCBT), were marked and the marks recorded for each respondent while the data from the questionnaires was sorted, edited and recorded. On qualitative data, the researcher used content analysis approach, which emphasized on thematic analysis.

Table 2: Summary of Quantitative Data Analysis Procedure

Hypothesis	Independent Variables	Dependent Variables	Descriptive statistics	Inferential statistics
H0 ₁ : There is no statistical significant difference in task competence between students exposed to IBSTA IBSTA other exposed to conventional teaching method in Kitui County Kenya.	IBSTA teaching Approach Conventional teaching method.	Task competence	Frequency Mean Standard deviation Percentage	t-test LSD

RESULTS AND DISCUSSION

The objective of the study sought to determine the difference in task competence between students taught by Inquiry-Based Teaching Approach and those taught using conventional methods. Before the treatment started experimental, group1 and control group1 were given a pre-test exam. The means and standard deviation obtained for the pretest exam for both groups are presented in Table 3

Table 3: Students Mean Scores for Each Group in the Pre-test

	Category	N	Mean	Std. Deviation	Std. Error Mean
Pre-test score	Control	38	43.34	14.28	2.3173
	Experimental	37	42.75	13.05	2.1457

Source: Researcher, 2020

Table 3 shows the mean scores and standard deviation for all the respondents that undertook the pre-test. E1 had a mean score of 42.33% and standard deviation of 14.28 while C1 had a mean score of 43.34% with a standard deviation of 13.05. The findings show that the mean scores for the two groups were different with the control group C1 having a higher mean score than experimental group E1.

To check whether there was a statistically significant difference between the means of control group1, experimental groups1 a t-test was computed, and the findings are shown in table 4.

Table 4: The Independent t-test for Pre-test Mean Score of PCBT1

	F	Sig.	T	Df	Mean Dif.	Std. Error Dif.	95%Conf. Interval of the Dif.	
							Lower	Upper
Pre-test score Equal var. assumed	.319	.574	.185	73	.585	3.162	-5.717	6.887
Pre-test score Equal var. not assumed			.185	72.710	.585	3.158	-5.709	6.880

(Source: The researcher, 2020)

Table 4 shows that the t-statistical value was 0.185 with 73 degrees of freedom which yielded a significance level of 0.574 which is higher than the set value of 0.05. This means that there is no significant difference in the means of the two groups (control and experimental). The findings of this study implies that the experimental and control groups were homogenous in terms of learning outcomes at the start of the study.

Students Learning Outcome on the Post-test

After the learning period, a post-test exam to gauge the effectiveness of each teaching method was administered to all the groups, their percentage means and standard deviations were computed, and the findings obtained are as shown in table 5.

Table 5: Comparison of Mean Scores and Standard Deviation of Post-test in all the Groups

Sub-category	Mean	N	Std. Deviation
C1	45.42	38	14.63
C2	43.00	39	15.06
E1	59.75	37	10.70
E2	57.95	36	11.52
Total	52.03	150	14.80

(Source: Research data, 2020)

Table 5 shows that the experimental group E1 had a mean score of 59.75% and E2 had mean score of 57.95%. Control group C1 posted a mean score of 45.42% and control group 2 obtained a mean score of 43.00%. This finding indicates that experimental group E1 and E2 posted a higher mean score as compared to the control groups C1 and C2.

Table 6: Post-test Score by Category

Category	Mean	N	Std. Deviation
Control	44.31	70	14.776
Experimental	58.78	80	11.122
Total	52.03	150	14.804

(Source: Research data, 2020)

The figures on table 6 indicate that the average of the experimental and control groups mean scores were 58.78% and 44.31% respectively. This means that the average mean score for the control group was lower than that of experimental group. These findings are in line with a study by Banerjee (2010), who argued that Inquiry-Based lesson had a positive effect on students and posted a very high score in an achievement test as compared to a class that was taught through traditional Approach.

To understand whether there was a statistically significant difference in task competence depending on the teaching approach used, the following hypothesis was tested:

H₀₁: There is no statistically significant difference in task Competence to learning Physics between students exposed to Inquiry-Based Science Teaching Approach and those exposed to Conventional methods.

A t-test was used to test this hypothesis. Table 7 presents the findings on the t-test computation of the significant differences between means.

Table 7: Independent t-test for Post-test Examination

		F	Sig.	T	Df	Sig. (2- tailed)	Mean Dif.	Std. Error Dif.	95% Interval Dif. Lower	Conf. of the Upper
Post test score	Equal variances assumed	4.676	.032	-6.826	148	.000	-14.473	2.120	-18.663	-10.283
	Equal variances not assumed			-6.701	127.094	.000	-14.473	2.159	-18.747	-10.199

(Source: Research data, 2020)

From table 7, the control group C1 and experimental group E2 had a t-statistic of 0.185 with 148 degree of freedom yielding a significance level of 0.032, which is, less than the set value of 0.05. This shows that there was significant difference in the means of the control and experimental group. The findings of this study show that the mean difference between the pre-tests and the post-test scores show that the Inquiry based science teaching approach had a great impact on the performance of students in Physics. This is in line with Osborne (2014), who argued that science teachers’ ability to practice Inquiry-Based Instruction enhances good performance.

the present study concur with a study conducted in Europe by Shafqat (2015) who argued that Inquiry based learning is more effective as compared to traditional methods of teaching, since it improves different learning domains such as knowledge, ability and task competence that improves learner’s outcome. The findings are also in line with a study carried out in Malaysia by Rakhmawan, Setiabudi & Mudza (2015) that indicated that Inquiry-Based Learning makes a student more confident and makes learning more meaningful hence increases learning outcomes.

To further understand the different significance levels that exist between the sub-categories (C1, C2, E1 & E2), Least Significant Difference was computed. The findings obtained are shown in table 8.

Table 8: Results of LSD Post Hoc Comparison of PCBT2 Mean Score

(I) Sub- category	(J) Sub- category	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
C1	C2	2.421	3.118	.439	-3.743	8.585
	E1	-14.335	3.0023	.000	-20.269	-8.402
	E2	-12.532	2.894	.000	-18.252	-6.812
C2	C1	-2.421	3.118	.439	-8.585	3.743
	E1	-16.756	3.138	.000	-22.958	-10.554
	E2	-14.953	3.034	.000	-20.951	-8.955
E1	C1	14.335	3.0023	.000	8.402	20.269
	C2	16.756	3.138	.000	10.554	22.958
	E2	1.803	2.914	.537	-3.957	7.564
E2	C1	12.532	2.894	.000	6.812	18.252
	C2	14.953	3.034	.000	8.955	20.951
	E1	-1.803	2.914	.537	-7.564	3.957

*. The mean difference is significant at the 0.05 level.

(Source: Research data, 2020)

As tabulated on table 7 the difference between C1 and C2 (0.439) and E1 and E2 (0.537) was not statistically significant since $P > 0.05$. This implies that E1 and E2 groups, C1, and C2 performed relatively the same on Physics task competence test scores. However, the comparison between the mean difference in the groups C1 and E1 (0.000), C1 and E2 (0.000), C2 and E1 (0.000) and E2 (0.000) were statistically significant since $P < 0.05$. This shows that the experimental groups' mean score was higher than the control groups' mean score in task competence. Therefore, the null hypothesis one, that read H_{01} : *There is no statistically significant difference in task Competence to learning Physics between students exposed to Inquiry-Based Science Teaching Approach and those exposed to Conventional methods*, was rejected.

These findings concurred with a research conducted by Vandewalle, (2007) who argued that Inquiry Learning when well introduced to the learner has positive impact on students' task competence in physics. This is also in line with a study by Chopra and Gupta (2011) who argued that, inquiry-based teaching approach allows students to make meaningful real-world connections in the class as they link the relevance between what they learn in the classroom and their potential careers. Awafala (2013) observed that those teachers who use the Inquiry Based Teaching posted a high achievement (mean scores) in their subjects.

CONCLUSIONS AND RECOMMENDATIONS

In this study the findings show that the post-test scores for students in the Experimental groups E1 and E2 ($M_1=59.76$, $M_2 =57.95$) were higher than those in the control groups C₁ and C₂ ($M_1=45.42$, $M_2=43.00$). This indicates that Students from the experimental groups outperformed the ones from the control group in the results obtained. The answers and flow of calculation for

the experimental group was well detailed and clearly elaborated. This showed that IBSTA had a positive effect on their task competence. The inquiry approach also enabled students to develop process skills and thus enhanced good performance.

There was a significant difference in the post-test (PCBT) on task competence mean scores between students in the experimental groups who were taught Physics using IBSTA and those in the control groups taught by conventional methods ($F_{4.676, df=148, P=0.000}$) since $P < 0.05$.

The results of the study also indicated that the difference between C1 and C2 (0.439) and E1 and E2 (0.537) was not statistically significant since $P > 0.05$. This implies that E1 and E2 groups, C1, and C2 performed relatively the same on Physics task competence test scores. The comparison between the mean difference in the groups C1 and E1 (0.000), C1 and E2 (0.000), C2 and E1 (0.000) and E2 (0.000) were statistically significant since $P < 0.05$. Therefore, the null hypothesis, one was rejected.

Conclusions

From the summary of the findings above, the following conclusions were made:

- a) The Inquiry based science teaching approach is a good method for teaching Physics as it enhances task competence.
- b) There is need for an environment in which inquiry based science teaching approach can be adopted in schools.
- c) There is need to find a ways of promoting inquiry based science teaching approach through ICT given three factors; the impact of covid-19 pandemic, the need to adopt a new pedagogy and to realign the teaching of physics with the new competence-based curriculum (CBC).

Recommendations

Based on the study findings, the following suggestions are made: school administrators should reward Physics teachers who use IBSTA to create a culture that would improve students' inquiry skills of engagement, elaboration, exploration, explaining and evaluation which consequently improves students' learning outcomes by making them competent and build; sources of funding should be identified to purchase more science practical equipment and build more infrastructures to promote the use of IBSTA by Science teachers in preparation for the implementation of the Competence-Based Curriculum; Since online practical can be carried out in science subjects, the school management should expand ICT infrastructure, computer hardware and practical integrating software for schools to conduct experiments online using the IBSTA; and an appropriate policy should be developed for diploma colleges and universities to train their teacher trainees with an emphasis on IBSTA as part of their Physics training curriculum. The teacher trainees should then be assessed on the appropriate use of this method during micro-teaching and teaching practice in order to equip them with IBSTA skills.

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Transactional Leadership and Organizational Performance: A study of Private Universities in Kenya

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Abstract

Private universities are undergoing tough times due to reduced number of students, financial crisis, poor academic programs and general management crisis. The manner in which the vice chancellors dispense with their authority has to a great extent affected the performance of lecturers which has great effect on the performance of these universities. Therefore, this study sought to find out the effect of transactional leadership style on the performance of in private universities in Kenya. Descriptive research design was used as a method of study. The study used primary data collected by use of structured questionnaires. Data obtained was cleaned, coded and entries made into Statistical package for social sciences. Descriptive and inferential analysis was conducted for quantitative data. Mean and standard deviations were also used as measures of central tendencies and dispersion respectively. Results were presented in form of tables and charts. The study found that transactional leadership had a significant and positive influence on performance of private universities in Kenya. The study further established that the perceived supervision support had insignificant moderating effect on the relationship between transactional leadership and performance of private universities in Kenya. The study concluded that as a result of transactional leadership, performance of private universities in Kenya was enhanced. The study recommended that the private universities which face performance challenges should uphold transactional leadership as an aspect of integrative leadership so as to steer their performance.

Key Words: *Leadership, Transactional Leadership, Integrative Leadership, Private Universities, Chattered Universities.*

INTRODUCTION

Background to the Study

In an era of volatile economic environment, emerging economies should be able to develop its human resources as a source of competitive advantage (Shin, Heath & Lee, 2011). In order to develop and enhance workforce capabilities and to successfully compete in the 21st Century, organizations have to embark on future oriented human resource strategies. It could be argued that the individual competencies of the workforce in any organization under robust leadership would determine its overall success (Uhl-Bien & Marion, 2011). This success, among other

things, may be attributed to the socio-behavioral characteristics and adjustments this leadership has to make in their job-role and position-power to gain common ground in any organizational setting (Yukl, 2011).

As such, in order for the organizations to remain focused and competitive in the global business, there is need for alignment of leadership with various changes which affect the core objectives and the mission of organization's existence (Zhu, Sosik, Riggio & Yang, 2012). These changes most often affect employee's ability to perform their roles and functions positively or negatively dependent on the leadership approach by the person steering the organization (Houglum, 2012). The dynamic systems that control the heartbeat of organizations performance gravitates around the systems that the leadership of an organization has put in place to motivate and inform organizational performance positively (Duin, 2010).

Transactional leadership is comprised of two fundamental dimensions, contingent rewards, and management by-exceptions, while transformational leadership is comprised of four central components, charisma, and inspiration, individualized, consideration and intellectual stimulation, Contingent rewards take place when the leader and follower have mutual understanding of the rewards or sanctions for performance or non-performance (Glynn & DeJordy, 2010). The emphasis is on completing tasks that have been agreed upon based on previous expectation. In management –by- exception, however, the leader takes action only when deviation from plans is evident (Wood, 2014).

According to Piccolo and Colquitt (2013), transactional leadership, also known as Managerial leadership, focuses on the role of supervision, organization, and group performance, transactional leadership is a style of leadership in which the leader promotes compliance of his followers through both rewards and punishments. Transformational leadership is not keen as futile but interested in paying attention to followers 'work in order to find faults and deviations. This type of leadership is effective in crisis and emergency situations, as well as when projects needs to be carried out in specific fashion (Odumeru & Ifeanyi, 2013).

Private Universities in Kenya are established under both the Universities Rules, 1989 which details the Establishment of Universities, the Standardization processes and procedures, accreditation as well as Supervision and the Universities Act 1985 (CAP 210B). Private universities in the country operate under two main categories, those with a full charter or those operating under an interim charter awaiting full charter. Private universities in Kenya offer both undergraduate and postgraduate programs with different programmes including certificates, diplomas and degrees. the growing demand for university education and consequently a strain on public universities to handle the subsequent demand. Being profit making entities, fees in private universities are accordingly charged in conformity to market forces on the grounds of full cost recovery (Boit and Koskei, 2015).

Statement of the Problem

The intensified competition for student enrolment among private universities internationally as well as the Kenyan context has pushed the institutions into becoming more customer focused and resorting to strategies that will enhance their positions within the market and improve market share (McNamara, 2014; Ng'ongah, 2012).

In the wake of this competition, and in order not to compromise on the quality of education thereof, university leadership among private universities has been considered, in international studies, as key in translating this competition into enhanced organizational performance underscored by such desirable competitive practices as the recruitment of high caliber teaching staff, improving student facilities and overall infrastructure as well as providing cutting-edge technology and teaching aids (Research Universities Futures Consortium, 2012; Davenport, 2013; Kaczynski, 2013). With the increasing growth in the number of private universities in Kenya, it is imperative to establish the role played by leadership in these universities.

Objectives of the Study

The objectives of this study were to examine the influence of transactional leadership on performance of chartered private universities in Kenya and to determine the moderating effect of perceived supervision support on the relationship between transactional leadership and performance of chartered private Universities in Kenya.

Research Hypotheses

Ha1: Transactional leadership has a significant effect on performance academic staff of chartered private universities in Kenya

Ha2: Perceived supervision support has a significant moderating effect on the relationship between transactional leadership and performance of chartered private Universities in Kenya

LITERATURE REVIEW

The Motivational Model

The motivational model states that increasing the level of participation in decision making may increase performance through increased motivation (Sashkin, 1976). Previous scholars suggest that participative behavior of superiors have an important role in providing sub-ordinates with the experience of intrinsic motivation, feelings of self-worth and a sense of self-determination (Deci et al., 1989). This type of leadership behaviour promotes a feeling of ‘‘psychological ownership’’ of sub-ordinates (Sashkin, 1976); increase subordinates’ feelings of believing in themselves and control, and reduce their sense of powerlessness (Arnold et al., 2000). Other scholars suggest that participative leadership behaviour may promote the feeling of empowerment among subordinates (Ahearne et al., 2005; Leach et al., 2003).

The theory was employed in studying how when the university staff are involved in administrative decision making with implications on their welfare as well as in taking part in intrinsically motivating work, they may discover that the performance of their work is more benefiting, and consequently, they are motivated to put more effort to achieve their work objectives.

Organizational Effectiveness (OE) Theory

Organizational effectiveness (OE) has been one of the most extensively researched issues since the early development of organizational theory (Rojas 2010). Organizational theory has spawned a rich body of literature that has had a major influence on management accounting studies (Hopper and Powell 2009). Performance measurement models have moved from a cybernetic view whereby performance measurement was based mainly on financial measures and considered as a component of the planning and control cycle to a holistic view based on multiple nonfinancial measures where performance measurement acts as an independent process included in a broader set of activities. As such, in the present study, the theory was used in understanding how the various universities have performed across the years as well as how much of the performance can be attributed to integrative leadership thereof.

Conceptual Framework

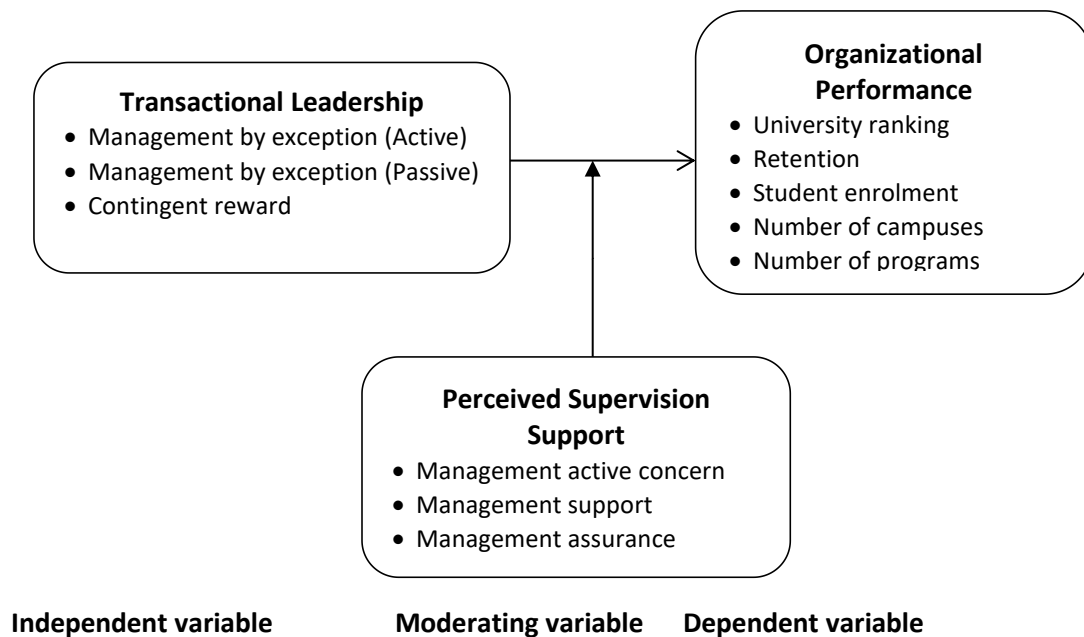


Figure 1: Conceptual Framework

Empirical Literature

According to Realawam et al (2015) transactional leadership is based on the exchange process where the leader administers rewards and sanctions. One way or another, the leader and follower agree, explicitly or duplicity that desired follower behaviors will be rewarded, while undesirable behaviors will draw out impediments, potential rewards include an increase in salary, promotions, and more benefits. Bryman (2012) initially had pointed out that, transactional leadership model, is not satisfactory for most of the situations. Indeed, one could say that transactional leadership behaviors do not even qualify for the true leadership label. According to Boxall and Bartram (2011) transactional leadership approach is based on exchange, the leadership does not seek to motivate followers beyond the level that is required to avoid punishment or gains extrinsic reward.

Garev (2012) contends that, transactional leadership cannot be labelled as a true leadership model, based on the fact that, it is an exchange transaction between the leader and follower. Such that the leadership does not seek to motivate followers beyond the level that is required to avoid punishment or gain extrinsic rewards. Waldman et al (2011) support that to maximize their effectiveness; leaders should exhibit both transformational and transactional behaviors and not one in isolation.

Research Gaps

It is evident from the foregoing literature that a vast majority of studies have been conducted internationally in developed economies while regional and Kenyan literature remains scanty. It is also noted from the literature that no study has been conducted on integrative leadership and organizational performance among private universities in Kenya. Overall, the studies carried out on transactional leadership are not conclusive as they focus mainly on one or two dimensions of integrative leadership. In view of the above illuminated gaps, this study will attempt to investigate the effect of integrative leadership style on organizational performance in private Universities in Kenya.

RESEARCH METHODOLOGY

Research Design

This study used a descriptive research design. According to Dawson (2002) the purpose of a research design is to set out a description of, and justification for, the chosen methodology and research methods. The ultimate objective of descriptive research study is to accurately portray characteristics of persons, situations, or groups, and/or the frequency with which certain phenomena occur. This research sought to present facts as they are and therefore descriptive research design that is confirmatory in nature was deemed most appropriate.

Target Population

The study targeted the teaching staff from all the seventeen (17) chartered private universities as enlisted by CUE. The commission is established under the Universities Act, No. 42 of 2012, as the successor to the Commission for Higher Education and is the Government agency mandated to regulate university education in Kenya. With an anticipated large target population, the study however narrowed down the scope to the universities that have been chartered for 10 years and above.

Sample Size and Sampling Design

Owing to the anticipated large number of employees, the study employed the Fisher et al. (1983) formula for determining sample size in large population. This is as shown below:

$$n = \frac{Z^2 pq}{d^2}$$

$$\text{Therefore, } n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

The study thus reached a total of 384 employees proportionately distributed across the selected universities.

This gave a sample size of 384 employees which can be adjusted when population is less than 10,000 using the following relationship (Neuman, 2012).

$$nf = \frac{n}{1 + \frac{(n-1)}{N}}$$

$$nf = 384 / 1 + (384 / 2453) = 331.89$$

$$= 332$$

Data Collection Instruments

The study used primary data which was largely quantitative and descriptive in nature. The questionnaire was designed to solicit the data on constructs pertinent to establishing the interrelationship between the independent and dependent study variables. The study employed structured questionnaire with close-ended questions. This helped guide respondents' answers within the choices given to ensure they stay in focus with the study objectives.

Data Collection Procedures

At the data collection stage, in order to reach the 384 respondents from across the selected private universities in Kenya at the required timeframe, the study utilized a total of 10 research assistants to aid in the exercise. The questionnaires were distributed on a drop and pick basis whereby the researcher administered the questionnaires to respective respondents who were allowed time to respond after which the duly filled questionnaires were collected.

Data Analysis

After data collection, the data obtained from the field was filled-in and returned questionnaires were edited for completeness, coded and entries made into Statistical package for social sciences (SPSS version 24). Qualitative data was analyzed by content analysis while quantitative; both descriptive and inferential analysis, was conducted for quantitative data. Means and standard deviations were used as measures of central tendencies and dispersion respectively. The purpose of conducting descriptive statistics was to reduce, summarize data and analyze items and constructs. This provided insights into the characteristics of the samples. Descriptive statistics provided a basis for inferential statistics using correlation and multiple regressions.

RESULTS AND DISCUSSION

Response Rate

The study surveyed 332 respondents from 7 private universities in Kenya using a structured questionnaire. A total of 271 questionnaires were filled and returned for analysis. This implied a response rate of 81.6%. On the other hand, 61 questionnaires were not returned, returned while not fully filled or returned completely blank. This represented a non-response rate of 18.4%.

Descriptive Analysis of the Study Variables

Transactional Leadership

The first objective of the study was to determine the influence of transactional leadership on the employee performance among private universities in Kenya. The respondents were asked specific questions based on the measures of the variable which were; active management by exception, passive management by exception and contingent reward. Likert's scale questions were used by asking the respondents to indicate their level of agreement or disagreement. The findings are as shown in table 1.

The findings go concur with the argument by Piccolo and Colquitt (2013) that a transactional leader ought to embrace managerial leadership qualities by not only influencing followership but also effectively supervising to ensure that there is conformity with the set guidelines and procedures. However, the findings do not harmonize with those by Boxall and Bartram (2011) that transactional leaders formulate expectations and are keen to ensure that the followers strictly adhere to the guidelines towards achieving those expectations. The findings moreover reap support from the motivational model which asserts that transactional leaders focus on motivating the employees to the point where it equalizes with their contribution and effort towards attaining the organizational goals (Sashkin, 1976; Ahearne et al., 2005).

Table 1: Transactional Leadership

Statement	Mean	Std. Dev.
I am aware of the link between the effort and reward	3.93	0.91
I motivate followers by setting goals and promising rewards for desired performance	4.13	0.76
I believe leadership depends on the leader’s power to reinforce subordinates for their successful completion of the bargain	3.79	0.94
I often use technical knowledge to determine the change process	3.48	1.05
To realize achievement, I offer support	3.71	0.99
I pay special attention to the breaking of rules and deviation of set standards	3.94	0.98

Perceived Supervision Support

The study sought to find out the moderating role of perceived supervision support on the impact of transactional leadership style on performance of private universities in Kenya. Five-points Likert’s scale was used to identify the respondent’s views on the variables whereby specific statements were formulated based on the specific measures of perceived supervision which were; management active concern, management support and management assurance. The findings are as shown in table 2.

The findings concur with those by Tansuhaj, Randall and McCullough (2011) who found that large organizations in the modern business market ought to focus on closer supervision of the employees through which the employees become more cautious and their productivity increases as well. According to Lewin and Minton (2014), effective supervision of the employees by the senior management enables the flow of command to be as effective so as to enhance the employee productivity at the end of the day.

Table 2: Perceived Supervision Support

Statement	Mean	Std. Dev.
There is a clear connection between supervision and Professional development in my institution	4.06	0.79
Supervision aligns with the institution’s goals and other professional-	2.64	1.08

learning activities

Supervision focuses on core content and modelling of teaching strategies for the content	3.10	0.94
Supervision includes opportunities for active learning of new teaching strategies	3.41	0.99
Supervision provides the chance for the staff to collaborate	3.47	0.96
Supervision includes follow-up and continuous feedback which is effective in growth process	3.45	0.97
Supervision is grounded in day-to-day administrative and teaching practice, and is designed to enhance staff's instructional practices around content	3.86	0.93
Supervision is integrated into the workday, and part of a continuous improvement cycle in my institution	3.91	0.87
Supervision is directly connected to learning and application in daily practice	4.01	0.76

Organizational Performance

The study sought to find out the current situation of the universities as far as their organizational performance is concerned. The main measures of organizational focused on in the study were academic ranking, employee turnover, number of branches as well as enrolment rate of the students.

Employee Turnover

The findings imply that the employee turnover at the universities focused on in the study has been increasing systematically for a period of five years and indication that the performance of the universities could be declining. According to Hopper and Powell (2009), employees are most likely to leave an organization when they realize that the performance is declining hence they are not assured of their job security.

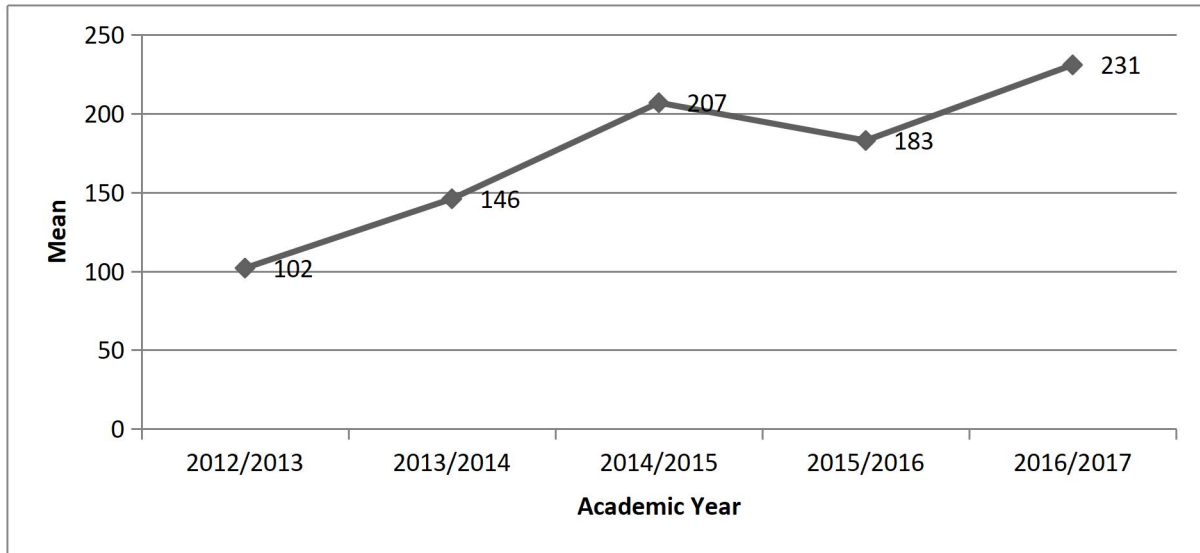


Figure 2: Employee Turnover

Number of Branches (Campuses)

The study sought to find out the number of new branches and/or campuses opened by the universities in a period of five years prior to the study period. According to Elenkov (2012), a well performing organization has a high flow of customers thus it is forced to have other branches to take the services/products closer to the customers. In the same, a good performing university would open new campuses to meet the growing number of students.

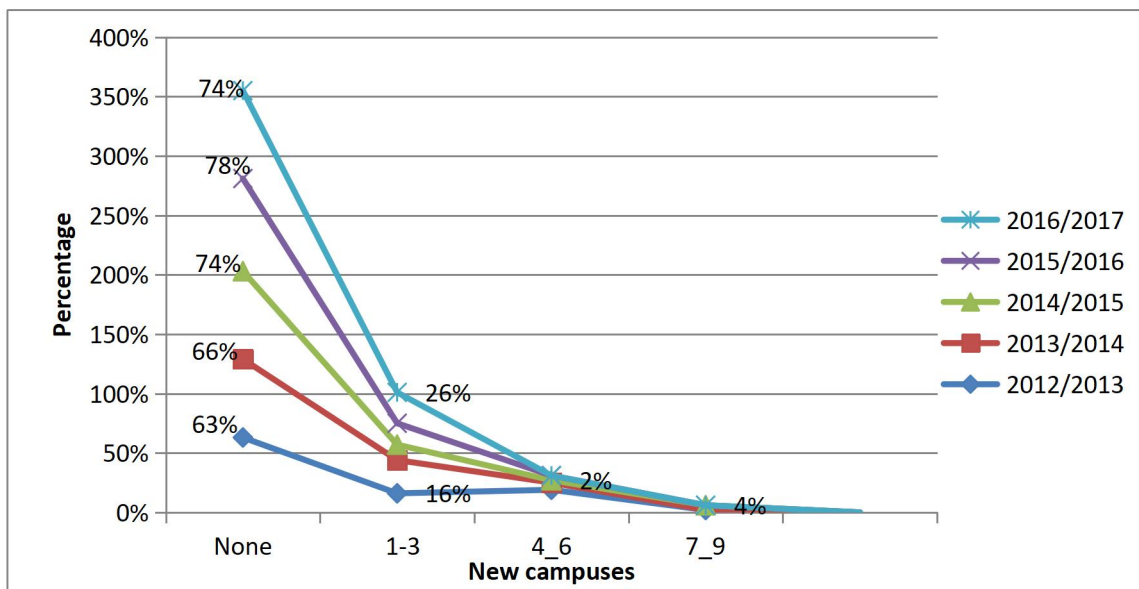


Figure 3: Number of New Campuses Opened

Hypothesis Testing

Ha: Transactional leadership model has a significant effect on organizational performance in chartered private universities in Kenya

To know about the impact of the transactional leadership on performance of private universities in Kenya, multiple regression using the following model was adopted:

$$Y = \alpha_j + \beta_2 X_2 + \varepsilon$$

The model summary as shown in table 3 below revealed that the R-value is 0.714. Therefore, R-value (.714) for the transactional leadership suggested that there is a strong effect of the independent variable on performance of private universities in Kenya. It can also be observed that the coefficient of determination, the R-square (R²) value is 0.509, which represents 50.9% variation of the dependent variable (organizational performance), which is due to the change in independent variable (transactional leadership).

Table 3: Model Summary for Transactional Leadership

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.714a	.509	.491	.20128

a. Predictors: (Constant), Transactional Leadership

b. Dependent Variable: Organizational Performance

From the ANOVA results on transactional leadership and organizational performance as shown in table 4, it is evident that an F statistic of 405.259 was observed which indicated that the model was significant. This was supported by a P-value of (0.000). The reported P-value of (0.000) is less than the conventional P-value of (0.05) thus implying that model applied can significantly predict the change in the organizational performance of private universities in Kenya as a result of transactional leadership. The study, therefore, accepted the alternative hypothesis HA2 at 95% confidence interval, meaning there was a significant relationship between transactional leadership and organizational performance of private universities in Kenya.

Table 4: ANOVA for Transactional Leadership

Model	Sum of	df	Mean Square	F	Sig.

		Squares			
1	Regression	15.660	1	15.660	405.259 .000b
	Residual	28.048	269	.104	
	Total	43.708	270		

a. Dependent Variable: Organizational Performance

The coefficients for transactional leadership and organizational performance are as shown in table 5. From the coefficients, the new model now becomes $Y = 0.133 + 0.784X_2 + \epsilon$. This implies that at a p-value of 0.000, a unit increase in transactional leadership results to 78.4% increase in the organizational performance of the private universities in Kenya. The alternative hypothesis is thereby accepted and the conclusion made that transactional leadership has a positive and significant effect on organizational performance of chartered private universities in Kenya.

Table 5: Coefficients for Transactional Leadership

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.133	.097		1.371	.091
Transactional Leadership	.784	.084	.791	9.334	.000

a. Dependent Variable: Organizational Performance

Structural Equation Model (SEM) for Transactional Leadership

Structural equation model was also used to test for the influence of transactional leadership on organizational performance of private universities in Kenya. The findings as shown in figure 4 revealed that the path coefficient beta (β) value for transactional leadership and organizational performance was 0.830 implying that a unit change in transactional leadership explained up to 83.0% increase in organizational performance of private universities in Kenya. Specifically, on the sub-constructs of transactional leadership, active leadership style had the strongest influence on performance with a coefficient of 0.58 followed by passive style with a coefficient of 0.40 and contingent was the least with a coefficient of 0.29. On the other hand, of the influence that transactional leadership had on performance, ranking was the most influenced with a coefficient of 0.71 followed by the number of programs with a coefficient of 0.65 and employee came last

with a coefficient of 0.27. This is to imply that transactional leadership will influence the university ranking and the number of programs more than it will influence the retention of the university staff and the number of campuses.

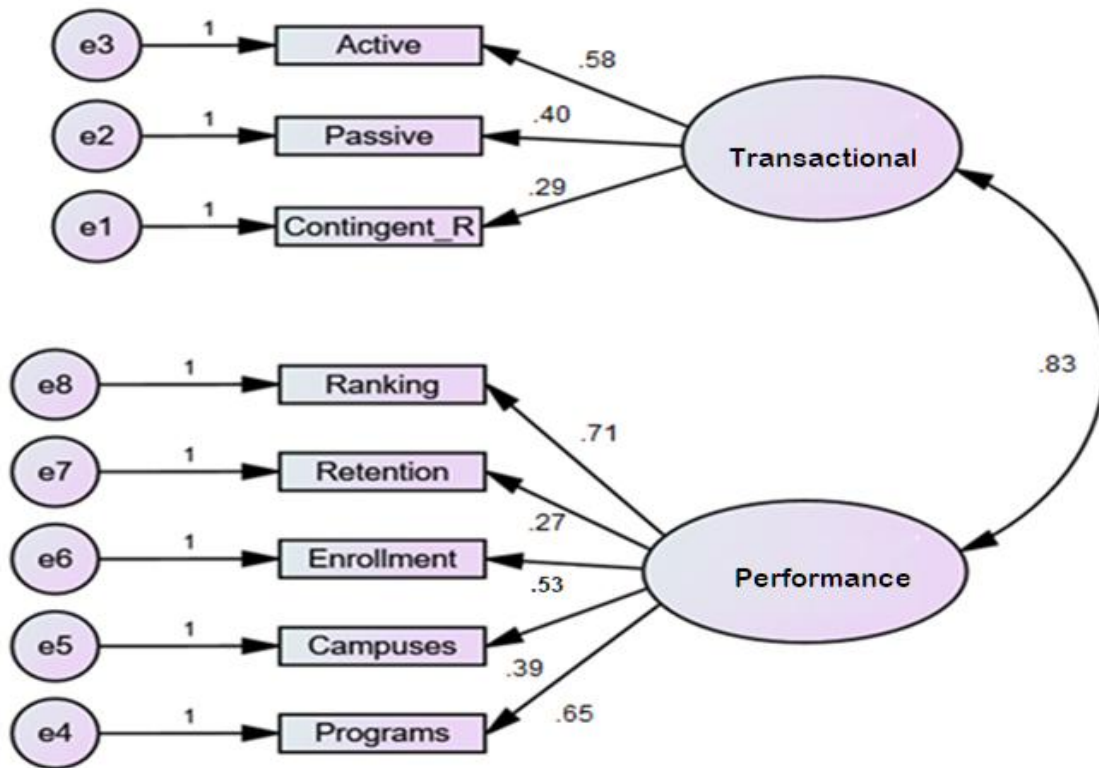


Figure 4: Structural Model for Transactional Leadership

Moderating Effect of Perceived Supervision Support

The study sought to find out the moderating effect of the perceived supervision support on the relationship between transactional leadership and organizational performance among private universities in Kenya. The results as shown in table 6 revealed that perceived supervision support has no significant moderating effect on the organizational performance of private universities in Kenya. This is evidenced by the P-value of 0.613 which is way above the standard p-value of 0.05. This is also revealed by the t-value of 0.924 which is less than the t-critical value of 1.96 at a 95% confidence level. The results thereby satisfy the verdict to fail to accept the alternative hypothesis that perceived supervision support has a significant moderating effect on the relationship between integrated leadership and organizational performance of private universities in Kenya.

Table 6: Regression Coefficients (Moderated Model)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	3.702	.057		64.924	.000
Transactional Moderator	-.195	.084	-.274	-2.312	.022

a. Dependent Variable: Performance of Private Universities

CONCLUSION AND RECOMMENDATIONS

The main aim of the study was to assess the effect of Transactional leadership on organizational performance of private universities in Kenya. From the findings, the study concluded that transactional leadership is a critical aspect in ensuring and promoting performance of private universities in Kenya. The study concluded that most of the universities considered rewarding as a mere form of appreciating the employees while the management of the institutions upheld the concept of management by exception whereby the management actively gets involved in supervision aspects to steer performance.

The management of the private universities should create an environment where employees run any projects as if they were their own so as to enhance accountability. As transactional leaders, the managers at the universities should embrace adopting and seeking employees' input and ideas so long as they are bound to the interests of the firm out of which diversity and innovativeness is embraced.

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The Impact of Covid-19 Pandemic on The Implementation of The University Curriculum: a Case of Public Universities in South Eastern Kenya

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Abstract

The outbreak of the Covid-19 pandemic was the least expected catastrophe globally. The first case of Covid-19 infection was reported on March 2020. Due to the panic of the Covid-19's effects on human life, the Government of Kenya issued directives on how to combat the spread of the disease which, led to the indefinite closure of institutions of learning. Including Public universities. were not an exception. Since then, universities mounted diverse strategies to ensure that curriculum implementation was not disrupted. However, there have been concerns by stakeholders about the quality of the Universities' curriculum implementation activities during of the Covid-19 period since March 2020. The purpose of this study was therefore to investigate the impact of covid-19 pandemic on the implementation of the university curriculum. This study was guided by two research objectives; to examine the teaching strategies used for curriculum implementation in Kenyan universities and to establish the quality of the curriculum implementation in Kenyan universities since March, 2020. This study adopted the survey research design. It was carried out in two (2) public universities in Machakos and Kitui counties, Kenya. The study used both simple random and purposive sampling procedures. The sample of study was 80 students, 20 lecturers, 10 Chairmen of Departments, 2 directors of ICT, 2 directors of Quality Assurance and 6 Deans of Schools yielding a total of 120 respondents. Data was collected using two research instruments; questionnaires and interview schedules. The findings of the study revealed that curriculum implementation was done using several teaching strategies; Online online and blended teaching strategies (pure online teaching, Face to Face, synchronized teaching and digitalization of units). The platforms used for teaching were zoom, google meet and knet. In addition, the findings of the study further showed that the quality of the curriculum implementation was significantly compromised. This was attributed to poor network, limited technical skills on use of online platforms by lecturers and systemic failures. It was therefore concluded that public universities have put innovative teaching strategies to mitigate the challenges brought by the Covid-19 pandemic, but the quality of curriculum implementation was poor. The study recommends that universities should invest in adequate ICT infrastructural facilities that enhance e-learning. The results of the study will promote the quality of blended teaching and learning in all universities in Kenya

Key words: *curriculum implementation, e-learning, teaching and quality.*

INTRODUCTION

Background to the study

The emergency of the Covid-19 pandemic was first reported in China in December 2019. The disastrous effects of the pandemic brought about disorganization of both economic and social activities. In Kenya, first case of Covid-19 infection was reported on the month of March 2020. Due to the panic of its' effects on human life and experiences reported in European countries and in the United states of America, the Government of Kenya issued instructions to of fighting the

spread of the disease. The indefinite closure of all institutions of learning was put in place. The institutions of higher learning were not spared and particularly the public universities.

Later, after the first wave of the pandemic was brought into control in Kenya, most of the tertiary institutions of learning among them public universities were opened and went back to face to face teaching and learning. However, this was immediately terminated after a second wave of the pandemic struck in the month of October 2020. In order to ensure that teaching and learning was not adversely affected, the Cabinet Secretary for the Ministry of Education directed all institutions of higher learning to mount virtual learning programs. This led to the gradual transitioning from face to face; remote learning; and blended and blended teaching and learning modes. On the other hand, some universities with small populations continued with face to face physical teaching and learning activities, although physical distancing requirements and other health safeguards made it challenging to return to full-time in-person instruction which put the life of students at risk. Furthermore, the uncertainty of the mutation of the corona virus required universities to be ready to switch between in-person and remote learning to ensure teaching and learning is not further disrupted.

As schools have been closed to cope with the global pandemic, students, parents and educators around the globe have felt the unexpected ripple effect of the COVID-19 pandemic. While governments, frontline workers and health officials are doing their best slowing down the outbreak, education systems are trying to continue imparting quality education for all during these difficult times. Many students at home/living space have undergone psychological and emotional distress and have been unable to engage productively. The best practices for online homeschooling are yet to be explored (Petrie, 2020). The use of suitable and relevant pedagogy for online education may depend on the expertise and exposure to information and communications technology (ICT) for both educators and the learners. Some of the online platforms used so far include unified communication and collaboration platforms such as Microsoft Teams, Google Classroom, Canvas and Blackboard, which allow the teachers to create educational courses, training and skill development programmes (Petrie, 2020). They include options of workplace chat, video meeting and file storage that keep classes organized and easy to work. They usually support the sharing of a variety of content like Word, PDF, Excel file, audio, videos and many more. These also allow the tracking of student learning and assessment by using quizzes and the rubric-based assessment of submitted assignments.

The flipped classroom is a simple strategy for providing learning resources such as articles, pre-recorded videos and YouTube links before the class. The online classroom time is then used to deepen understanding through discussion with faculty and peers (Doucet et al., 2020). This is a very effective way of encouraging skills such as problem-solving, critical thinking and self-directed learning. The virtual classroom platforms like videoconferencing (Google Hangouts Meet, Zoom, Slack, Cisco, WebEx) and customizable cloud-based learning management platforms such as Elias, Moodle, BigBlueButton and Skype are increasingly being used.

Challenges in Teaching and Learning With the availability of a sea of platforms and online educational tools, the users - both educators and learners - face frequent hiccups while using it or referring to Higher Education for the Future these tools. Some of the challenges identified and highlighted by many researchers are summarized as follows: Broadly identified challenges with e-learning are accessibility, affordability, flexibility, learning pedagogy, life-long learning and

educational policy (Murgatroid, 2020). Many countries have substantial issues with a reliable Internet connection and access to digital devices. While, in many developing countries, the economically backward children are unable to afford online learning devices, the online education poses a risk of exposure to increased screen time for the learner. Therefore, it has become essential for students to engage in offline activities and self-exploratory learning. Lack of parental guidance, especially for young learners, is another challenge, as both parents are working. There are practical issues around physical work spaces conducive to different ways of learning. The innately motivated learners are relatively unaffected in their learning as they need minimum supervision and guidance, while the vulnerable group consisting of students who are weak in learning face difficulties. Some academically competent learners from economically disadvantaged background are unable to access and afford online learning.

The level of academic performance of the students is likely to drop for the classes held for both year-end examination and internal examination due to reduced contact hour for learners and lack of consultation with teachers when facing difficulties in learning/understanding (Sintema, 2020). Student assessments are carried out online, with a lot of trial and error, uncertainty and confusion among the teachers, students and parents. The approach adopted to conduct online examination varies as per the convenience and expertise among the educators and the compatibility of the learners. Appropriate measures to check plagiarism is yet to be put in place in many schools and institutions mainly due to the large number of student population. The lockdown of schools and colleges has not only affected internal assessments and examinations for the main public qualifications like General Certificate of Secondary Educations (GCSE), but A levels have also been canceled for the entire cohort in the UK. Depending on the duration of the lockdown, postponement or cancellation of the entire examination assessment might be a grim possibility (United Nations, 2020). Various state-level board exams, recruitment exams, university-level exams and entrance exams have been postponed across India due to the COVID-19 outbreak and national lockdown. Various entrance examinations (such as BITSAT 2020, NATA 2020, CLAT 2020, MAT 2020, ATMA 2020) have also been postponed/rescheduled. The education system in schools, colleges and universities across the country has been severely impacted due to the ongoing situation. It is also possible that some students' careers might benefit from the interruptions. For example, in Norway, it has been decided that all 10th grade students will be awarded a high-school degree. A study carried out in France shows that the 1968 abandoning of the normal examination procedures in France, following the student riots, led to positive long-term labour market consequences for the affected cohort (Maurin & McNally, 2008). Pokhrel and Chhetri School time also raises social skills and awareness besides being fun for the children. There are economic, social and psychological repercussions on the life of students while they are away from the normal schedule of schools. Many of these students have now taken online classes, spending additional time on virtual platforms, which have left children vulnerable to online exploitation. Increased and unstructured time spent on online learning has exposed children to potentially harmful and violent content as well as greater risk of cyber bullying. School closures and strict containment measures mean more families have been relying on technology and digital solutions to keep children engaged in learning, entertained and connected to the outside world, but not all children have the necessary knowledge, skills and resources to keep themselves safe online.

In the case of online learning in Bhutan, majority of the learners are from rural villages where parents are mostly illiterate farmers. Students are engaged in assisting parents in farm activities

such as agriculture, tending to cattle and household chores. Some students even requested to postpone exam time towards the afternoon since they had to work on the fields during morning hours. Some students expressed that they had to attend to their ailing parents/grandparents/family members and take them to hospitals. By evening, when they are back home, it becomes difficult for them to keep abreast with the lessons. Parents whose children are in lower grades feel that it would be better to let the children repeat the next academic year. Majority of students do not have access to smartphones or TV at home in addition to poor Internet connectivity. There is no or less income for huge population due to closure of business and offices. The data package (costs) is comparatively high against average income earned, and continuous access to Internet is a costly business for the farming community.

Online face-to-face classes (video) is encouraged by most; however, some students (economically disadvantaged) have expressed that the face-to-face online class consumes more data packages. The teachers are in dilemma as to whom to listen to and which tools to adopt. Some think pre-recorded videos could help; however, this would restrict interactions. It is difficult to design a proper system to fit the learning needs and convenience of all students. As schools have been closed to cope with the global pandemic, students, parents and educators around the globe have felt the unexpected ripple effect of the COVID-19 pandemic. While governments, frontline workers and health officials are doing their best slowing down the outbreak, education systems are trying to continue imparting quality education for all during these difficult times. Many students at home/living space have undergone psychological and emotional distress and have been unable to engage productively. The best practices for online homeschooling are yet to be explored (Petrie, 2020).

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directed learning. The virtual classroom platforms like videoconferencing (Google Hangouts Meet, Zoom, Slack, Cisco, WebEx) and customizable cloud-based learning management platforms such as Elias, Moodle, BigBlueButton and Skype are increasingly being used.

Although many universities have worked round the clock to embrace virtual teaching and learning, research findings have reported a number of challenges. These includes such as the weakness of online teaching infrastructure, the knowledge gap, and in particular lack of technical ICT skills by lecturers to online teaching. In addition,, non-conducive environment for learners at home, equity and academic excellence in terms of higher education also pose influence the success of blended teaching and learning. (Pokhrel& Chhetri, 2021 and Houlden and Veletsianos, 2020). However, despite these challenges, the use of blended learning appears to be among the solutions that may provide sustainable quality teaching and learning at the universities amidst the covid-19 pandemic.

According to Mahyoob (2020), the challenges to accessing online learning among learners and teachers are less because both have experienced the opportunity of interacting with educational technology tools such as mobile-based learning and computer-based learning. In addition, Byun, Sooyeon, & Slavin (2020) noted that the availability of affordable technology globally puts the today's learners in an advantage position to learn using ICT. The interactions of today's' learners with different sorts of technology even in remotest and rural areas enabled enables them to be active recipients of content in the e-Learning platforms (platforms (MohalikMohali & Sahoo, 2020; and 2020) Paul, J.& Jefferson,).

According to UNESCO (2020), creating an effective hybrid-leaning strategy involves an iterative approach with four steps: understand and envision, decide and design, enable and execute, and monitor and adjust. Hybrid/Blended learning can be defined as a learning approach that combines both remote learning and in-person learning to improve student experience and ensure learning continuity. It is of particular relevance during school partial reopening and in preparation for potential virus resurgence.

Purpose and objectives of the Study

The purpose of this study was to investigate the impact of covid-19 pandemic on the implementation of the university curriculum. This study was guided by two research objectives to; examine the teaching strategies used for curriculum implementation in Kenyan Public universities and establish the quality of the curriculum implementation in Kenyan Public universities since March 2020.

METHODOLOGY

This study adopted the survey research design. The design was purposively selected due to its flexibility and suitability during restrictions in the covid-19 pandemic (Kombo and Tromp, 2006). It was carried out in two (2) public universities in Machakos and Kitui counties, Kenya. The sample of study was 80 students, 20 lecturers, 10 Chairmen of Departments, 2 directors of ICT, 2 directors of Quality Assurance and 6 Deans of Schools yielding a total of 120 respondents.

Location of the Study

This study was carried out in South Eastern Kenya, which comprises of Machakos, Makueni and Kitui counties. However, the study was carried out only in Machakos and Kitui counties because there is no public university in Makueni County. The counties were selected because they were easily accessible and also hosts both public and private universities in the region.

Research Instruments

The research instruments used in this study were Students' Questionnaire, Lecturers' questionnaire and interview guides for Chairmen of Departments, directors of ICT, directors of Quality Assurance and deans of schools. The validity of the instruments was established through consultation with ICT specialists while the reliability was done through a pilot study in a public university in Nairobi County. The Students' Questionnaire and Lecturers' questionnaire had 0.83 and 0.89 coefficients of reliability which were acceptable since they were based on the threshold of 0.7 according to Gay, Mills, & Airasian (2012).

Sampling Procedures

The sampling techniques used in this study were stratified and simple random sampling methods. Two public universities were purposively sampled, one from Machakos and Kitui counties. Mouton (2002:136) asserts that the key concept in sampling is representativeness of the units in order to provide accurate generalization of the study findings. Kerlinger (2003) suggests that at least 30 per cent of the target population is a good representation of the entire population for research for survey research design. Based on these guidelines, 2 universities were sampled for this study. Simple random sampling technique was used to select a sample of 80 students, 20 lecturers, 10 Chairmen of Departments, 6 Deans of Schools, 2 directors of ICT and 2 directors of Quality Assurance yielding a total of 120 respondents.

Statistical Techniques for Data Analysis

The data collected was processed and analyzed by use of Statistical Package for Social Sciences (SPSS). Both qualitative and quantitative data analysis techniques were used in this study. The results of the study were presented by usage of frequencies, tables, graphs and pie-charts.

RESULTS AND DISCUSSION

Results

The first objective of this study was to examine the teaching strategies used for curriculum implementation in public universities in Kenya. To address this objective, the respondents were asked to highlight the platforms that are used in their universities. The findings in Table 1 shows that three online platform are commonly used in blended teaching and learning in public universities since March 2020; zoom(36.25%), google meet(30%) and Knet(33.75%) as reported by the student respondents. These findings were also supported by lecturer respondents; zoom (25.0%), google meet (35%) and Knet(40%). Similar results were further revealed by the Chairmen of departments as follows; zoom (30.0%), google meet (30.0%) and Knet (40.0%). A critical analysis of the above results shows that Knet was the most popular platform used for online teaching and learning in the institutions selected for this study. A detailed summary of the findings is shown in table 1.

Table 1: Platforms used for virtual teaching in Public Universities

Response	Students	Lecturers	CODs	Deans
zoom,	29(36.25%)	5(25%)	3(30%)	2(33.3%)
google meet	24(30%)	7(35%)	3(30%)	2(33.3%)
Knet.	27(33.75%)	8(40%)	4(40%)	2(33.3%)

The respondents were also asked to state the teaching strategies used in virtual teaching and learning as a measure to ensure that the curriculum implementation process was not halted by the restrictions put in place to control the spread of the pandemic by the Ministry of Health. Results of this study showed that a variety of teaching strategies were adopted since the outbreak of the Covid-19 pandemic; pure online teaching, face to face, synchronized teaching, digitalization of units and blended teaching and learning. The findings as reported by the lecturer respondents were as follows; pure online teaching (20.00%), Face to Face (15.00%), synchronized teaching (20.00%), digitalization of units (15.00%) and blended teaching and learning (30.00%). This finding was supported by those of the Chairmen of Departments as shown in table 2.

Table 2: Teaching strategies used for curriculum implementation since March 2020

Response	Students	Lecturers	CODs	Deans
Pure online teaching	14(17.50%)	4(20.00%)	2(20.00%)	1(16.67%)
Face to Face	17(21.25%)	3(15.00%)	2(20.00%)	1(16.67%)
Synchronized teaching	16(20.00%)	4(20.00%)	1(10.00%)	1(16.67%)
Digitalization of units	10(12.50%)	3(15.00%)	1(10.00%)	1(16.67%)
Blended teaching and learning	23(28.75%)	6(30.00%)	4(40.00%)	2(33.33%)

The second objective of the study was to examine the quality of the curriculum implementation in Kenyan universities since March 2020. The results of the study as per student respondents on the quality of curriculum implementation was; excellent (7.50%), Good (21.25%), satisfactory (52.50%) and Poor (18.75%). Similar findings were reported by Chairmen of Department who indicated that the quality of teaching was reported as follows: excellent (20.00%), Good (20.00%), satisfactory (40.00%) and Poor (40.00%). These findings were further supported by

the deans of schools who noted that the quality of curriculum implementations was; excellent (16.67%), Good (16.67%), satisfactory (33.33%) and Poor (33.33%). An interview with the two directors of Quality Assurance also concurred with the other respondents when they rated the quality of curriculum implementation was satisfactory. Similar sentiments were also given by the directors of Open, Distance and eLearning (ODEL).

Table 3: Quality of Curriculum implementation using Blended teaching and Learning in Kenyan Public Universities

Response	Students	Lecturers	CODs	Deans
Excellent	6(7.50%)	2(10.00%)	2(20.00%)	1(16.67%)
Good	17(21.25%)	6(30.00%)	2(20.00%)	1(16.67%)
Satisfactory	42(52.50%)	7(35.00%)	4(40.00%)	2(33.33%)
Poor	15(18.75%)	5(25.00%)	2(40.00%)	2(33.33%)

The respondents were further asked to highlight the challenges that affected the quality of curriculum implementation using blended learning. A summary of the findings is shown in table 4 below.

Table 4: Factors affecting the quality of curriculum implementation using Blended teaching and learning

Response	Students	Lecturers	CODs	Deans
Poor network connectivity	51(63.75%)	15(75.00%)	6(60.00%)	3(50.0%)
Lack of technical skills	62(77.5%)	14(70.0%)	3(30.00%)	1(16.67%)
Lack of laptops/computers	65(81.25%)	4(20%)	0(0%)	0(0%)
Lack of smart phones	35(43.75%)	0(0%)	0(0%)	0(0%)
Limited e-learning resources	66(82.5%)	7(35.00%)	5(50.00%)	2(33.33%)
Inadequate subject matter/content	40(50.00%)	3(15.0%)	4(40.00%)	3(33.33%)

The study findings as shown in table 4 shows that there were several challenges which affected the quality of virtual teaching and learning; poor network connectivity, lack of ICT technical skills, lack of laptops/computers, lack of smart phones, limited e-learning resources and inadequate subject matter/content. The magnitude of these challenges as reported by the student respondents were poor network connectivity (63.75%), lack of technical skills (77.5%), lack of laptops/computers (81.25%), lack of smart phones (43.75%), limited e-learning resources

(82.50%) and inadequate subject matter/content (50.00%). The problem of poor network connectivity (63.75%) and lack of ICT technical skills (77.50%) was also pointed out as a major challenge by the lecturer respondents. However, as shown in the table 4, availability of laptops/computers, smart phones and e-learning resources were not areas of concern as reported by the lecturers. These results were further supported by the CODs and the Deans who reported that availability of laptops/computers, smart phones and e-learning resources are no longer an inhibiting factor to curriculum implementation using blended learning mode.

Discussions

As reported earlier public universities commonly use three online platform namely zoom (36,25%), google meet (30%) and Knet(33.75%) as reported by the student respondents. these findings were supported by lecturers when they noted that zoom (25.0%), google meet (35%) and Knet(40%) platforms were commonly used in the selected universities. This finding was in agreement with that of Mok, Xiong and Rahmam (2021) on their study on COVID-19 pandemic's disruption on university teaching and learning and competence cultivation when they argued that in addressing the constraints of emergency online learning, the university management and the teaching profession must find a mixed-mode of delivery for enhancing teaching and learning.

The results of this study according to the student respondents was as follows: pure online teaching (17.50%), Face to Face (21.25%), synchronized teaching (20.00%), digitalization of units (12.50%) and blended teaching and learning (28.75%). The findings concurred with those of earlier studies that shown that the e-learning curriculum needs to be reviewed and, teachers should be equipped with various teaching strategies to ensure that the quality of classroom teaching is not compromised.

The results of the study on the quality of curriculum implementation of blended teaching and learning as per different categories of respondents was recorded as satisfactory. For example, the Chairmen of Department noted that the quality of teaching was excellent (20.00%), Good (20.00%), satisfactory (40.00%) and Poor (40.00%) respectively. These findings were also supported by the deans of schools who also noted that the quality of curriculum implementations was rated as satisfactory (33.33%) and Poor (33.33%). However, this finding seems to differ with those of Dakhi et al. (2020) who argued that online learning in higher education has leading to meaningful learning as today's learners have already adopted to learning environment that utilize technology. In addition, Dakhi et al. (2020) further noted that the integration of technology in online learning enables for a more flexible interaction between instructors and students, and between students themselves

The results of the study indicated that the quality of the implementation of the university curriculum using blended teaching and learning was affected by several variables related to systemic, technical skills and availability of teaching facilities and resources. Majority of the lecturer respondents (75%) reported that public universities lacked stable network services and 75% also reported lack of sufficient technical skills to navigate the various platforms. This finding concurred with that of Ngwacho (2020) who found out that there was a significant relationship between the availability of teaching resources and effective curriculum delivery during the Covid 19 era. This researcher attributed this result to lack of sufficient ICT infrastructure in the institutions of learning in Kenya.

CONCLUSION

Based on the findings of this study, it was concluded that effective implementation of the university curriculum has been affected by the effects of the Covid 19 pandemic. Since the emergency of the pandemic public universities have been using zoom, google meet and knet platforms to provide online teaching and learning. The teaching strategies used in virtual curriculum implementation include pure online teaching, Face to Face, synchronized teaching and digitalization of units. The quality of curriculum implementation was found to be either poor or satisfactory. This was attributed to several challenges. These challenges range from poor network connectivity, lack of technical skills, lack of laptops/computers and smart phones, limited e-learning resources and inadequate subject matter/content.

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Assessment of Selected Physico-Chemical Parameters of Groundwater in Chuka Igambang'Ombe Constituency, Kenya

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Abstract

Groundwater is an essential source of water for drinking and other domestic uses. Recently, there has been high dependence on groundwater due to water shortage as a result of changing climates, and higher costs of accessing piped water. An occurrence of the physico-chemical parameters of the groundwater in levels past the WHO highest permissible limits can cause serious health implications to the consumers of the groundwater. This study therefore, assessed the extent of the physico-chemical parameters concentration of the groundwater in Chuka, Igambang'ombe constituency. A total of five samples was collected from 5 boreholes in the Mucw'a and Ndagani regions surrounding the Chuka University main campus. Selected physical parameters were recorded onsite by use of portable apparatus. Samples for testing chemical parameters were collected and transported in cooler boxes to Chuka University laboratories for analysis. Physical parameters determined onsite were dissolved oxygen (DO), temperature, and the pH. Dissolved Oxygen meter, mercury thermometer, and pH meter were the equipment used to test the respective physical parameters. UV- spectrophotometry was used to analyze the chemical parameters: nitrates, and phosphates, where absorbance was recorded at a wavelength of 220-820 nm and 880nm respectively. The assessment was conducted during the relatively dry months of January to March. The temperature of the water ranged from 22.8-25.2^oC. The pH levels ranged from 4.50 – 9.50. The high altitude nitrate levels were 2.4mg/L, and 7.37mg/L at the low altitude. The phosphate concentrations were below detectable limits. The results were then compared with WHO standards for the highest permissible levels for the tested parameters to determine the suitability of the water for consumption. All the tested parameters lied within the WHO permissible limits for drinking water except for the pH levels.

Keywords: *Groundwater, physical parameters, chemical parameters, infiltration, suitability,*

INTRODUCTION

Groundwater is ideally the most essential component of the water cycle as it's a key source of potable water, especially in Africa. It contributes to up to two thirds of the world's freshwater resources. Groundwater is highly relied on due to the uneven distribution and inaccessibility of surface water resources of the world (Chapman, 1996 and BGS, 2011).

According to Onwughara (2013), drinking water should be of high quality as presence of physical and chemical elements past the permissible standard levels make the water unsuitable for consumption. Groundwater faces a great threat to its quality due to contamination. Thus, it is hard to access clean, safe and potable water in most African developing countries such as Kenya (Dara and Mishra, 2011; Idibie et al., 2018).

Prospects by the Water Resource Authority ([WRA], 2018), depict potential worsening of the shortage of potable water by the year 2030. This will be due to human activities that influence groundwater quality such as wastes carried into boreholes by means of flash floods, leaching of septic and buried wastes etc. According to Talafre and Knabe (2009), it is estimated that droughts and other forms of water scarcity will affect up to one third of the world's population, and will influence consumption and migration patterns.

Even with the associated health concerns (Palamuleni and Akothi [2015], Idibie et al., 2018), noted that up to 1.5 billion world population depend on untreated groundwater. According to WHO (2011), the highest permissible levels for nitrates is 10mg/L. Consumption of water whose nitrates concentration surpasses the WHO standards cause bluebaby syndrome or methaemoglobinaemia for young children (Jain and Agarwal, 2012). It is also known to cause cancer to humans (Ayesha et al., 2012; WHO, 2011). Although there are no set standards for phosphate levels in drinking water, clean water usually has low levels of phosphates (Ombaka et al., 2013).

An assessment of groundwater is therefore, essential in order to determine the suitability of the water for consumption. The data obtained can be utilized to manage health implications resulting from water contamination. This study was thus conducted to establish the extent of selected physico-chemical parameters borehole water in Chuka, Igambang'ombe constituency.

METHODOLOGY

Study Area

Chuka is in Tharaka Nithi county, eastern part of Kenya and it lies below the slopes of Mt. Kenya. Tharaka Nithi county is situated between longitudes 37° 19' East and latitudes 0° 07' and 0° 26' south. Chuka area is a section of Igambang'ombe constituency and has an area coverage of 624.4 km². The county receives an average annual rainfall of 717 mm. Chuka being part of the high altitude areas receives a reliable rainfall while the low altitude regions such as Kathwana receive low and poorly distributed rainfall. The temperatures in the county range from as low as 14°C to 30°C in highland areas and 22°C to 36°C in the low altitude region. Chuka and Chogoria towns have exhibited a fast growth with an increase in population (GOK, 2013; KNBS, 2019).

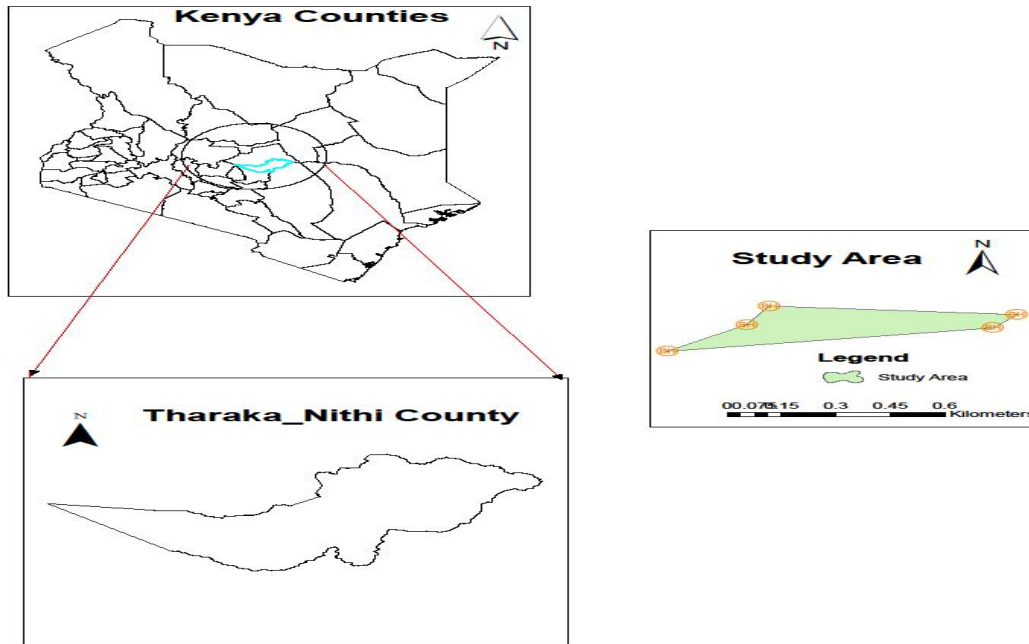


Figure 1: A map showing the specific study area that the boreholes were sampled.

Field sample collection and laboratory procedures

Water sample collection

A total of five samples were collected from five boreholes situated in the Ndagani and Muc'wa areas. The samples were collected during the evening hours to avoid interference of the water quality by external factors. They were collected during the relatively dry months of January to March. The boreholes were randomly selected to ensure a true representation of the study area. Before extraction of the samples from the boreholes, 3 buckets full of water were drawn from each borehole to ensure the tested water would represent a true state of groundwater quality. One litre plastic bottles pre-sterilized with 70% ethanol were used to draw the samples. Once filled with water, the bottles aseptically closed, labelled, packed in cool boxes and transported to Chuka University laboratories for analysis.

Physical parameters analysis

The physical parameters dissolved oxygen (DO), temperature and pH were determined on site by use of dissolved oxygen meter, mercury thermometer and pH meter respectively. The results were recorded in triplicates to ensure reproducibility.

Nitrate analysis procedure

Each of the samples were filtered and in each 50mls measured into separate conical flasks. 1 ml of dilute hydrochloric was added to each of the sample containing conical flasks.

Blank solution preparation

This was prepared by measuring 50mls of distilled water and adding 1ml of dilute hydrochloric acid into it.

Standard solutions were prepared following the below procedure

From 100ppm of nitrate; 4 ML to represent 8ppm and 3mls to represent 6ppm were transferred each into a 50mls volumetric flask and filled to mark with distilled water.

Absorbance of the standards, the blank, and the sample solutions was recorded at a standard wavelength of 220- 820nm. The concentrations were then established from the absorbance.

Phosphate analysis procedure

Reagents

Potassium antimonyl tartrate solution

Ammonium molybdate

Dilute sulphuric acid

Procedure for preparation of a combined reagent

To a 150ml conical flask; 50 ML of dilute sulphuric acid were added, 5 ML of potassium antimonyl tartrate solution, 15 ML of ammonium molybdate solution and 30 ML of ascorbic acid stepwise with gentle stirring after every addition.

Full procedure

Each of the water samples were filtered using a Whitman filter paper to remove suspended particles.

25mls of the blank solution, 25mls of each samples, and 25mls of the standard solutions were pipetted into 150mls conical flask each.

4mls of the combined reagent were added into each of the conical flasks and mixed thoroughly for 10minutes.

The absorbance of each was measured within 15-30 minutes at a wavelength of 880nm by use of UV-spectrophotometer. The concentration were established using respective absorbance.

RESULTS AND DISCUSSION

The Physical Parameters

Temperature

The groundwater temperatures ranged from 22.8- 25.2 ° C within all the boreholes. Water from some of the boreholes had temperatures significantly higher compared to others. The temperature data was collected during the morning and evening hours to avoid influence from

external factors. This is according to Trivedi (2010), who observed that variations in water temperature could be influenced by the time of sample collection. High temperatures can intensify chemical reactions in an aquifer such as weathering of rocks which can release chemicals to the water thus changing its quality (Murhekar, 2011). The average temperature of the water in both high and low altitude regions did not lie within WHO (2008) highest permissible levels, that is, 28-32.

Table 1: temperature levels of the selected boreholes

Borehole	Temperature	t-Test: Paired Two Sample for Means		
Mc01	25.2			
Mc02	24.6		<i>temperature</i>	<i>WHO standard</i>
Mc03	23.6	Mean	23.92	30
ND01	23.4	Variance	0.932	0
NDO2	22.8	Observations	5	5
		Pearson Correlation	#DIV/0!	
		Hypothesized Mean Difference	0	
		df	4	
		t Stat	-14.0825	
		P(T<=t) one-tail	7.38E-05	
		t Critical one-tail	2.131847	
		P(T<=t) two-tail	0.000148	
		t Critical two-tail	2.776445	

pH

The pH of the boreholes water ranged from 4.50 to 9.50. Some of the boreholes exhibited slightly acidic conditions while others exhibited basic characteristics. The weak acidic pH of some of the borehole water could be as a result of dissolved carbon dioxide and organic acids caused by decayed matter which may leach and reach the groundwater. Acidic water can cause redness and irritation of eyes in humans. It can also cause corrosion of pipes in water distribution systems (Ombaka et al., 2013). There is a link between low water pH and gastrointestinal disorders such as hyperacidity and ulcers. Water of higher pH has adverse effects such as scale formation in water heating systems (Buridi & Gedala, 2014). The pH of the water tested from the selected boreholes deviated from the WHO (2008) highest permissible levels and thus not suitable for drinking by humans.

Table 2: comparing the pH of the boreholes with WHO standards

Borehole	pH	Deviation from WHO standards	Inference
Mc01	4.71	-1.79	Acidic
Mc02	5.01	-1.49	Acidic
Mc03	4.50	-2.00	Acidic
ND01	9.50	0.3	Basic
Nd02	4.50	-2.00	Acidic

Dissolved oxygen

The mean dissolved oxygen levels in the groundwater ranged from 69.1mg/L to 146.1mg/L. Some of the boreholes exhibited a significantly high concentration in dissolved oxygen as compared to others. This could be attributed to nearness of the boreholes to the surface, allowing free circulation of gases in the groundwater. Dissolved oxygen concentration is a key test in water pollution control and waste treatment as is used to indicate the level of contamination and potability of water. According to Olumuyiva (2012), low levels of dissolved oxygen in water indicate microbial contamination or corrosion of chemical substances in the groundwater.

Table 3: dissolved oxygen levels of the boreholes

Borehole	Dissolved oxygen level
Mc01	69.1
Mc02	134.8
Mc03	146.1
Nd01	65.5
Nd02	117.0

The chemical parameters***Nitrates***

In order to understand the distribution of nitrates in the groundwater, an aspect of altitude was introduced. This was so as to understand if altitude influenced the nitrates distribution in anyway. The selected boreholes had their nitrate concentration levels ranging from 1.1 mg/L to 3.8 mg/L in the high altitude region and 1.6mg/L to 6.7 mg/L in the low altitude region. The mean nitrate levels in the high altitude region was at 2.4 mg/l while that of the low altitude region was at 4.2 mg/L. There was no correlation between altitude and the level of nitrate in the groundwater. The nitrate levels in both the low and high altitude regions were within the WHO (2008) standard levels of 10 mg/L. High nitrate levels in some of the boreholes could be attributed to infiltration of water into the aquifer from runoff containing dissolved nitrates (Prasad et al., 2014). According to Suthra et al., (2009), there is an association between high levels of nitrates in groundwater and intensive agricultural activities in the same area. High nitrate levels in water past the recommended levels is known to cause blue baby syndrome in infants (WHO, 2011).

Table 4: comparing nitrate levels with WHO standards

Region	Mean nitrate levels	Deviation from WHO standard levels
High altitude	2.4mg/L	-7.6 mg/L
Low altitude	7.37 mg/L	-2.63 mg/L

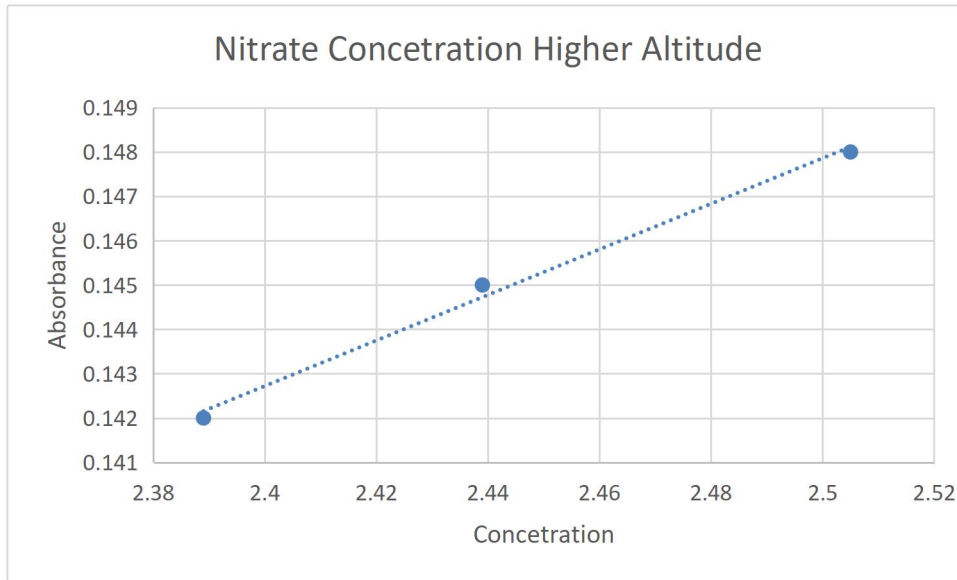


Figure 1: a graph showing high altitude nitrates concentration

A graph plot of the low altitude region nitrate concentration

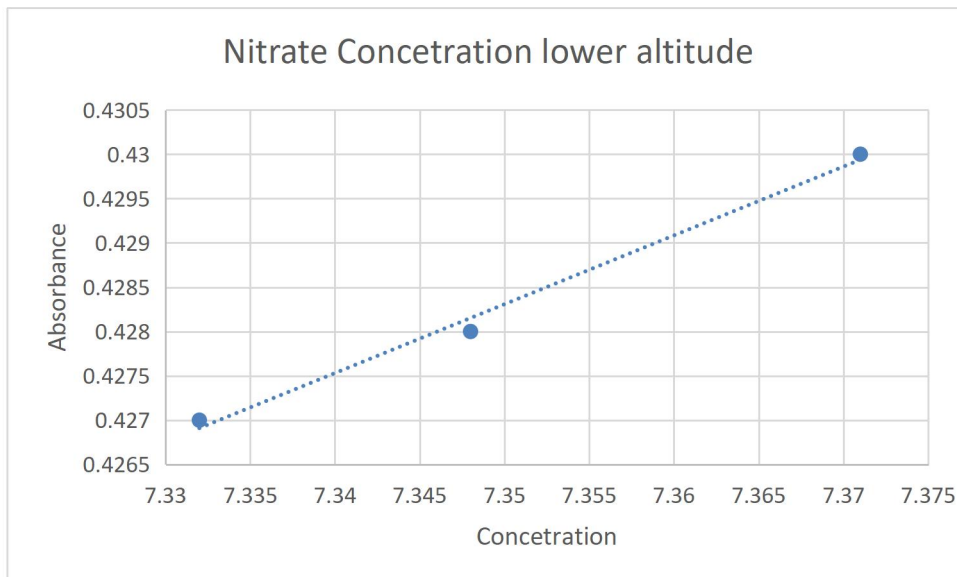


Figure 2: a graph showing nitrates concentration in low altitude region

Phosphates

The mean concentrations for phosphates in the study area were below detectable levels. This was the case with both samples from high altitude region and those from low altitude region of the study area. The low concentrations of phosphates could be attributed to geology of the area (Adeyemo et al., 2013). According to WHO (2008), high phosphates concentration has no health complications despite for its role in causing eutrophication in water bodies.

CONCLUSION AND RECOMMENDATIONS

Key physico-chemical parameters of the groundwater, that is, temperature and pH were significantly different from the WHO (2008) standards for drinking water thus making the water not fit for human consumption. This could be due to natural sources such as rock weathering and human factors such as poor management of septic sewage from urbanization.

based on the study results, the following suggestions are made.

- i. There is need for good site selections for boreholes and wells in the Chuka area. It was noted that the boreholes were located too close to the urbanized areas where poor waste and sewage management could be influencing the quality of the groundwater.
- ii. There is need to prevent the boreholes and wells from contamination by runoff. This can be done by properly sealing the boreholes to prevent entry of contaminated run off water.
- iii. The local authorities need to ensure constant supply of clean piped water to the residents of the area to help safeguard their health. It was noted that the residents of the area usually turn to the borehole water when piped water supply grows short. Also, not all the residents of the have access to piped water, and so some rely on the groundwater entirely.
- iv. A borehole management committee should be formed and trained as technicians to help repair minor damages in cases of breakdown.

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Benefits of Psychosocial Interventions on Traumatized Children Living in Difficult Environments in Mbeere North: a Systematic and Meta-Analysis

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Abstract

This study examined the benefits of psychosocial interventions of traumatized children living in difficult environments. Psychosocial interventions refer to additional forms of assistance for child development other than educational or practical interventions. Children who have experienced any form of trauma or lack necessary basic needs require additional and specific psychosocial interventions. From reviewed studies, substantial evidence shows that exposure to traumatic experiences out of living in difficult environments can affect brain functions of children, have long-lasting consequences resulting to poor mental health and various psychological and social problems. All forms of abuse, abandonment, neglect, poverty, illness, disabilities, pandemics, loss, and conflict, among others can all have negative effects on a child's psychosocial wellbeing. Trauma directly causes stress fears as well as emotional reactions and memory processes. While several studies have shown the benefits of use of various forms of psychosocial interventions such evidence has been inconsistent, with results varying significantly based on various factors, such as gender, culture, age, economic status setting and conflict-phase, and various forms of disabilities. Very few studies have been conducted in Mbeere North Sub-County, as regards the significance of psychosocial interventions such as psychosocial counselling regardless of the numerous cases of children going through traumatic experiences and in particular during this time of Covid-19 pandemic. Additionally, the data supporting the importance of psychosocial interventions in Mbeere North on traumatized children has not been well synthesized. Based on the evidential inconsistencies, there was need to conduct a detailed analysis on significance of psychosocial interventions used on traumatized children exposed to traumatic experiences due to living under difficult environments for healing purposes. To establish the benefits of psychosocial interventions, a systematic review and a meta-analysis was conducted by searching published studies from online databases, including PubMed, Clinical trials, and various relevant journals dating from 2000 to 2020. The results from nine randomized control trails indicated that provision of psychosocial services on traumatized children enhances the implementation of children's rights, promotes personal and community peace and reconciliation, helps children improve on self-esteem and social awareness, improves children's emotional intelligence, and brings in healing to broken hearts as well as helping individuals live in a more satisfying lives. The results indicated a weighted mean of Cohen's d 0.6 effect size in post treatment period. The results also indicated that the change between the intervention and control groups was statistically significant at $p < .05$. Findings further indicated that the assisted children had positive coping, enhanced hope, and reduced their fears, as well as being able to socialize and some accepted to return to school. The study recommends that teachers, parents and care givers be taught skills of dealing with in child trauma so that they can assist their children. The study also recommends that the stakeholders in Mbeere North sensitize the community and the parents on the benefits of provision of psychosocial interventions so that they can help children deal with post-traumatic stress disorder complications. Further, the local community needs to be economically empowered so that they can support their children towards accessing education and other services.

Keywords: *Difficult Environments, Psychosocial Counselling, Trauma, Post-traumatic Stress Disorder.*

INTRODUCTION

There is significant research in scientific literature showing the enormity of resources in children that help them in negotiating the common challenges of life. However, such resources can be damaged by child traumas that a child goes through (UNICEF, 2009). In possession of their fast growing intelligence, creativity, emotional range and social relationships as well as other assets, children have a way of meeting their own needs and overcoming difficulties. However, to overcome difficult times, children also depend on support of others, such as members of their families. In some challenging situations like continued hunger, separation of family, stricken poverty, all forms of abuse, abandonment, neglect, infections, disabilities, pandemics, loss, and conflicts, among others may cause trauma in children and this weakens competencies. Additional support during such aforementioned times may be necessary to help children cope with adversity, regain a sense of control and so that they can function as before (UNICEF, 2009). This study reviewed other studies and explored on the benefits of psychosocial interventions to the traumatized children living in difficult environments in Mbeere North.

Reviewed studies have shown that exposure to trauma in children living in difficult environments can result to poor mental health and other various psychosocial problems, prompting the need for psychosocial interventions including psychological support (Purgato, et al., 2014). In his work Hansen, (2014) in a book called “*A Handbook, Psychological Interventions*” describes psychosocial support’ as the procedures aimed at addressing both psychological and social needs of a person, his or her family or community. The International Federation of Red Cross (IFRC), (2020) states that psychosocial support represents the close and intense relationship between a person and the collective attributes in a given social entity.

According to Da Silva, Cardoso and Chronister (2009), teachers, counsellors, parents, teams of medics and different care givers as a multi-disciplinary team are in a position to provide psychosocial interventions to traumatized children so as to help them deal with the troubling issues. The multi-disciplinary team can conduct different types of assessment on the traumatized children through each case theory and predict the form of intervention measures that need to be applied (Sherry & Nancy, 2013). Another benefit of psychosocial interventions noted in the reviewed studies is that the traumatized children acquire psychosocial adaptation towards achieving good fitness in a person-environment congruence described as adjustment (Da Cardoso & Chronister, 2009). By providing different types psychosocial interventions to the traumatized children, reviewed systematic and meta-analysis research has shown that children can attain psychological resilience.

Ian and Christine (2014) explain that psychological resilience is the ability of an individual to emotionally or mentally cope with a crisis, thus helping such an individual to promptly return to the status they were in prior to crises such as those experienced during childhood traumas. The National Institute of Mental Health (2020), describes childhood trauma as an emotional, painful or distressful event experienced by a child that more often than not leads to long-lasting physical and mental effects. Majority of children and youth living in difficult environments like some children in some sections in Mbeere are usually faced with greater risks for poor mental health

due to exposure to unpleasant experiences, long time drought contributing to inadequate food, water, basic needs and others live in abject poverty. Other contributing factors include traumatizing include, emotional and physical abuse, insecurity, violation of human rights, poverty, or lack of basic needs domestic violence natural calamities, and wars, among others. Smith et al. (2020), emphasize that children and youth living in poor families are likely to experience trauma due to disasters and scourges, such as the novel coronavirus pandemic, HIV/Aids and other chronic disease, violent crimes, armed, family conflicts and other similar traumas. Trauma causes psychological trauma, (UNICEF, 2020).

The American Psychological Association (APA), (2019) describes trauma as an emotional response to dreadful events, such as natural disasters, accidents, experiencing tragic ordeals such as rape, or losing a loved one and family separation like divorce among other factors, which can cause psychological trauma. Another study report by SAMHSA (2015) identified an array of potential traumatic events that children commonly go through. These stressful events include factors such as physical abuses, neglect, abandonment, psychological factors, experiencing or witnessing domestic violence; community or school violence; sexual exploitation or physical or sexual assault; violent or sudden loss of a family member or friend; experiences of war or living as refugees; and neglect among others. Reviewed studies have shown that when children are faced with potential harm, their bodies' *alarm systems* get activated in an attempt to fight or run away from harm, which subsequently leaves children feeling irritable, angry, scared or withdrawn (Copeland, Keeler, Angold & Costello, 2007) &the American Psychological Association (2011) and this calls for psychosocial support interventions.

Research reported by Pearce, Murray and Larkin (2019) shows that vulnerability to trauma in children is tied to the fact that their brains are still being developed. During tragic events, children go through a state of heightened stress, which sets off the body to release stress and fear hormones. Research findings state that such developmental trauma may be damaging to young children as it may cause disruption to normal brain development. Persistent trauma can substantially impact on long-term development in child's behaviour, mental and physical health. The feeling of fearfulness and helplessness in children may persist into adulthood, leaving such children with heightened risk of future traumatic effects and post-Traumatic Stress Disorder (PTSD), thus requiring psychosocial interventions (UNICEF, 2020).

A report by Substance Abuse and Mental Health Services Administration (SAMHSA) (2015), indicated that at least 70% percent of American children go through a traumatic event before celebrating their sixteenth birthday. Studies further as reported by Shriberg (2013) have shown that about 70% of children growing with a single mother live under low income status, while only about 30% of children live in other forms of family structures. This low income situation has its own negative effects, such as psychological and social emotional problems on children. Study results by Mohamed and Toran (2018) show that socio economic status of a family play an important role in influencing children's social emotional development.

More studies as reported by Eshleman (2020) indicate that long term and bad experiences can have devastating effects to the most vulnerable. During calamities, children are the most vulnerable members of the society and may in search of refuge even be forced to leave their homes, at times being separated from families and caregivers in the confusing escapades. This

situation causes a lot of fear and trauma children and the whole family (UNICEF, 2009). Whether in one's childhood or adulthood, being exposed to trauma may end up increasing risks for various mental health problems that may last in one's lifespan such as PTSD (Breslau, Chilcoat, Kessler, & Davis, 2014).

Published studies by Harder, Mutiso, Khasakhala, Burke and Ndeti (2012) on post political election violence, multiple traumas, and posttraumatic stress among children from poor families in Kenya indicated that experiencing violence related to elections caused multiple traumas, and had high levels of PTSD. Many children and young people continued to experience PTSD symptoms for over a period of 6 months subsequent to postelection violence. The study further indicated that those who said they experienced multiple traumatic events had a high likelihood of experiencing PTSD. Reported studies by UNICEF (2019) and UNESCO have shown that children face diverse challenges, including. These include altered family dynamics, older children assuming the role of caregivers to their siblings or taking care of physically or psychologically injured or ailing parents. Moreover, those who resettle across struggle with problems including foreign culture, learning new languages, and trying to adapt to different education systems under challenging circumstances (Reed et al., 2012). Study reports by WHO (2008) indicate that UNICEF and UNESCO provide support services to children in disaster areas by evacuating them to safer places and also participate in offering psychosocial support activities to children, adolescents, caregivers, families, and the wider community through a range of psychosocial interventions that meet their complex needs.

Munda, Munene, & Nyagwencha, (2020) from Day Star University conducted a study on the state of PTSD among children living and schooling in informal areas in Kajiado North. The authors found considerable number of young people living in such settlements to experience PTSD. Studies by Tumuti and Wang'eri (2014), from Kenyatta University reported traumatic stress among many students. The study established that trauma was higher in male students compared to their female counterparts. The traumatic events associated with significant levels of trauma included witnessing violence, having a terminally ill member of family being caught in situations where one has narrowly escaped death. Okumu (2018) study findings from Day Star University targeting bereaved adolescents in children's homes in Kajiado reported that such children had past and present experiences of traumatic events. The above cited study findings may have similar results or not if they were conducted in Mbeere Sub-County.

Ndeti, Francisca, Owuor, Khasakhala and Mutiso (2007) conducted studies from the Universities of Nairobi and Kenyatta, exploring on the traumatic experiences of high school students in Kenya, and to determine the extent of PTSD among Kenyan adolescents, in relation to socio-demographic variables. Findings revealed experiences of traumatic events among students in secondary school in Kenya, who also experienced significantly high levels of PTSD, thus requiring psychosocial interventions like counselling. Additionally, individual counselling was found to be helpful to children who were seriously afflicted by political violence in Sudan (Jordans, et al., 2013). In Kenya, Mutavi et al. (2016) in a qualitative study targeting Nairobi suburbs found that children showed various negative psychosocial due to defilements. Some of the children turned to trafficking drugs while others suffered mental challenges.

Similarly, Waweru (2018) study findings in Mbeere South indicate that poverty in the area led to children being separated from their families. The abandonment resulted in fear and other traumatic experiences. Psychosocial interventions such as counselling for both children and parents was found essential for averting trauma in children and fostering integration. This is consistent with WHO advocacy that psychosocial interventions should not be a stand-alone activity but integration into wider systems including other family support mechanisms (WHO, 2007). Generally, there is evidence that psychosocial interventions can foster resilience in children and help them cope with traumatic experiences and psychological changes that could affect their cognitive, social and mental health.

Study findings by Mutumi, (2013) from Mbeere on management challenges of drug abuse found that drug and substance abuse was influenced by some traumatic experiences. The poor families in Mbeere South face perennial problems of in-adequate food, drought, water, and poor infrastructures to support proper learning conditions. Research by Mugai (2020) indicate that there are no trained counsellors and psychologists in Embu County in primary schools who can provide psychosocial interventions to children in Mbeere North of Embu County primary schools. This means that the traumatized children in schools in Mbeere North remain with traumatic events bothering them and thus resulting to problems of post-traumatic stress disorders.

Very few studies have been conducted in Mbeere North Sub-County, as regards the significance of psychosocial interventions such as psychosocial counselling regardless of the numerous cases of children going through traumatic experiences and in particular during this time of Covid-19 pandemic. Additionally, the data supporting the importance of psychosocial interventions in Mbeere North on traumatized children has not been well synthesized. Based on the evidential inconsistencies, there was need to conduct a detailed analysis on significance of psychosocial interventions used on traumatized children exposed to traumatic experiences due to living under difficult environments for healing purposes. To establish the benefits of psychosocial interventions, a systematic review and a meta-analysis was conducted by searching published studies from different databases.

LITERATURE REVIEW

The concept of psychosocial intervention refers to any assistance that offers psychological or social support (or both) with a goal of helping to prevent mental health problems from developing, preventing post-traumatic stress disorders (PTSD), improve and promote good and long-term mental health (Feldman & Dreher, 2012). The Reference Centre for Psychosocial Support (2014) argues that applying the term psychosocial support interventions arises from combination of several factors responsible for psychosocial well-being of individuals. Supporting the same idea, Psychosocial Working Group (2005) and ARC (2009) contend that emotional, biological, spiritual, mental, cultural, material and social aspects and none can be detached from the others (INEE, 2010). As opposed to exclusively focusing on psychological or physical aspects of an individual's health and well-being, psychosocial support puts greater emphasis on people's ultimate experiences, more so highlighting the need for looking at these issues within the wider context of family and community set-ups where they occur.

Psychosocial intervention offered to traumatized children is usually offered through trained members of the community being targeted. These are people who are well respected and trusted

in the community they live in, and from which they can be selected using interactive processes. These services can also be provided by other professionals such as those who hold training in mental health, psychotherapists, teachers, counsellors, local psychologists, and social workers, as well as psychiatrists, who offer services at the upper end of intervention pyramid. For emergencies, psychosocial support commonly takes place by way of child-friendly spaces as well as, through education, together with emotional and social learning. This may be effected by way child-friendly schools and temporary learning spaces, as well as mental health and psychosocial support service, (MHPSS) as described by United Nations agency for refugees (UNHCR Public Health Section, 2020).

Providers of psychosocial interventions to the traumatized children living in difficult circumstances need to understand a variety of issues such as the causes, nurturing methods, procedures, effects, types of interventions, treatment presentation, engagement and the outcomes of the support services to each individual child and how to include the parents and care givers in the provision of support services, (Technical Note on Mental Health and Psychosocial Support, (TNMHPS; 2021). Millions of children around the world suffer unthinkable distress due to different traumatizing factors. Mental Health and Psychosocial Support Network (2021) argues that psychosocial interventions ought to be accessed by anyone affected by crisis and more so childhood traumas.

The National Institute of Mental Health (2020), describes childhood trauma as an emotional, painful or distressful event experienced by a child that more often than not leads to long-lasting physical and mental effects. Given the importance of the family environment for child and youth wellbeing, family interventions are a powerful mode of treatment; however, their development and evaluation has received relatively little attention to children living in difficult circumstances (UNICEF, 2020). In another study reviewed, Michels, (2009) share similar views with (UNICEF), (2010) in a paper that presented some systematic reviews on methods of supporting traumatized children and had made analyses on psychosocial support interventions as an essential tool for protection of the rights of children participating in transitional justice mechanisms, and the rights of child victims and witnesses in transitional justice processes.

Another systematic study by Demaria (2015) outlines other importance of providing psychological interventions, psychological first aid, and professional self-care. The said interventions encourage children to return to everyday and routine activities. This is helpful as it gives a sense of normality, creates a feeling of security and certainty to the traumatized children. Other reviewed systematic and meta-analysis studies explain that when traumatized children are provided with equivalent psychosocial interventions, they do not suffer from lack of psychological resilience. In simpler terms, psychological resilience exists in people who develop psychological and behavioral capabilities that allow them to remain calm during crises/ chaos and to move on from incidents without long-term negative consequences (Ian & Christine, 2014). There is need then for the multidisciplinary team of professionals to train traumatized children in difficult environments on how to develop and use positive emotions and positive affectivity to help in managing difficult traumatic situations.

Revised studies also explain that children and youth who have undergone through traumatic events lack positive affectivity. Positive affectivity, if acquired by traumatized children helps

them promote sociability, open-minded attitude, and helpfulness (Schenk, 2017). The traumatized children having low levels of positive affectivity are characterized by sadness, lethargy, distress and un-pleasurable engagement. Gillies, Maiocchi, Bhandari, Taylor and O'Brien (2016) study contend that children and adolescents who have experienced trauma are at high risk of developing negative emotional, behavioural and mental health outcomes. The meta-analyses in this review provide some evidence for the effectiveness of psychological therapies in prevention of traumatic stress and reduction of symptoms of PTSD in children and adolescents exposed to trauma. Child Protection Initiative, Save the Children (2011), in Denmark, explains that psychosocial interventions entail the child's feelings, mind and behavior, or his or her inner world in connection to what is happening in their environment. Some children go through very traumatic experiences during their childhood.

Ayaya, & Braitstein, (2014) conducted a study in Uasin Gishu, Kenya to establish the importance of domestic care environment on potentially traumatic events (PTEs) among orphaned and separated children. From the findings, bullying was found to be the most common PTE amongst the domestic care environments of low economic status, leading physical and sexual abuse in that sequence. All PTEs were found to be most common among street children. The study however found sexual abuse to have been common in households. Further, PTSD was reported to be more prevalent among street children at 28.8%, followed by households at 15.0%. Findings further indicated that children who were separated from their families and orphans in different domestic care difficult environments suffered to some extent, while street youth suffered the most. Psychosocial support interventions are necessary for the purpose of addressing traumatic events such as bullying, neglect, sexual abuse, and abandonment particularly in children living in extended or large family households in the low economically disadvantaged homes (WHO, 2016).

Study findings reported by Shonkoff, Boyce and McEwen (2009), indicate that exposure to hardship as ways of living in difficult environments, especially in early childhood when children are still developing, may end up exposing such minds to permanent impairments, thus affecting their behavioral development, learning, and physical health as well as mental health. Adverse childhood traumatic experiences like those from low economic homes status are risk factors that refer to intensive and common sources of stress affecting children in their early stages of life. Advanced childhood traumatic experiences include wide ranging forms of abuse, acts of violence amongst parents of caregivers, and common dysfunctions in household like alcoholism, collective violence, substance abuse (WHO, 2016).

According to UNHCR, (2016) more than 50% of forcibly displaced people in the world are children. Displacement for such children is particularly a disruptive ordeal that henceforth separates children from their families, causes them to spend their lives away from home, thus causing them traumatic stress. Studies by Mutumi (2013), showed that some children in Mbeere North spend their time looking for clean water, food or looking after animals in cases where money to meet educational needs is not enough. Such children may be at risk of all types of abuse, neglect, violence, exploitation, child labour and misuse.

What is a Traumatic Event?

According to the National Child Traumatic Stress Network (2008), a traumatic event refers to an event that may be a cause of trauma and therefore causing psychological trauma. This form of trauma can be injurious to an individual's mind due to related resultant events that may yield an individual to overwhelming stress levels, which may end up overstressing an individual's coping abilities. This may also leave such persons with impaired abilities to integrate the involved emotions involved and this can eventually result in grave, long-term consequences (SAMHSA, 2014). The National Traumatic Stress network (2020) affirms that of a child feels deeply threatened by an event that they have witnessed or been involved in, then such event or incident can be described as child trauma.

A traumatic event can also be illustrated as a dangerous, frightening, or violent experience posing a potential threat to the life or bodily integrity of a child. Witnessing traumatic, life threatening events with potential to harm an individual or a loved one's security or life can also be termed as traumatic (Cafasso (2017). Traumatic experiences particularly in children can initiate strong emotions and physical reactions that can persist long after the event. Children may feel terror, helplessness, or fear, as well as physiological reactions such as heart pounding, vomiting, or loss of bowel or bladder control. Traumatic experiences in difficult environments are described by researchers as some of the most influential factors on children and youth's mental, psychological social interactions, and growth as a whole (International Network for Education in Emergencies (INEE, 2010; UNESCO, 2006).

Being displaced from home, living in poverty, losing a parent or loved one, having a parent serving in a war zone or incarceration are other experiences that can be termed as traumatic for children (Sitler, 2009). After experiencing trauma, children often view themselves and the world differently, because they lose their ability to make sense of their experiences (Kuban & Steele, 2011). Symptoms of trauma include "posttraumatic stress disorder, anxiety problems, depressive symptoms, and dissociation" taking of alcohol, drugs and other substances (Jaycox et al., 2009). Other traumatic effects include dropping out from school, perpetration of violence, internalizing problems and showing of myriads of emotional and behaviour disorders (Zahradnik, O'Connor, Stewart, Stevens, Ungar & Wekerle, 2010, p. 409).

Impact of Traumatic Events on Children

Reviewed studies state that while traumatic events may share certain characteristics, it is apparent that their exposure to emotional impact may not be the same (David, Edna, Riggs & Foa, 2004). Mental Health Foundation in London (2021) and National Center for Biotechnology Information, U.S share similar views that the impact of child traumatic stress can last well beyond childhood. Research has shown that child trauma survivors may experience impact such as, increased use of health and mental health services, increased involvement with the child welfare and juvenile justice systems, long-term health problems such as, diabetes child psychosis and heart disease among others. Trauma is a risk factor for nearly all behavioral health and substance use disorders.

Reviewed systematic studies indicate that trauma affects behaviour, social, learning, and emotional as well as psychological functioning of a student (Kuban & Steele, 2011, p. 41). Research indicate that children who survive trauma may experience learning problems, including lower grades and more suspensions, expulsions, rational thinking and emotional brain are

affected. Such children may experience lower functioning, cognitive, develop attention and behavioural problems, drop off from schooling, or repeat grades and even experience educational achievement problems, such as poor performance in reading. Exposure to child trauma may also lead to impairment in school functioning, accelerate aggressiveness and delinquent behaviour (Jaycox, Langley, Stein & Schonlau, 2009, pp. 49-50). Regarding achievement, exposure to child trauma may cause children to have poor performance in school, lead to absenteeism, and poor reading abilities (Kuban & Steele, 2011, p. 41). Researchers in examining classroom behaviours have established that when learners suffer traumatic effects, they may end up presenting with behaviours such as poor concentration, passivity, physical verbal blow-ups, spacing out and regular absences (Sitler, 2009, p.120). Thus it is important to provide psychosocial interventions for supporting traumatised students.

Supporting Traumatized Children through Psychosocial Support Interventions and Management Programmes

Psychosocial interventions offered to traumatized children include all of the interventions in which counseling or behavior management techniques are used. The effective psychosocial interventions include contingency reinforcement, child therapies, music and movement therapies, supportive psychotherapy, group therapy, family therapy, telephone counselling, speech therapy, physiotherapy, nutritional counselling, fertility counselling genetic counselling, grief and loss counselling, and specialized pain services among others. Psychosocial interventions provide a framework which can guide the implementation of psychosocial care (Hutchison, Steginga and Dunn (2006) and (Lock, & Wolraich 2008). Psychosocial interventions, such as cognitive behavioral therapy and acceptance including commitment therapy, are often delivered by psychologists, social workers, mental health counselors, and community health workers. These evidenced-based interventions occur in both individual and group formats (Didwell and Crosby, 2020). These interventions are not tailored towards treating a condition but are designed to foster healthy emotions, attitudes and habits. Such interventions can improve quality of life even when mental illness is not present. Psychosocial interventions are part of psychosocial support services.

According to NAMI (2017) psychosocial managements (interventions) include structured counseling, motivational enhancement, case management, care-coordination, care, protection psychotherapy and relapse prevention. Other recommended intervention programs for trauma reduction include: non-traditional as well as traditional practices; Cognitive Behavioural Intervention for Trauma in School (CBITS) Support for Students Exposed to Trauma (SSET) program; Trauma Focused Cognitive Behaviour Therapy (TF-CBT; Structured Sensory Intervention for Children, Adults, and Parents (SITCAP) program; Project Fleur-de-lis, and CBI Classroom/school-based intervention. Others include TFT Thought Field Therapy; TF-CBT; Somatic therapies, Medications, self-care, mindfulness, having a balanced, regulated sleep, diets, exercises, and Trauma-focused cognitive behavioural therapy among others.

Flynn, Fothergill, Wilcox, Coleclough, Horwitz, Ruble, Burkey, and Wissow, (2015) argue that the level of evidence on interventions to treat traumatic stress in children is based upon published, peer-reviewed data using the accompanying treatment classification criteria utilized by the 'Office of Victims of crime Guidelines for the Psychosocial Treatment of Intra-familial Child physical and Sexual Abuse. Their studies suggest inclusion of primary care providers, and their

parents or other caregivers would be of help in addressing child traumatic stress. Similar studies for the interventions of trauma in children were also addressed by Psychological, Social and Welfare Interventions for Psychological Health and Well-Being of Torture Survivors (PSWIPHWTS); (2014) and Kellel, & William 2014).

Professionals assisting children experiencing trauma should understand how the effects of trauma in children (Akin, Little, & Somerville, (2011); Jaycox, et al., 2009); Dionne and Nixon (2014) suggested that integrating traditional and non-traditional practices may be helpful for traumatized children. Professionals like teachers and counsellors struggle to help children cope with traumatic effects common in a school setting. Study Findings from the narrative synthesis suggest that psychosocial interventions may improve trauma feelings and include social support, financial support and other resources.

Other intercessions for early interventions and prevention of PTSD to help traumatized have been suggested by various writers such as the American Psychiatric Association (2013); and Groves, (2007). Their findings suggest that irrespective of a child's age, reassurance and support should always be offered for the purpose of supporting and **encourage children to openly share their feelings**, help them know that whatever the feelings they are experiencing are normal. Children should be assured that even unpleasant feelings will pass if they open up about them. They should be allowed to grieve any losses and those experiencing trauma should be given time to mourn and heal from the form of loss they are experiencing. This may arise from events such as disasters or a pandemic like the Covid-19 or any other disease. Activities known keep their mind occupied should be encouraged in order to remove their focus from the traumatic event. Children can be made to feel safe again by reassuring with acts such as hugging, which can be helpful in comforting and making any child feel secure irrespective of their age. Other approaches include establishing practicable structures, maintaining routines, and schedule their lives so as to make their world feel stable again. Professionals can also try to maintain regular mealtime, time for homework, and other home based or family activities (American Psychological Association, 2013); Chen, Shen, et al. 2014). Helpers and parents should keep their promises to the child as they help them rebuild trust by being trustworthy. They should reassure and help them place the situation in context (Chen, Shen, et al. 2014).

Other ways of helping traumatized children deal with trauma include: minimizing media exposure, or stop exposing the traumatized children to graphic images and videos and especially those which have similarities of the past traumatic event. Helpers should create an environment where the child feels safe to communicate what they are feeling and to ask questions, provide the child with ongoing opportunities to talk about what they went through, encourage traumatized children to ask questions and express their concerns but never force them to talk. Other helpful ways include communicating with the child based on their age since some children can have difficulties talking about a traumatic experience. Encouraging a child to seek friendship with others and engaging in sports, games and hobbies that were enjoyable prior to experiencing the traumatic incident can help in coping. Encouraging physical activities, doing sports, games, doing happy music and play among others. Helpers should encourage children to eat good and well balanced diet with plenty of water that is, being focused on overall diet rather than specific foods (National Center for Child Traumatic Stress (2010); National Child Traumatic Stress Network (2008). Counsellors to offer structured psychosocial counselling and child therapy.

Psychological counselling encourages and assists the child to find a solution for his/her problem/situation, (The National Child Traumatic Stress Network, 2020).

Further studies by Pattison from the University of Nottingham jointly with Harris (2006) from Arden University support that psychological and psychosocial counselling are effective in helping children going through trauma. Proper psychosocial counselling will help incorporate valuable lessons in a child's new life after the events. Psychosocial support helps to shape a student's behaviour and also instill enough discipline in them if they had changed their behaviours after the event. Proper psychosocial counselling helps traumatized children learn skills of helping them achieve their goals (MOeST 2004). For those who had found silence in alcohol and substance abuse due to trauma, they will learn skills of stopping the drug abuse tendencies. Psychosocial support and counselling helps those with suicidal tendencies come to self-realization and change their thoughts Ajowi, & Simatwa, (2010); American School Counselor Association (2012); American Psychiatric Association (2013)

When should Professionals be Contacted to assist the Traumatized Children?

According to National Child Traumatic Stress Network (2008) symptoms like confusion, numbness, despair and guilt that one experiences following a disaster, crisis, or other traumatic events may begin to weaken after relatively a short while. Nonetheless, traumatic stress reactions that are so intense may interfere with the ability of a child to function at home or school or home. If there is no indication that symptoms are fading, or in the event that they become worse over time, the affected child may require support from a specialist, such as mental health professional. Parents, care givers, or teachers should seek professional help for children if symptoms persist and interfere with day-to-day activities, school or work performance, or personal relationships. The commonest signs that a child is in need of professional help to cope with a traumatic event include: emotional outbursts, aggressive behavior, withdrawal, persistent difficulty in sleeping, continued obsession with the traumatic event, serious problems at school, disrupted sleep patterns, eating habits, correct use language among others.

American Psychiatric Association, (2013) asserts that psychologists and mental health providers can work with parents and care givers to find ways to help children cope with traumatic stress. Professionals can help both children and their parents understand how on to cope with the emotional impact of a traumatic event (Health line 2020); Children do recover from traumatic events, and helpers can play an important role in their recovery. A critical part of children's recovery is having a supportive caregiving system, access to effective treatments, and service systems that are trauma informed (Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children and Adolescents, 2008)

Why is Psychosocial Support Important to Children?

Through offering of psychosocial counselling, traumatized children are helped to deal with anxiety, reduce fear, cope with grief, depression, neglect, abuse, deal with self-care issues, loss of confidence, and improve on lack of social skills as caused by traumatic experiences (David, Riggs, Edna & Foa, (2004): Wikipedia Sep 30, 2017). Psychosocial interventions address all the child's essential elements of positive human development which are; emotional,

intellectual, mental, social, and spiritual needs (Oxford English Dictionary, 2012). Other study findings by Kohrt, (2018) outline additional benefits of offering psychosocial interventions to traumatized children to include, building internal and external resources for children and their families cope with adversity, supporting families to provide for children's physical, economic, educational, health and social needs. Psychosocial interventions also help children to build resilience and positive emotions, (Ong, Bergeman, Bisconti, & Wallace, 2006); Wikidedia (2015). Even children in Mbeere Sub-county can benefit from psychosocial counselling offered by school counselors.

Guidance and counselling is offered in schools and traumatized children can be assisted by their school counsellors in collaboration with parents and care givers to develop positive emotions (Ajowi, & Simatwa, 2010). In order for the child to reach this goal, guidance and psychosocial counseling services should help children get to know themselves better and find effective solutions to their daily problems. Counsellors can also apply different types of child therapies. Child therapy helps young children as well as teenagers to cope with various psychological and emotional traumas that are affecting their wellbeing, (Wikipedia reviews, and 2019).

According to The American School Counselor Association (2012) and Oregon Department of Education (2003) primary roles of psychosocial counselor is to assist children in reaching their optimal level of psychosocial functioning through resolving negative patterns, prevention, rehabilitation, and improving quality of life. Another type of child therapy that assists traumatized children is Systems Therapy (TST) as reported by Saxe, Ellis, Folger, Hansen, Sorkin, (2005) through their Clinical trial studies. Child Trauma Systems Therapy (TST) is helpful for improving a traumatized children's mental health and well-being. This may include adolescents and young children with social problems at home or school, experiencing traumatic problems secondary to physical abuse, rape, neglect, death of a close member of family or other major life altering emotion trauma (Glenn, 2012).

According to study findings by and WHO, (2008); Wolf, Prabhu & Carello, (2019) every child reacts to traumatic events in his or her own way. It is important to listen and try to understand children's unique perspectives and concerns, as well as those of the family. Culture plays an important role in the meaning we give to trauma and our expectations for recovery. Thus, trying to understand the child's experience from the child's own point of view, as well as that of the child's family and community, can help guide intervention efforts, (USAID, 2020; UNICEF, 2020)

Theoretical Framework

The study was guided by Erik Erikson's Stages of Psychosocial Development theory. Erikson's psychosocial development theory emphasizes the social nature of our development rather than its sexual nature. Erikson observes that an individual goes through eight stages of development, with each stage building on the preceding one. Erikson suggested that how we interact with others is what affects our sense of self, or what he called the ego identity. Erikson perceived that social interactions and relationships hold a fundamental role in shaping people's growth and development.

MATERIALS AND METHODS

The study used a systematic review and adopted a meta-analytic approach involving individual data from 2567 children in nine Randomized Controlled Trials (RCTs) evaluating the benefits of several psychosocial support interventions versus the waitlist control groups such as those receiving usual care or no treatment. The data was obtained by searching various online databases, including PubMed, MEDLINE, Clinical trials and a range of relevant journals dating back from 2000 to 2020. The data only included studies that focused on the benefits of psychosocial support services and interventions, such as individual and group counselling, involvement in support groups, peer support, and parental support as well as community services in traumatized children and youth in low and middle income households. Duplicate studies and studies that did not meet the criteria were excluded. Data was subsequently extracted on computer spreadsheets, focusing on details such as author, title, design, intervention and forms of comparison used, number of participants, pre-treatment and variation of scores for both intervention and waitlist control groups.

RESULTS AND DISCUSSION

Data analysis involved finding and calculating the effect size of the population of each of the studies that met quality assessment for inclusion. Individual studies' Cohen's d value was obtained through random effects Dorsmanin and Laird's method for meta-analysis. A Cohen's d scores of d 0.2 was considered as low, d 0.5 as medium and d 0.8 as high. Each of the studies effect size is shown on Table 1.

Table 1: Individual Studies Effect Size

Author, Date	N	Effect Size
Rith-Najarian, 2019	110	d 0.82
James, 2015	1806	d 0.74
Murray, 2015	131	d 0.62
Bolton, 2018	125	d 0.86
Dorsey, 2020	320	d 0.14
Michael, 2014	138	d 0.63
Mannarino, 2012	158	d 0.77
Cohen, 2006	126	d 0.69
Chorpita, 2018	148	d 0.18

Data was obtained and recoded for each of the randomized control trials both at pre-intervention and post-intervention phases, after which scores were analyzed to establish the mean differences and standard deviations for each of the two groups. The study identified a beneficial effect of psychosocial interventions on PTSD after an intervention period of 6 weeks (Cohen d 1.02). The effect reduced slightly at follow up from at least 9 weeks after the interventions (Cohen 0.86). The analysis highlighted benefits of mental health psychosocial interventions such as focused care to children and families, specialized care, family and community support and social support services had benefits on post-traumatic distress in children. The analysis showed benefits of on PTSD (Cohen d 0.46), strengths such as positive coping (Cohen d 0.82), maintained peer social support (Cohen d 0.60) enhanced hope (Cohen d 1.04). The study hypothesis was tested by

establishing confidence interval through a paired samples test for the means of the two groups. A statistical significance value of $p < .005$ was obtained as shown on Table 2.

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair Intervention_ Group - Control_ Group	.86556	.68832	.22944	.33647	1.39464	3.772	8	.005

Based on the above results, the study hypothesis that psychosocial interventions have no importance on traumatized children and youth in low and middle income families in Mbeere North is rejected, since the results provide an initial support for benefits of psychosocial support interventions on traumatized children living in difficult environments. The findings were consistent with Purgato (2018) study which established that Mental Health and Psychosocial Support (MHPSS) is effective in reduction of PTSD and anxiety symptoms in children exposed to traumatic events in low-resource humanitarian settings.

CONCLUSIONS AND RECOMMENDATIONS

The study aimed at analyzing the benefits of psychosocial interventions on traumatized children living in difficult environments in Mbeere North. Based on the systematic and meta-analytic review of 9 randomized control trials involving 2567 children, it was established that psychosocial interventions are effective and beneficial in mitigating the symptoms of posttraumatic stress disorder in traumatized children living in difficult environments.

Conclusions

The study concludes that psychosocial interventions are important in helping traumatized children living in difficult environments. Based on the results, the study further concludes that psychosocial interventions such as providing focused care, specialized care, family and community support services, psychosocial counselling as well as social services is beneficial and effective in dealing with symptoms of posttraumatic stress disorder resulting in positive coping, enhanced, maintained social support and enhanced hope. The study makes inference that psychosocial interventions may be helpful on traumatized children living in difficult environments in Mbeere North.

Recommendations

Based on the findings the following recommendations are made:

Given the scope of traumatic experiences facing children living in difficult environments, the Government of Kenya should channel more resources towards mental health to support rehabilitation of children and youth living in needy and broken families in including all those who are living in difficult circumstance, and those being currently affected by the Covid-19 pandemic in Mbeere North.

A similar study should be conducted in lower Embu as the areas share similar hardships and later compare the results. Further, teachers and parents should be taught skills of reducing stress in traumatized child so that they can assist their children. Also, a further study is required on the benefits of specific psychosocial interventions on traumatised children in similar households.

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Universal Design for Learning: Promoting Inclusive Education in an Empathic Manner

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Abstract

Access to quality education is deemed a basic human right around the world. To this end, universal primary education is available in many countries around the world. To bolster countries' efforts in their quest to support this noble aspiration, the United Nations Sustainable Development Goal 4 whose stated aim is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all¹”. Notwithstanding such noble efforts, learners with disabilities unfortunately find themselves facing discrimination, prejudice and exclusion from mainstream educational opportunities, or find themselves at the receiving end of arguably lower quality standards of education if granted such access. Whereas there are specific challenges depending on the type and degree of disability, a significant number of learners could perform in terms of literacy through empathic attitudes and interventions by teachers, coupled with improvements in learning environments, content delivery and more effective modes of engagement. This position paper explores the efficacy of Universal Design for Learning (UDL) as a novel approach to Inclusive Education in Kenya, and in so doing seeks to promote this more empathic and inclusive pedagogic and didactic ethos towards teaching and learning.

Keywords: *Attitudinal Barriers; Disability; Discrimination; Empathy; Exclusion; Inclusive Education; Literacy; Universal Design for Learning (UDL)*

INTRODUCTION

Disability remains a primary cause of educational disadvantage and exclusion – it accounts for the largest single group of learners of all ages, both boys and girls who remain out of school. UNICEF (2017) report indicates that children with disabilities are ten times less likely to attend school than those without. Even when they do attend school, they are more likely to drop out early and typically a lower level of schooling than that of their peers.

In all countries of the world, people with disabilities have lower literacy rates than people without disabilities (Singal, 2015; UIS, 2018; United Nations, 2018). Significant differences exist based on the nature of the disability resulting in higher levels of illiteracy among children with visual impairments and those with multiple or mental disorders when compared to children with motor disabilities (Singal, 2015).

When they do attend school, children with disabilities consistently score lower in mathematics and reading tests (Wodon *et al.*, 2018; World Bank, 2019). Additionally, girls with disabilities are penalized even further due to disadvantages occasioned by their gender (UNESCO, 2018). Generally speaking, disability tends to compound social inequalities. Studies in the United States of America have shown that students with disabilities achieve better academic outcomes and

social integration when studying in a mainstream environment than students studying in segregated or specialized classes (Alquraini & Gut, 2012).

Every child has the right to education regardless of disability, race, language, religion, gender or poverty. When all children regardless of their differences are educated together, everyone benefits and this is the cornerstone of inclusive education. Inclusive education values diversity and the unique contributions each student brings to the classroom. Classrooms around the world from pre-school to the university need to be more inclusive to ensure that all learners are exposed to high quality education. Every learner needs to feel welcomed, supported, and safe although this is easier said than done.

The model of teaching/learning of separating learners into specialized institutions which is currently favored in so many schools does not enable each child to receive quality education that would make them productive members of the society. Inclusive education involves interrogating ways in which schools, programmes, classrooms and lessons are designed so that all children can participate and learn. It is about finding different ways of teaching so that classrooms actively involve all children. Further, separating children with special learning needs from mainstream institutions only serves to entrench psychosocial prejudices, stigma and discrimination.

HISTORICAL AND LEGAL TRENDS OF INCLUSION

Inclusive Education is a product of several social and political movements that emerged in the middle of the Twentieth Century. In the United States, the civil rights movement of the 1950s and 1960s intensified awareness that many individuals were still being excluded from social institutions, including schools. By the late 1960s and 70s movements such as the disability rights movement arose in order to combat other forms of exclusion such as those due to gender, ethnicity, sexual orientation or disability. One significant outcome of these movements was the passage and implementation of laws and policies designed to ensure opportunities for all including access to education

Many countries around the world have passed laws and policies implementing inclusion. Inclusive education has also been mandated by international and non-governmental organizations. These include the Salamanca statement of the United Nations (1994) and the UNESCO *Dakar World Declaration on Education for All* (2000). The increase in the number of children diagnosed with disabilities has led to the emphasis in inclusive education. The rise in numbers can be attributed to an increased focus on assessments and early detection, development of new assessment technologies and a lowering of diagnostic thresholds. Education and training for children and adults with disabilities has therefore become an important initiative in most countries of the world and this has led to major educational reforms especially with emphasis to inclusive education (Fergusson, 2008).

In Kenya, the Ministry of Education (MoE) launched the sector policy for learners and trainees with disabilities in May 2018. This sector policy succeeds the *Special Needs Education Policy Framework* of 2009 (MoE, 2009). The previous policy had some gaps and this necessitated a review. Some of the gaps included that it came before the promulgation of the constitution and thus required to be aligned with Kenya's 2010 Constitution and other national and policy frameworks. It had also focused on twenty-two categories of disabilities that was too broad and thus required a revision to eleven categories. Further, it lacked implementation guidelines

meaning that the implementers were unable to implement the policy that the current sector policy has addressed. Perhaps, the most significant focus of the current sector policy is the recognition that Kenya needs to move towards inclusive education instead of segregated education. Inclusive Education is an overarching principle in this sector policy, advocating for the right of every learner with disability to be enrolled in a regular classroom together with his/her peers without disabilities. However, the shift to Inclusive Education according to the sector policy, recognized other education delivery models such as special institutions of learning, special units in regular institutions of learning and home-based education for learners with severe disabilities. Consequently, Kenya recognizes the need to specifically maintain special schools while striving to transition towards Inclusive Education.

If embraced, Inclusive Education is both a means of ensuring access to educational opportunities for all children and a way to combat discriminatory attitudes and to socialize diverse generations to be more accommodating and tolerant towards a wider spectrum of human diversity.

Issues and Constraints to Inclusion

According to UN (2016), the barriers to an Inclusive Education setting are multifaceted ranging from attitudinal, environmental, institutional and information barriers. In Kenya, attitudinal barriers take the form of prejudice, discrimination and stigma towards persons with disabilities. In terms of environmental barriers all schools are not physically accessible to persons with disabilities and the curriculum is not responsive to learners with disabilities. There also lies the misconception about the roles of special schools and special education. Often times, inclusive education is perceived as a threat to the existence of special schools. It is seen as merely putting a child with a disability in a regular classroom without support and resources.

Management of inclusive classrooms pose a great challenge to teachers and this could probably explain the favor of educating children in specialized institutions. The teacher is faced with the dilemma of creating environments where students can accomplish their best learning. Students in an inclusive classroom have differing capabilities, learning styles, ways of expressing themselves and modes of interacting with physical and social environments. They can have differences in their ability to focus and pay attention, sit still, make sense and respond to social cues and regulate themselves in response to stimuli.

Teachers, as facilitators of learning, must create and maintain order, structure and safety all of which are necessary for a successful learning environment. Classrooms involve routines and patterns of interactions. All learners must be included in building a classroom community where every learner feels a sense of belonging with their learning, development and social needs met. The teacher must ensure effective classroom management because learners must learn how to regulate their behavior to minimize the risk of stigmatization and exclusion. This helps the teacher to implement academic and social curricular in order to help every learner maximize their potential. To achieve all this, the teacher has to cultivate a culture of inclusion where everyone in the classroom becomes like a member of a well-functioning team. This calls for an integration of many different practices that work together to reinforce inclusivity (M'Rithaa, 2011).

Integration of Universal Design for Learning in Inclusive Education

The concept of *Universal Design for Learning* (UDL) originated in architectural practice and was designed to provide accessible environments for entire populations (Nelson, 2014). Although this concept was initially developed to ensure accessibility of people with disabilities to physical structures, these principles have been applied to other areas of pedagogy and didactics. In education the term was adopted as a set of principles, strategies, and actions that aim to make education accessible and functional for all people. It is important to emphasize that universal learning design comes to the area of Special Education since it visualizes individuals in a unique way and proposes to think about their peculiarities.

There are many ways to adapt pedagogical techniques, curricula and other aspects of teaching/learning to meet the varied needs and abilities of students. UDL can make learning accessible to a wide range of learners. It can be applied to how teaching/learning resources are prepared as well as on how teachers plan and execute the curricular. Further, it can also involve building an individualized approach into the way curriculum is constructed and lessons taught.

Lessons and learning activities can be designed to provide multiple ways for students with disabilities or different learning modalities to access learning material and learn. This type of curricular planning and presentation is similar to designing an elevator so that people can use it whether using wheel chairs, walkers or walking unassisted. Similarly, UDL makes academic and social aspects of school arguably more accessible to all learners – especially those living in majority world contexts such as Africa where accessibility is a major challenge to inclusion (M'Rithaa, 2011).

Principles of Universal Design for Learning

The overall goal of UDL is to use a variety of teaching methods to remove any barriers to learning and give all students equal opportunities to succeed. It is about building in flexibility that can be adjusted for every student's strengths and needs (Meyer, Rose & Gordon, 2014). UDL ultimately benefits all learners.

This approach to teaching does not specifically target learners who learn and think differently. However, it can be especially helpful for the learners with these issues — including those who have not been formally diagnosed. UDL provides that same kind of flexibility in the classroom. By applying UDL principles, teachers can effectively instruct a diverse group of learners. They do this by building in flexibility in the ways learners can access information and, in the ways, students can demonstrate their knowledge.

UDL is a framework for developing lesson plans and assessments that is based on three main principles. The first principle is providing multiple means of engagement, the second is providing multiple means of representation and the third is the provision of multiple means of action and expression— these principles are elaborated in Sections 5.1-5.3 (Meyer *et al.*, 2014). According to Nelson (2014), the concept of UDL is informed by neuroscience, which argues that each individual learns in a certain way and through different stimuli. It is therefore a continuous process to think about teaching planning. Although UDL has been designed to meet the demand of the entire population and its various characteristics, it is important to reflect on its influence in the area of Special Education.

Principle of Engagement

UDL encourages teachers to look for multiple ways to motivate students. Letting kids make choices and giving them assignments that feel relevant to their lives are some examples of how teachers can sustain students' interest. Other common strategies include making skill building feel like a game and creating opportunities for students to get up and move around the classroom (Meyer *et al.*, 2014).

Principle of Representation

UDL recommends offering information in more than one format. For example, textbooks are primarily visual. But providing text, audio, video and hands-on learning gives all kids a chance to access the material in whichever way is best suited to their learning strengths. (UDL enables teachers to practice inclusion because the greater the possibilities of presenting new knowledge, the greater the possibilities of learning it (*ibid*).

Principle of Action and Expression

UDL proposes giving learners more than one way to creatively interact with the material and to show what they have learned. For example, students might get to choose between taking a pencil-and-paper test, giving an oral presentation or doing a group project (*ibid*).

CONCLUSION AND RECOMMENDATION

Educational systems need to focus on educational needs of all learners regardless of disability, gender, race or religion. This can be done by developing curricular and pedagogy that addresses the diverse needs of all learners. The Universal Design for Learning approach is critical in incorporating inclusion into pedagogy and didactics at every level of formal schooling – from pre-school then primary school all through to higher and tertiary levels of education. Though progress has been made, much work remains before this effort achieves its full potential, particularly within the present challenges and imperatives of Open, Distant and e-Learning (ODeL) occasioned by the COVID-19 global pandemic. Consequently, the authors recommend that UDL be incorporated into education-specific courses, as well as generally as a module offered across all disciplines and course offerings so as to proffer the benefits of an inclusive educational ethos to as many learners/students as possible.

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Covid- 19 Pandemic And Its Impact On The Lecturers' And Students' Performance In Teaching And Learning At Kenyatta University, Kenya

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Abstract

The outbreak of the Covid-19 pandemic brought unprecedented disruptions in all aspects of human life across the globe. In the education sector, university calendars were re-scheduled and in-class learning was commuted to online platforms. The present study focused on performance of lecturers and students at Kenyatta University. The chosen institution has the second largest number of enrolled students and it is ranked as number 2 in Kenya. Performance, in this study, is broadly defined as 'the expectations placed on the lecturers and students during their stay at the University'. Performance during the post-Covid period has received little attention in literature relating to adjustments in universities. A case study approach was adopted within the broad mixed-methods research design. Interviews and questionnaires were used to obtain qualitative data. Quantitative data derived from questionnaires was computed into mean and Standard Deviation scores. This was further subjected to Analysis of Variance (ANOVA) using the Statistical Package for the Social Sciences (SPSS). The Pearson-mark was also used to correlate the data. The findings indicated that interactive activities were drastically reduced during the post- Covid period; a significant number of classes and postgraduate defenses were postponed for various reasons. Make-up classes were created from time to time; reduced class attendance; failure by students to remain in classes throughout the entire class sessions; internet interruptions and numerous disconnections were reported. Modules were written as a stopgap measure for augmenting lost time. The paradigm shifts in pedagogical approaches impeded, to some extent, the lecturers and students' performance. Activities on proposal writing for funding and research activities were drastically reduced. In conclusion, the University lost heavily due the intermittent resurgence of the pandemic and a sluggish approach to confront it. The study recommends a robust online-based system of monitoring classes and postgraduate defenses; provision of internet for both students and lecturers in order to avoid numerous disconnections. Lastly, both students and lecturers should be proactive in order to surmount the Covid-19 related challenges.

Key words *Performance, e-trinities, monitoring, challenges, interactions, disruptions*

INTRODUCTION

Background to the Study

Kenyatta University is one of the largest universities in Kenya. According to UniRank (2021), the University has a student population of over 45,000 and it is ranked position 2 n Kenya, 24 in Africa, and 2170 in the world, among the top best universities. This ranking is undoubtedly associated with the performance of both lecturers and students at the University. Performance, in this study, is limited to the expectations placed on the lecturers and students during their stay at the University. Prior to the Covid outbreak in early 2020, lecturers were required to prepare and attend all the classes assigned to them for teaching during the semester. They were also required to engage the students in learning activities in class throughout the lecture sessions. Among these activities were Continuous Assessment Tests (CATs) and quizzes, which are a formative form of

assessment whose ultimate purpose is that of ‘improving learning’ (p.17). Students on the other hand were required to attend all the ‘face- to face’ classes and do the assignments provided by the lecturers. All the students who attended the classes were required to sign a class attendance form. The lecturer also counter signed this form.

Following the outbreak of Corona, the classes were commuted to online teaching and learning. Like the other higher education learning institutions around the world, Kenyatta University invested heavily in online platforms. Among these online platforms are the Learning Management Systems (LMS) and Google Meet. These two platforms are capable of generating class attendance records for both students and lecturers. Google Meet also has the capability of audio recordings and lecturers are required to record the online classes and forward the recording links to their respective chairs of departments. This ensures that the University’s online facilitation is monitored by the Quality Management Systems (QMS) section.

While the University has sufficient quantitative data on class attendance and recordings, there is little information on the actual activities that happen in individual online classes. For instance, there is hardly any information on what actually happens in the online classes right from the moment the lecturer logs in and invites the first student, up to the time that he/she ends the class for everyone. This paper used the mixed methods approach to investigate the ‘real happenings’ which relate to lecturers’ and students’ performance during online class facilitation. These activities are juxtaposed with the activities, which went on during the face-to-face sessions.

In the next part of this paper, we present the statement of the problem. This is followed by the research objectives and the attendant research questions. The methodological approach that is adopted in the study is then described. This is followed by a presentation of findings, conclusions and recommendations.

Statement of the Problem

Kenyatta University has been ranked as position 2 in Kenya 24, in Africa and position 2170 in the world. The university has an elaborate quality management system (QMS) and its adherence to standards is confirmed by the ISO certification which is consistently renewed. The Academic Section, like any other sections in the organization, has well outlined QMS procedures, which are backed by records to ascertain whether the procedures have been met. Based on the University Calendar and upon the registration and enrollment of students, teaching timetable is prepared. Lecturers and students are expected to adhere to the timetable. Besides teaching students that are enrolled in their classes, lectures are also expected to provide a minimum of two Continuous Assessment Tests (CATS) and provide feedback for the same. Following the advent of Covid-19, the classes were commuted to online teaching. Consequently, there has been a dearth of literature relating to adjustments in teaching and learning. This study examines the performance of teaching and learning at Kenyatta University during the Corona period.

Research Objectives and Research questions

The objectives of this study were to; assess lecturers’ and students’ teaching and learning performance, examine the challenges that lecturers and students face during teaching and learning, examine what the University management has done to assist the lecturers and students

to overcome the challenges and, proffer suggestions that the University can adopt to make it better prepared for future eventualities.

Hence the research questions;

- a) How is the teaching and learning performance of both lecturers and students rated by both students and lecturers?
- b) What challenges do lecturers and students face during teaching and learning?
- c) What has the University Management done to assist the lecturers and students to overcome the post- Corona challenges?
- d) How can the University be better prepared for future eventualities?

METHODOLOGY

This subsection presents the research design, the sampling procedures as well as the data collection and analysis methods that were used in the study. A case study approach was adopted. This was premised within the broad mixed-methods research design. A Purposive sampling approach was adopted. Since this was a case study, all the students were drawn from Kenyatta University (KU). KU was selected because of its high student and lecturer population and proximity to the city center. The students are drawn from virtually all the regions across the country.

Piloting

A pilot study was conducted to test both the instruments, and data collection procedures; and ascertain whether the whole study would take off. Two students and two lecturers, all from Machakos University were used in the piloting.

Sampling

Fifteen lecturers were sampled in each of the 15 schools at the University. The *friend-of-a-friend* approach (Milroy, 1987, Milroy & Gordon, 2003) was used to obtain a sample of the lecturers who were willing to respond to the interview questions, as well as to provide the contacts of their class representatives. These lecturers were duly informed about the study objectives and they were requested to also inform their class representatives before sharing their phone contacts with the researchers. The researchers further contacted the students on phone and reiterated the objectives of the study. Two lecturers 'accepted' to participate in the study but they failed to respond to the interview questions which were sent to them two weeks before the scheduled Google Meet Interview. Consequently, two other lecturers from different departments within the same schools were contacted before the interview sessions. These replacement lecturers aptly replaced the descenders.

All the students who were referred by the lecturers were willing to participate in the study, and they aptly responded to the questionnaires, which were send to them by mail. These students were also class representatives and their views were regarded to more or less represent those of the entire classes that they were in. The students who were recommended to participate in the interview were either in 3rd year or Fourth year. These two groups of students had 'experienced the 'two worlds': that of learning before Corona, and learning after during the epidermic. The students also belonged to the Regular Group of students. This group was mainly taught only in the in-class mode before Corona struck. The other groups such as those from the Digital

School of Virtual and Open Learning (DSVOL) and the Continuing Education Program (CEP) had variable experience with online teaching and were therefore, considered not ideal to respond to questions regarding the transition to online teaching.

The identities of the lecturers and the students, as well as the schools and departments where they belonged were coded as shown in Table 1 below.

Table 1: Sampling Frame

1	Lec1	Dpt1	Sch1	Std1
2	Lec2	Dpt2	Sch2	Std2
3	Lec3	Dpt3	Sch3	Std3
4	Lec4	Dpt4	Sch4	Std4
5	Lec5	Dpt5	Sch5	Std5
6	Lec6	Dpt6	Sch6	Std6
7	Lec7	Dpt7	Sch7	Std7
8	Lec8	Dpt8	Sch8	Std8
9	Lec9	Dpt9	Sch9	Std9
10	Lec10	Dpt10	Sch10	Std10
11	Lec11	Dpt11	Sch11	Std11
12	Lec12	Dpt12	Sch12	Std12
13	Lec13	Dpt13	Sch13	Std13
14	Lec14	Dpt14	Sch14	Std14
15	Lec15	Dpt15	Sch15	Std15

Data Collection

Structured questionnaires group interviews were used to obtain data. The questionnaires had 14 questions, whose responses were based on Linkert Scale. These questions related to the same object of study for both the lecturers and students. This was designed to enable meaningful correlation during data analysis. (See Appendix ii and ii). Quantitative data was obtained from the subjects’ responses to questionnaires. Further, both lecturers and students were interviewed in online Google meet sessions. These sessions were recorded. The oral data was recorded using Bailey (2017) Open Broadcasting Software (OBS). The data recorded was annotated and transcribed in ELAN (Version 6.0) and segmented using Audacity.

Data Analysis

A total of 14 questions were asked to both lecturers and students. A Linkert scale to evaluate an aspect of performance in each of these questions helped the coding and subsequent quantification of the data for analysis. The statics of mean, standard deviation and Pearson- mark correlation were computed. Analysis of Variance (ANOVA) was also used to evaluate the significance of the mean scores obtained. The Social Sciences (SPSS) was used to compute these measures. Qualitative data was obtained from the interview sessions. Four open ended questions, each

relating to the research objectives (cf. 1.3) were asked to the participants during the Google Meet interview sessions for the lecturers and for the students. The narrative approach analysis was used to analyze and present the study findings for from the qualitative data. According to Creswell and Poth (2018), different sub-fields have adopted various types of narrative research. Among these is the ‘postmodern, organizational orientation’ Czarniawska (2004). In Czarniawska (2004: 43), data on stories told about organizations is usually collected in an interview, but also an observation technique. Czarniawska (2004) enumerates the procedure for organizational orientation narrative design as shown below:

- 1) Establishing general aims of an activity
- 2) Describing the unit and the actors
- 3) Choosing an incident
- 4) Description of the critical incident
- 5) Critical judgments of the observer may be included but must be clearly separated

In this study, the general aims of the activity comprise the statement of the problem, the objectives and the research questions. The ‘unit and the actors’ in the study refer to the University and the students. The incident is teaching and learning performance, and description of the incident relates to the subjects’ responses during the interviews. The critical judgments of the observer relate to the recommendations provided.

RESULTS AND DISCUSSION

As noted in the Methodology Section, 14 research questions were designed to provide answers relating to the first study objective namely; to assess lecturers’ and students’ teaching and learning performance during teaching and learning. The first two questions in both the students’ and lecturers’ questionnaires required the subjects to rate their performance in relation to class attendance, both before and after Corona. Both the students and lecturers rated their class attendance highly with an equal frequency score of 7 and 9 for rank 1 and rank 2 respectively, during the online classes. None of the subjects rated themselves lower than 2. Before Corona, the level of class attendance by lecturers and students was lower. Majority of the subjects rated themselves highly, but a few students and lecturers indicated lower class attendance levels than they recorded in the online classes. For instance, a lecturer who indicated a rank of 4 for his face-to-face class attendance also mentioned, during the interview, that there was no room for multitasking during the face- to- face sessions and absenteeism was common because of the need to travel from the campus where he taught to attend physical meetings at main campus such as exam moderation, post-graduate defenses and other official functions.

The students were asked to rate their lecturers class attendance during and before Corona in in Question 3 and Question 4, respectively. 53 percent of the students gave a rank of 2 (good) and 20 percent of the students rated their lecturers’ class attendance in the third rank (‘average’). The lecturers on the other hand, indicated that some of the student’s class performance was below average as demonstrated in Table 2 and 3 below.

Table 2: Lecturers’ rating of students’ class attendance before Corona

Q3					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	13.3	13.3	13.3
	2	9	60.0	60.0	73.3
	3	2	13.3	13.3	86.7
	4	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

Table 3: Lecturers’ rating of students’ class attendance after CoronaQ4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	13.3	13.3	13.3
	2	10	66.7	66.7	80.0
	3	1	6.7	6.7	86.7
	4	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

From the data presented in the two tables, it is clear that more students fail to attend classes during the online teaching. These findings are statistically significant as evidenced by the ANOVA statistics presented in Appendix vi. This may be attributed to the fact that in the in-class teaching sessions, majority of the students stay within the University premises. One of the students during the oral interviews told the panel that one of her major challenges of online teaching was that while at home, there were other domestic chores that were ‘competing for the hours with the scheduled classes’.

The 4th and 5th questions relate to the level of interaction between lecturers and students during both online and face-to-face classes, respectively. There was variable rating of integration in class by both lecturers and students for the online classes as well as the face-to-face classes (see Appendix v. This variability may be attributed to the individual class student-lecturer interaction. This attests to the fact that interaction in every class, irrespective of the mode of teaching, is dependent on the students and lecturer relations.

The next two questions relate to timely attendance to CATs and quizzes. The face-to-face CATs were administered and done in a timelier manner than the online cats. The students rated their own timely attendance to CATs higher than the lecturers, who have indicated several tokens of ‘below average’ self-evaluation CATs and Quizzes admiration. During the oral interview, two lecturers indicated that the online schedules were often overwhelming since lecturers were also tasked with other duties such as Modules writing attendance to online defenses.

As relates to provision of feedback on CATs and quizzes, the lecturers evaluated themselves higher than the way the students evaluated them. The two tables below manifest this discrepancy.

Table 4 Students Rating of Lecturers’ Provision of Feedback on online CATS

Q11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	40.0	40.0	40.0
	2	6	40.0	40.0	80.0
	3	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Table 5 Lecturers’ Rating of their Provision of Feedback on online CATS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	53.3	53.3	53.3
	2	5	33.3	33.3	86.7
	3	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

The same pattern of a higher self-evaluation is also evident in the face-to-face sit in CATS (See Appendix v). While it is expected that subjects will do a higher self-evaluation, this outcome needs further investigation to determine why a significant number of students are not content with the nature of feedback provided by their lecturers. This will inform the educators on whether other pedagogical approaches need to be adopted so as enhance quick and effective feedback of formative evaluation.

The last two questions asked both the students and lecturers about how often they conducted personal reading and research during both online and the pre-Corona period. The data showed that lecturers created more time to conduct their personal reading than the students during the period before Corona. However, both lecturers and students do not significantly differ in terms of how much time they allocate for personal reading. The majority of the subjects from the two groups indicated that they either ‘frequently’ or ‘less frequently’ found time to conduct their personal reading. (See Appendix v).

In the interview questions, the subjects were asked to compare their teaching/learning performance before Corona with their performance after. Both the lecturers and students indicated that life was ‘better’ and more predictable before Corona struck. The lecturers indicated that online teaching was sometimes overwhelming; since they also had other official duties to do such as the writing of modules, marking of examinations as well as attending to

meetings and post-graduate defenses. Students on the other hand treasure the moments when they were in campus or outside residence, away from home, where they did not have to do multiple chores besides their learning tasks. Several students also mentioned that consultation hours with the lecturers in their offices were much better than online interaction.

When asked to describe some challenges that they faced during the online classes, both the lecturers and students indicated the issue of connectivity whereby they would be disconnected when the classes were going on. Students also mentioned that internet was expensive and sometimes, they were forced to subscribe to data which was more expensive because some of the cheaper internet providers were not available in some locations across the country.

Asked about how these challenges can be surmounted, both lecturers and students suggested that the University could negotiate with the main internet service providers to avail cheaper internet for classes. All the students should also be provided with learning tablets to enable them access the learning modules and class sessions without the hindrances that were common whenever they used their mobile phones. A student also pleaded to the University to communicate with parents so that they (parents) could free them from the numerous domestic chores that they were assigned because of their 'presence at home'.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

It is abundantly clear that Covid 19 interrupted learning in all the institutions the world. The implications of the interruptions were felt in the education sector as well as on the economy. However, it may not be easy to quantify the losses but it ran into trillion sterling pounds. However, universities and countries responded differently depending on their financial and educational capability. Although the lecturers were retooled on the new pedagogical skills but some have grudgingly embraced the new changes. The Government of Kenya as well as the universities out of their meagre resources had to spend money on purchasing more facilities /equipment. Finally, the students lost in terms of time and lost job opportunities. Therefore, the paper avers that the government, lecturers and Universities should invest more in disaster management and become more proactive in order to stay afloat in times of calamities.

Recommendations

The paper recommends the following:

First; the universities should invest heavily in research in order to forestall the dangers in future.

Second; the lecturers should be ready to adopt and adjust to the new pedagogical approaches.

Third; the students should be able to diversify their thinking and rise to the challenge in case of uncertainties.

Forth; the government should at all times be ready to cushion the students as well as the universities in times of calamities.

Fifth; a revolving fund should be created at all levels in order to assist the vulnerable students in case of uncertainties in the universities.

Sixth; internet connectivity and band width should be strengthened and extended to every part of the country. This development would assist the students to take classes where ever they are without a hitch. They should on the other hand be assisted to purchase data bundles without strain.

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Using e-Learning as a Tool for Enhancing Teaching and Learning in University Education: Lessons Learned from Machakos and Chuka Universities

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Abstract

This paper argues that e-learning is a critical component in teaching and learning especially during the Covid-19 pandemic. The paper interrogates the online teaching and learning environments, the Moodle as an e-learning platform for teaching and learning, the challenges of using e-learning in teaching and learning, and the effect of E-Learning on University Education. This paper also provides some practical lessons on e-learning from Machakos and Chuka Universities. The study adopted a desk review approach that focuses on document analysis to get information on e-learning. The documents analyzed were journals, Internet Communication and Technology (ICT) websites, and paper reviews on online teaching and learning. Also, interviews of OdeL staff in the two universities was done. The paper concludes that e-Learning can be adopted and utilized to promote education in Africa even during covid-19 pandemic times and post Covid era. In addition, e-learning can make learning easier and accessible to everyone, everywhere in the world. It provides the opportunity to achieve great results at lower costs and thus revolutionizing the conventional education system.

Key Terms: *Online teaching, Moodle as an e-learning platform, Challenges, Effect of E-Learning*

INTRODUCTION

E-learning has become an increasingly popular learning approach in higher educational institutions due to the rapid growth of internet technologies. Use of information and communication technology to enhance and facilitate teaching and learning is called E-learning. (oye, N.D., A.Iahad, N., *at-al*, 2012). According to Rogers (2008), in this modern age e-learning has a competitive advantage and many universities have implemented it and this has impacts on student's performance. According to Fisser and felliccione (2001) developments in information and communication technologies (ICTs) have impacted all sectors of society, including the education sector. In higher education, application of ICTs in form of e-learning is already changing teaching and learning processes. There are many pedagogical and socio-economic factors that have driven higher learning institutions to adopt e-learning. These include greater information access; greater communication via electronic facilities; synchronous learning; increased cooperation and collaboration, cost-effectiveness (e.g. by reaching different students and in greater numbers) and pedagogical improvement through simulations, Virtual experiences, and graphic representations. Both trainers and learners can choose more appropriate applications which are flexible in time, in place, personalized, reusable, adapted to specific domains and more cost-efficient.

According to Pei-Chen sun and Hsing Kenny Cheng (2013), the rapid development of computer and internet technologies has made e-learning become an important learning method. There has been a considerable increase in the needs for multimedia instructional material in e-learning recently as such content has been shown to attract a learner attention and interests. Virtual

learning systems (VLSs) offer a repository for course documents, discussion forums, chat boxes, mass communication options, among others. According to Green (1999), In the last few decades with the use of internet, email, multimedia technology and intelligence tutoring system on campus the Computer Assisted Learning (CAL) system become so popular. According to a survey, it is recorded that majority of college professors use email to communicate with their students and one-third of college courses utilize CAL technology. Similarly, according to the report of Jones (2002), that majority of the college and university student's own computers and wireless devices and use internet to enhance their learning experience and to save time. With the passage of time, the use of internet is increasing rapidly that's why the training and learning institutions have devoted great efforts and large sum of money to develop e-learning progress for use because it saves time and increase skills. (Chiu, Sun, *et al.*, 2007). The students involved in higher education through distance learning need a venue to connect and actively engage with other member of the class, who they often have never met in person, and activities in distance education courses need to allow for students to apply their learning to authentic educational contexts, (Correia & Davis, 2008).

FROM RELEVANT LITERATURE

Online Teaching and Learning Environment Vs Traditional Environment

E-learning is an innovative approach used to deliver electronically mediated, well designed, student-oriented, content to learners. The development and advancement in computers and electronic communications has removed barriers of space and time in teaching and learning. Lecturers can deliver knowledge anytime anywhere in the world (Horton, 2000). An educational environment has three basic elements. These is a teacher who teaches, a student who is taught and the content to be imparted. For educational dream to be realized, two things are very critical. These are: the teacher who is expected to create a good educational environment and the learner who is the recipient of the content. e-learning technology is becoming increasingly used in the higher education in the world today especially during the Covid-19 pandemic times. This is because, e-learning technology enables students to step out of the traditional class room environment. To create an e-learning environment, lecturers are required to have the content, technology, instructional support, technology support, infrastructure and organization. In addition, the success of e-learning requires the following human resources. This includes the teacher, programmer, multimedia expert, expert in both e-learning technology and pedagogy, the instructional designer and an administrator.

Virtual environments support a range of functionalities that includes supporting social interactions, modelling of real environments, document sharing and recording facilities that allow learners to replay activities undertaken in the real world. But the one-million-dollar question that we should ask ourselves is "How can we engage learners in an online learning environments? In the online learning environment, engagement by learners requires some cognitive effort and attention. When learners are engaged in the learning process, their levels of learning and retention increase and thus their learning experience is improved. (Kearsley & Shneiderman, 1998).

The challenge that most learners face online is not being aware of the structure of the online learning environment, and the strategies to be applied. Also, learners do not know the interactive online elements and how to use the online support tools. To mitigate this lack of awareness and

learning strategies, it is important for institutions of higher learning to conduct trainings for students and learners on how to learn or teach online. Such training will help lecturers and learners to learn the technical procedures needed in navigating the virtual environments such as logging on the LMS and navigating through the online learning environment and how to use the various tools available (Potter, 2000; Lim, 2001).

Equally important is setting ground the rules or guidelines for participation in the online learning environment. Outlining guidelines for online discussions is of great importance in online teaching and learning (Lim & Cheah, 2003). Guidelines about online discussions or chats are necessary to avoid the conference turning into a monologue of lecture-type material to which very few responses are made (Harasim and colleagues, 1995). The online learning environment provides opportunities for learners to have control over their learning process and become more engaged in it than the traditional teaching and learning.

Before beginning to teach online, lecturer's should strive to work on the learner's attitude, knowledge and learning strategies to enable them learn independently in the online learning environment. e-Learning provides different environments for learners as it provides dynamic, interactive access to a wide range of information. For example, text, graphics, and animation (Jonassen, 1996; Jacobson & Archodidou, 2000). E-Learning environments may contribute to the process of teaching and learning but only if the integration is done within the framework of proper pedagogy, both educational and technological.

Moodle as an E-Learning Platform for Teaching and Learning

Most institution of higher learning have acquired a MOODLE to aid in teaching and learning. The acronym MOODLE stands for Modular Object-Oriented Dynamic Learning Environment. This software is designed to help educators in the creation of quality internet-based courses. The Moodle is sometimes referred to as a Learning Management System (LMS), Course Management System (CMS), Virtual Learning Environment (VLE) or just Online Education (Dobrzański, 2006; Martin-Blas & Serrano Fernandez, 2009). The Moodle contains tools for construction, design, organization and management of courses or lessons in different levels of information communications technology (ICT) (Brandl, 2005). The Moodle has many benefits that includes 24 hours' availability, a variety of network interfaces (Internet explorer, Google Chrome, Netscape, FireFox) and support in different languages (English, Arabic, Hebrew etc.) The main benefit advantage of this software is the platform's code transparency that enables learners and developers to adapt the platform to individual needs and develop new advanced features and add-ons. (Dobrzański, 2006; Martin-Blas & Serrano-Fernandez, 2009).

The Moodle e-learning platform is also easy to use and provides a good communication tool, discussion area, group space, workspace, and makes learning more interesting". It enables the students can access courses' contents in different formats (text, image, sound), as well as interact with lecturers and colleagues, via message boards, forums, chats, video-conference or other types of communication tools.

One of the most important benefit of this software is that it allows for the exchange of information among users in different geographical regions by use of mechanisms of synchronous (chats) and asynchronous communication (discussion forums). It can easily be concluded that a Moodle's interface is very intuitive and allows for easy navigation. It is divided into sections that

has its own tools such as lessons, quizzes, assignments, and forums which are all linked (Goodwin-Jones, 2004). Moodle is also developed in such a way that it allows teachers or course participants to provide feedback in qualitative or quantitative form. Higher distance education offers a scenario for the development of teaching-learning processes through educational platforms and their functionalities for didactic communication, mainly online forum (Lopez, & Camilli, 2014; Guedez, & Navea, 2014; Bousbahi, & Alrazgan, 2015; Bin, 2017).

Challenges of Using E-Learning in Teaching and Learning

According to Mpofu et al. (2012), the adoption of e-learning in Africa is slow, as evidenced by the low number of African scholars who are familiar with teaching in an online environment. Hollow and ICWE (2009), reporting on a survey of 147 e-learning practitioners from 34 countries in Africa, observed that e-learning was developing at a slow pace due to many challenges that impede its adoption and utilization in the universities.

Inadequate ICT and e-learning infrastructure is one of the major challenges hindering the implementation of e-learning in Kenyan public universities. It is quite clear that infrastructure plays a key role in the implementation of e-learning. Infrastructure like computers, network and internet connectivity, and computer labs are inadequate in most public universities to support the high numbers of students who want to access e-learning. However, most universities have made some progress in improving their ICT and e-learning infrastructure in the last few years. ESIB (2003) also points out that the institution providing e-learning must provide adequate technological infrastructure, including network connections and computers, and technical support for both students and staff.

In addition, financial constraint is one of the challenges hindering the implementation of e-learning in Kenyan public universities. Implementation of e-learning is generally expensive for an average university at the initial startup stages. Inadequate financing of e-learning is therefore a major barrier to its successful implementation in Kenyan Universities. Though it's clear that Kenyan public universities make yearly budgetary allocations for e-learning implementation, it these allocations are inadequate to carry out all important e-learning activities like training of staff on e-learning, maintenance, e-content development, Internet bandwidth and e-learning infrastructure development. It also emerged that most ICT and e-learning related projects in public universities rely on donor funding. Most Kenyan public universities do not prioritize e-learning in their budgetary allocations. Huynh et al (2003) found out that budgetary restriction is a primary concern for institutions. According to Kashorda and Waema (2014), on average, Kenyan universities were spending only 0.5% of their total recurrent expenditures on Internet bandwidth.

Moreover, public universities in Kenya lack affordable and adequate Internet bandwidth, hence it is one of the challenges hindering implementation of e-learning. Additionally, though the cost of bandwidth in most public universities has gone down following the introduction of bandwidth subsidy by the government through the Kenya Education Network (KENET) and the arrival and operationalization of the undersea backbone fibre-optic cables in Kenya in the year 2012, the cost of Internet bandwidth is still high, hence currently universities cannot afford to procure adequate internet bandwidths. Faster internet connectivity is critical to an institution using e-

learning to support teaching and learning. According to the E-Readiness Survey of Kenyan Universities (2013) Report, the current price of \$160 per Mb/s was still a high price in comparison to developed countries.

On the other hand, lack of operational e-learning policies is another challenge hindering the implementation of e-learning in Kenyan public universities. Notably some Kenyan public universities don't have an e-learning policy and in cases where a policy exists, it's not operational. Most Kenyan public universities are unable to implement their e-learning policies due to budgetary constraints and lack of the necessary e-learning infrastructure. A policy framework on e-learning is critical to the success of implementation of e-learning in any given institution. In developing the appropriate e-learning policies, the core business of the university must take the center stage so as to ensure that e-learning puts the university on a competitive edge. Appropriate and operational e-learning policy is critical to the success of e-learning implementation. Awidi (2008) pointed out that the universities must have clearly defined strategic plans that spell out e-learning policies and implementation strategies. Catherall (2005) also established that most Kenyan public universities have no ICT and e-learning policies of any sort or where it is available, it is still in draft form.

Additionally, lack of relevant technical skills on e-learning and e-content development by the teaching staff is a challenge hindering implementation of e-learning in public universities. This is attributed to inadequate or lack of training in e-learning skills among majority of the teaching staff. It is evident that only a few of the teaching staff have been adequately trained on e-learning skills. Though some of the teaching staff have basic computer literacy skills, these skills may not be adequate for them to use e-learning in teaching as well as developing e-content, hence need for training. Wanyembi (2011) found out in a survey done in Kenya that most of the academics in universities have low ICT and e-learning skills because most of them were trained in the absence of ICT environment. E-learning skills for lecturers and relevant e-content are critical components necessary for successful implementation of e-learning.

Lack of interest and commitment among majority of the teaching staff to use e-learning in teaching in public universities is another challenge hindering the implementation of e-learning. This is attributed to lack of motivation among the teaching staff who perceive conversion of their courses to e-content as extra work with no additional pay. Fear of loss of jobs as a result of implementation of e-learning is also cited as a cause for lack of interest and commitment to use e-learning by the teaching staff. Khan, Hasan and Clement (2012) also found out that if teachers want to successfully use technology in their classes, they need to possess a positive attitude to the use of technology.

Lastly, the study revealed that creating e-content takes a longer time, hence hindering the implementation of e-learning in public universities. It came out clearly that most teaching staff are busy with routine teaching and research tasks, hence do not have adequate time to convert their courses from hard copy to e-content. However, on the other hand, the benefit is once a course has been developed in digital format, it is easier and less time consuming to maintain and update. Tarus (2011) found out that developing one complete e-learning course requires a longer period of time as well as resources such as computer and reliable internet connectivity.

LESSONS FROM MACHAKOS AND CHUKA UNIVERSITIES

The universities created the Centers for Open, Distance and e-learning in 2020 during the Covid-19 to coordinate all OdeL activities. The Centers has been able to do the following to enhance digital skills for faculty and students as they embarked on the blended teaching and learning: the training of faculty and students on the use of Kenet and other platforms. The faculty members are now able to use these platforms to conduct classes. At the same time, learners are able to log in to these platforms and participate in all classes. Faculty members have been trained on the development of interactive content. Most lecturers are now able to develop e-notes, prepare PowerPoint presentations and develop personal videos to use. All developed content developed are vetted by the departmental committee before they are uploaded on the Learning Management system. The universities also procured a Learning Management System software that is used to supplement teaching and learning. About 98% Faculty have been trained on the use of LMS to upload e-notes, journal articles, assignment, quizzes, CATs, Videos etc. on the same breath, students have been trained how to access e-notes, journal articles, assignment, quizzes, CATs, Videos etc. Ninety-eight (98%) of our faculty has been trained on online teaching and learning. However, the universities have had to contend with the following challenges; lack of enough infrastructure, unstable servers; capacity building and retraining of teaching staff; are tedious preparation of e-Notes; lack of enough computers for students; Use of smartphones with limited functionalities.

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A Review of Literature on Product Differentiation Strategy and Brand Loyalty

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Abstract

The concept of product differentiation goes back to the early 20th century when there were hardly any models of differentiated products. Incremental differentiation of products and services is the main variable that helps define the key aspect of value that marketing adds to a product. Extant literature has no consensus on the relationship between differentiation of products and consumer loyalty to brands. This paper aimed at critically reviewing studies available on product differentiation. The study methodology used involved literature review where empirical studies in the field of product differentiation and brand loyalty were examined. The methodology also involved a critical review of relevant theories. A number of theories were discussed in search of a clear relationship between the two concepts. The measures of product differentiation that were used included the product quality, product innovativeness, product design and costs of products. Brand loyalty measures were product repurchase, top of mind product, advocacy metrics, business referral frequencies, extent of behavioral change, and the willingness to pay premium price. The grounding of the study was on the assumption that various measures of product differentiation would have a substantial effect on the brand loyalty. A conceptual framework for measuring product differentiation and to give more insight into what product differentiation really is was developed. The empirical review indicated that differentiated products are key to an organization's competitive advantage and to customers' satisfaction leading to customer loyalty. Theoretical review led to a conclusion that there is a strong relationship between product differentiation and brand loyalty. This critical review of empirical literature highlighted some gray areas hence future scholars should review critical issues like product differentiation and customer satisfaction, brand awareness and performance; and perceived service quality and reputation.

Keywords: *Product differentiation, Brand loyalty, Switching behavior, Brand equity*

INTRODUCTION

Background to the study

Product differentiation concept dates back to Shaw's (1912) school of thought that commodities are increasingly being differentiated in modern markets, even though much confusion still exists pertaining to what product differentiation actually is (Shelby, 2011). According to Alderson (1957), the main variable that helps define the attribute of value that marketing contributes to commercial products is the process of their differentiation. Product differentiation is the specific way that one organization's products can be identified from another organization's products or services in a marketplace. Any distinguishing criteria, such as label or place of production, sale, or consumption, can be used to convey to the buyer the differences of one firm's product from

products of other firms that operate in the same environment. Wooliscroft, Tamilia, and Shapiro (2006) argue that product differentiation can be of many varieties or come in many shapes and forms. The differentiation can be based on observable and unobservable characteristics of a product itself, e.g., the features regarding taste, patents, trade-marks, and trade names, or product containers sizes, colours and designs, among many others. Product differentiation could further be defined by the situations surrounding a product's sale or conditions thereof. For example, proximity to the seller's location, reputation and stability, all of which can serve to first attract and then attach the customer to a specific firm. Despite competition, a seller who offers a differentiated product – that is, a product that is viewed by buyers as different from others, does actually occupy a monopoly position in among other products. Every firm would like to occupy a monopoly position in the market place. However, a monopoly position is not sufficient for a strong sales base, without which a firm cannot grow.

Brand loyalty is an essential variable in any organization's success because without brand loyalty, a steady, adequate or reliable inflow of revenue is at risk, especially in the modern business environment where rivalry is a fierce one. Brand loyalty is formed when customers' expectations are satisfied by the purchases they make so that a re-purchase from same brand occurs frequently or at least regularly. According to Aaker (1991), brand loyalty can reduce marketing costs and thus enhance the financial base of a company. In this sense brand loyalty is key in contributing to brand equity, that is, a financial worth associated with a particular brand of a product over and above the market value of that product. Thus, brand loyalty is an important contributor to the financial stability and sustainability of a company. The purpose of this review is to critically assess differentiation of products and services and their relationships with consumers' loyalty to product brands. The main idea is that product differentiation is the source of brand loyalty and brand equity. Thus a company's marketing division needs product and service differentiation strategies that will give the company a market edge over its competitors.

Product Differentiation

The term 'product differentiation' is increasingly being used to refer to a practical objective that a marketing strategy should be designed to achieve (McDonald, 1996). It is a deliberate effort to make a product from a staple commodity in order to increase demand for it and sell it at the highest possible price. A marketing strategy changes a familiar product and makes it to look different to consumers. There are numerous ways of making products which are essentially the same good in terms of content look distinctly different in the eyes of the consumer (Shaw, 1912). Despite this observation, it should be acknowledged that even the slight product modifications induced by a marketing strategy render a product better adapted to the use to which it is put. To achieve that end, niceties of packaging and trimming are employed.

Moreover, a product distributor occasionally builds up a pleasant atmosphere around a good as to taste or quality that assures the consumer of satisfaction upon consumption. A good or service for example might be shown by an advertisement as having superior qualities of good health or strength even when it is not different from similar goods and products on offer in the market place. At times, the distributor might differentiate the product by appealing on to service or special conveniences of the consumer and provide them as a collateral to the commodity at the point of sale or after sale. It is for this reason that many clothing stores offer private fitting rooms to customers to assure them they will be satisfied by the purchase. A distributor can also offer

repair services before the product leaves the store because he knows that it is of good quality and repairs would not be needed under normal circumstances.

Always, however, the aim of product differentiation is to distinguish a commodity from well-known commodities of considerably similar nature. Nearly always, the distributor achieves this purpose through the use of trademarks, brands, or trade names. Through a marketing strategy a distributor is in a position to convey to consumers the message that they are better off paying a higher price for his differentiated product than for the stock commodity. By calling attention to the unique qualities of his differentiated product, the distributor transfers to it a portion of the demand that was previously reserved for the stock commodity.

Product differentiation occurs if there exists a substantial basis for differentiating one marketer's products from another marketer's products. In addition to attributes specific to a product that marketing can help bring out, a marketing strategy can achieve product differentiation by highlighting the general tone or character of a seller's establishment, his way of doing business, his reputation for fair dealing, courtesy, efficiency, and all the personal links which attach his customers either to himself or to those employed by him (George, 2011). Porter (1985) views a differentiation strategy as a situation where buyers have willingness to pay for a firm's product whose value is unique in an industry. Consumers must first express their needs which enables a firm selects one or more product attributes which majority of the buyers perceive them to be important, and positions itself in order to meet the needs. This makes a firm's marketing strategy to be an effective one. As long as the firm meets these needs, loyal customers reward it by paying premium prices for its products. Porter (1985) argues that product differentiation strategies vary across industries so that a uniform differentiation approach would not work in all industries. Other attributes on which product differentiation is pegged on include the product, the product delivery system, the marketing strategy, to mention just a few.

Brand Loyalty

Brand loyalty as a concept in marketing came to light in the 1920s (Bennett, 2001). The concept has been defined by several authors whose schools of thought tend to agree. Jacoby (1971) views brand loyalty as a function of consumers' mental processes in which consumers show biased or deliberate reaction within a given period of time by centralizing their decision with regard to optional products found in a group of products. Brand loyalty mirrors the likelihood of a consumer to change brands when there is a change either in price or product features. Therefore, it measures the bond that exists between a consumer and the brand (Aaker, 1991). According to Oliver (1999), brand loyalty is a strong commitment that a customer shows in rebuying or patronizing a product, good or service of his/her preference regularly in the future that leads to a repeat buying of the same brand regardless of situational factors and marketing efforts that can prompt switching behavior. Ishak and Ghani (2013) define brand loyalty as the inclination/biasness that the consumer shows in choosing a particular brand for purchase from a product category due to the view that the customer will get the best features of the product, tastes, images or level of quality at the best price. Loyalty is developed as a result of repeat buying which emanates from the perception. Thus, cultivated attachment to the brand by the customer and his/her likings about the brand are related to brand loyalty over a period of time.

Switching Behavior

Although companies are striving to create common associations with clients by offering higher value and achieving their obligations, the competition in the marketplace is making it difficult for these organizations to do so (Zikiene & Bakanauskas, 2006). According to Solomon et al. (2006), customers' behaviors relate to a situation where they, alone or with others, including their peers and non-peers identify, search, select and consume products so as to fulfill their human needs and wants. This behavior is the determinant of how consumers make a decision to buy products and the various forces behind this inclination (Bhasin, 2010). It is basically the study of the maximizing behavior concerning the when, how and the why of consumers in marketplaces. Consumer switching behavior is found between firms and consumers since, because of the influences of marketing strategies it limits both groups from having a long or lasting relationship and it can even stop permanently the pre-developed long-term relationships at the expense or advantage of companies that operate within the same industry. It is the process by which consumers terminate their relationships with a current retailer or firm and replaces it with a competitor completely or partially (Nimako, 2012a).

Brand equity

This concept made its appearance in the writings of marketing in the 1980s. Since then business strategists have expressed interest in the concept because there is a strong bond between brand loyalty and brand preferences depicted by the consumers (Thiripurasundari & Natarajan, 2011). Successful firms boast of having market competitive advantages as a result of producing successful brands. This means that companies need to have the right brand equity for their products so as to remain successful for as long as they exist. Brand Equity describes the link/connection between the brand and the bundle of its strengths and weaknesses; brand name and its symbol have been known for some time now to increase or decrease the benefits drawn from a product by an organization and /or by the organization's target market (Aaker, 1991). In another view, Yoo and Donthu (2001) state that brand equity is the monetary value of the difference in the ordinary goods chosen by the consumer and the branded goods given the same level of product features. This means that brand loyalty represents the utility difference enjoyed by the consumer in terms of positive consumption outcome which is created by branded products compared to that of the generic version of the same products. Brand equity is both financial and customer-based. (Thiripurasundari & Natarajan, 2011).

Financial brand equity is the additional cash received as a result of selling branded products compared to the additional cash received after selling unbranded products. It is not useful for the marketing purposes because it has a monetary measure hence it does not explain the value of the brand from the consumer's perspective. Customer-based brand equity is the assessment of the buyer's reaction to the name of a brand (Keller 1993; Shocker et al. 1994). It is the unique influence that a brand knowledge has on a consumer or the reaction that a consumer gives to a brand due to its marketing. A brand is viewed as having a positive (negative) customer-based brand equity when the response of the buyers towards the brand is more (less) favorable and the way it is marketed after the identification of the brand than when it is not, for instance when the brand is attributed to a fictitiously named or unnamed version of a good (Keller, 1993).

Brand equity has five dimensions namely brand awareness, brand associations, perceived quality, brand loyalty, and other proprietary brand assets. The first four relate to buyer's behavior towards the brand whereas, in contrast, proprietary brand assets are not typically consumer

behavior based (Aaker, 1991). The main aspect of brand equity is brand loyalty. Product differentiation is therefore very important for competitiveness of a firm in modern markets. Brand loyalty increases a company's long-term value because it creates a large pool of customers that stakeholders expect to remain loyal to the company's products or services for a long time.

THEORETICAL FOUNDATIONS

Disaggregate Discrete Choice Theory

The analyses in this theory are done using aggregate models that assume that all consumers have the same preferences. The outcome of the analyses gives a model of choice behavior of a representative or average consumer (Renken, 1997). In most cases, consumers' preferences on brands differ greatly in terms of the features they look for, packages they prefer, response to price changes, promotions, etc. These differences lead consumers to fall into small homogeneous groups (segments) which can lead the marketing manager to know the behavior of each of the segments hence helping the manager decide on which segments to target and the marketing strategy that can appeal to the targeted segments. Disaggregate discrete choice model takes into consideration of various market segments that emerge because of the great differences that consumers portray in choosing the brands to buy. It provides a more accurate representation of consumers while at the same time allowing marketers to cluster consumers into segments with similar choice behavior. This paper will therefore be based on disaggregate discrete choice theory since it focuses more on how consumers make their choices given the variety of differentiated products that they are exposed to in the market and how companies target these consumers differently.

Brand Loyalty Theory

Brand loyalty is a positive biasness that an individual shows in responding to a branded, labelled or graded product as the consumer, the selector or the purchasing agent. The biasness can be as a result of affection, evaluation or reaction that the individual portrays towards a product (Sheth and Park, 1974). This definition tends to differ from several other definitions of brand loyalty which focus more on repeated buying behavior. Sheth and Park (1974) summarized the differences as follows: The limitation of brand loyalty is not only in situations whereby consumers reactions in terms of product purchase is the only focus when measuring brand loyalty. This is because loyalty toward a product can occur in situations where consumers have never bought the brand or product. For instance, children may be loyal to a brand because of their consumption experiences as opposed to buying experiences. Hence, brand loyalty may arise by learning from information, imitative behavior, generalization and consumption behavior and not from buying behavior experiences.

Brand loyalty is anchored on repeat purchase buying behavior even though the consumer or the buyer may have no evaluative (cognitive or attitudinal) structure underlying his brand loyalty. However, one can observe emotive tendencies (affect, fear, respect, compliance, and so forth) associated with this type of loyalty. The loyalty can occur at the non-behavioral level (emotive or evaluative level) for the products which are never bought by some consumers. It is possible for instance, for urban residents to be positively attracted emotionally towards high-end residential houses although they may not purchase them. On the other hand, some customers may have

positively biased non-behavioral tendencies towards certain vehicles, mobile phones, electronics etc. even though they may never buy them.

There are three different dimensions contained in the definition of brand loyalty namely emotive tendency, evaluative tendency and behavioral tendency. Emotive tendency is the affective (like-dislike), fear, respect or compliance tendency which is systematically exhibited more in favor of a brand than other competing brands. Evaluative tendency towards the brand is the positively biased evaluation of the brand on a set of criteria relevant to define the brand's utility to the consumer. This therefore means that the evaluation criteria focus on the features of the product that are relevant to the consumer. Behavioral tendency, is the biased positive reaction that a customer has towards the brand with regard to searching, buying and consuming it. The theory holds that it is not every circumstance where there is brand loyalty that all the three dimensions may necessarily be found. Brand loyalty dimensionality can be a simple one made up of any of the three scopes, one or a complicated one including the three scopes but this is dependent on the product class and the consumer.

EMPIRICAL LITERATURE

Product differentiation strategy

Dirisu, Iyiola and Ibidunni (2013) studied the association concerning product differentiation and ideal organizational performance of Unilever Nigeria PLC. Their objective was to establish whether product differentiation strategy can lead to achievement of competitive advantage while influencing organizational performance within the manufacturing industry. A significant positive relationship was found to be existing between product differentiation and organizational performance. However, it is worth noting that brands are built by customers and not companies hence it is important to consider what would make consumers to continue using a company's product or referring other people into use it. On the other hand, Valipour, Birjandi and Honarbakhsh (2012) examined the relationship between cost leadership strategy, product differentiation and firms' performance accepted at Tehran Stock Exchange. Its purpose was to investigate the business strategies effects on the financial leverage and company's performance relationship. Analysis of the findings led the researchers to conclude that a positive relationship exists between product differentiation and firm's performance. Whereas the study considers product differentiation as a critical component of the firm's performance, it fails to bring the customer into perspective, hence leaving a gap as to how the firm's performance is achieved.

Nolega, Oloko, Sakataka, and Oteki (2015) investigated product differentiation strategies' effects on firm product performance. This was a case study of Kenya Seed Company (KSC) in Kitale. The study findings indicated that a positive relationship exists between product differentiation and a firm's performance and its sales growth. This study was focused more product differentiation and firm's performance relationship. The findings are not clear on whether the firm's positive performance is as a result of the loyalty that agents and staff have on the various brands of seeds that the Kenya Seed company distributes to farmers. This therefore gives a gap as to whether differentiated products can lead to brand loyalty by consumers. Shafiwu and Mohammed (2013) studied on product differentiation effects on profitability in Ghana's petroleum industry. The findings indicated that product differentiation and profitability in

Ghana's petroleum industry have a positive relationship. Therefore, it implies that firms that differentiate their products are likely to better their profits.

Arasa and Gathinji (2014) sought to examine the relationship between competitive strategies and firm performance. The study aimed at examining whether competitive strategies and organizational performance among firms in the mobile telecommunication industry in Kenya have an existing relationship. The findings of the study indicated that there was high competition in the industry and that the most commonly used strategies are product differentiation and low cost leadership. The recommendation of the study is that when using product differentiation strategy, a company should be consistent in providing unique product or service to improve customer loyalty. The main focus of this study was find out how competitive strategies and firm performance relate therefore product differentiation and brand loyalty were not highly factored in. This begs the question: is there a relationship between product differentiation and brand loyalty.

Rahma (2011) studied on service differentiation to achieve competitive advantage. The focus of the study was on how airlines differentiated their services to fulfill the physically challenged persons' needs. The study aimed at enriching understanding of how airlines can distinguish their services and achieve competitive advantage by satisfying the needs of physically challenged individuals and to develop the model of the same. According to the findings of the study, differentiation of the airline services to suit the physically challenged persons' needs was found to be a source of competitive advantage to these firms since this niche market is growing. Kimando, Njogu and Sakwa (2012) studied the analysis of the competitive strategies employed by private universities in Kenya. Their objectives were to determine how technology has been employed as a competitive strategy by private universities and also to determine how these universities attain competitive advantage by use of a differentiation strategy. The findings of the study indicate that use of a differentiation strategy has enables these universities to gain a competitive advantage which has made them to stand out from the public universities. This study has not addressed the issue of brand loyalty and product differentiation which is the key focus of this paper.

Brand Loyalty

Kinuthia, Mburugu, Muthomi and Mwihaki (2012) carried out a study that focused on the factors influencing brand loyalty of swimwear among Kenyan University students. Price and variety, attractiveness and size and brand reputation were the factors that showed a significant relationship with brand loyalty. This implies that when a firm differentiates its product on one or more of these factors, customers can develop some level of loyalty can be developed by the customers to the brand. Mise, Nair, Odera and Ogutu (2013) explored brand loyalty determinants in global FMCG soft drinks markets in Kenya and India. The study aimed at investigating and doing a comparison of the soft drinks market in both African and Asia. This study has not focused on differentiation hence giving a gap that this paper seeks to bridge.

Auka (2012) focused on service quality, satisfaction, perceived value and loyalty among customers in commercial banking in Nakuru Municipality in Kenya. He aimed at examining the extent to which brand loyalty in commercial banks can be influenced by service quality, perceived value and satisfaction. A positive significant relationship was found to exist between the independent variables and the dependent variable. Hence, service quality, customer value and

satisfaction were found to be the critical success factors that influence the competitiveness of an organization. Nawaz and Usman (2011) studied the Telecommunication sector of Pakistan in order to unearth what makes customers brand loyal. Service quality was found to be the most essential factor of brand loyalty in mobile phone network market. It was however confirmed that an indirect positive relationship existed between service quality and satisfaction; and brand loyalty.

This section has shown that product differentiation matters for a firm's survival. In particular, companies that did not have well differentiated products like Arthur Andersen Limited went bankrupt. The section has reviewed empirical approaches that other researchers can use to conduct new studies. The gaps identified in this section demonstrated that little research has been done on product differentiation and brand loyalty relationship. Most of the studies for instance, Nolega, Oloko, Sakataka, & Oteki (2015); Dirisu, Iyiola & Ibidunni (2013); and Valipour, Birjandi & Honarbakhsh (2012) focused on product differentiation and the firm performance relationship. The findings of these studies indicated that firms whose products were differentiated had better performance compared to the firms whose products were not differentiated. Among the studies that were done on brand loyalty, there is none that showed its relationship with product differentiation, for example Mise, Nair, Odera and Ogutu (2013); Kinuthia, Mburugu, Muthomi & Mwihaki (2012); Auka (2012); and Nawaz & Usman (2011). There is a clear indication that there is need to delve into the research on product differentiation and brand loyalty relationship.

Conceptual Framework

Wooliscroft, Tamilia, and Shapiro (2006), argued that product differentiation is the main determinant of power that a firm has at the marketplace. Despite competition, a seller who offers a differentiated product – that is, a product that is seen by buyers as distinctly different from others, does actually occupy a position of monopoly power in the market. Brand loyalty is a key variable in any company's success because without it, a constant and steady inflow of cash for a firm is at risk, especially in situations where firms face stiff competition from their rivals. Brand loyalty is created when customers' expectations as to the quality of the products being offered are satisfied by the purchases the customers make so that a re-purchase from same brand becomes a norm (Chamberlin, 1933). This paper looked at the relationship between a firm's product differentiation, and the brand loyalty it experiences. Product differentiation is examined from the perspectives or aspects of product quality, innovation, design, and cost. Brand loyalty arises from product repurchase, business referral, advocacy, willingness to pay premium price and from customers' reluctance to switch from accustomed products. The relationship between the two variables is as shown in the figure below.

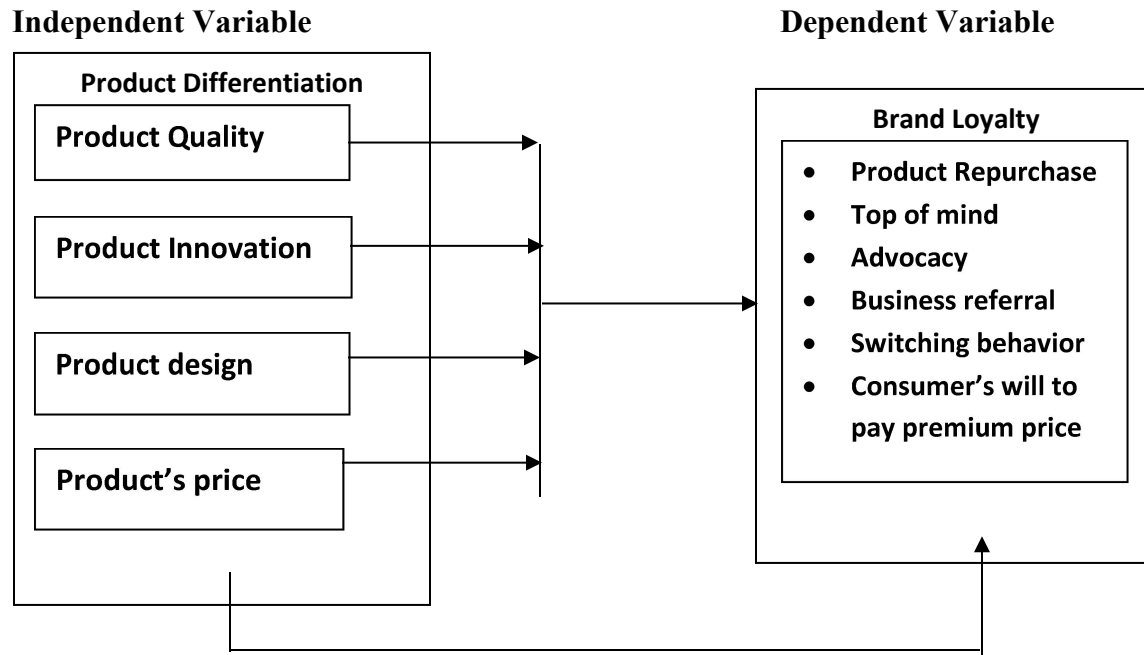


Figure 1: Conceptual Model

CONCLUSION AND SUGGESTIONS

This paper aimed at bringing to light the relationship that exists between product differentiation and brand loyalty for various brands. It is believed that companies that differentiate their products add value to these products making them attractive to the existing customers as well as potential customers. These sentiments are supported by Alderson (1957) and Chamberlin (1933) in their views as to what product differentiation is.

Conclusion

The paper outlined the key measurements of product differentiation which give a clear understanding of relationship between product differentiation and brand loyalty. Measurements of brand loyalty have also been highlighted in the paper. The conceptual model developed has its usefulness in examining the contribution of product quality, branding, innovation, design, customer service and cost to brand loyalty. It is important to note that differentiated products are key to an organization's competitive advantage and to customers' satisfaction. This is according to Rahma (2011) and Nawaz and Usman (2011) respectively. In most cases, a satisfied customer will most likely make a repeat purchase, refer other customers, patronage the brand, be willing to pay a premium price or will be unwilling to switching from a product. Consumer behavior exhibited in this manner is a reflection of brand loyalty. More empirical studies need to be done on the measures and dimensions of product differentiation.

Suggestions

Analysis of the literature shows that product differentiation is important in every company's undertaking because it enables an organization to set its products apart from the competitors' products in a way that it wins the attention and acquisition of most of the customers. Among the

key areas that the company should concentrate on when differentiating its products include product quality, branding, innovation, design, quality customer service and cost. Customers go for products that will give them value for their money. In the course of offering value to customers, organizations undertake various activities to ensure that the value is delivered in a unique and appealing way to the customers. If the customer's perceived value is met by the differentiated product, the customer will be happy with the firm's product; otherwise customer dissatisfaction will set in. A satisfied customer will in the future consider buying the product from the same organization. Other likely behavior that the customer will exhibit include speaking well about the product, giving business referrals, patronizing the brand, paying a premium price, etc. If the customer consistently exhibits all or some of these behavior, it will lead to brand loyalty. This justifies why firms should consistently aim at differentiating their products to ensure that they attract customers and while offering them value that they expect.

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Innovative Approaches for Promoting Resilience, Inclusion and Access to Education Amidst Covid-19 Pandemic in Kenya

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Abstract

Education has the potency to not only initiate but sustain change for development of an individual and the society at large. As such, education needs to be accessible and inclusive to all members of society regardless of their social and economic status. Education that is accessible to all, has the potency to usher in unending returns and benefit to individuals and society at large. Kenya has recently commenced implementation of competence-based education curriculum which is geared towards empowering her citizens with innovative skills and competencies for development of self and society. Nevertheless the outbreak of COVID-19 pandemic, education in Kenya has been in an awkward and precarious situation in terms of access and inclusion by all learners in the country. Numerous initiatives have been adopted by governments to mitigate the spread of the pandemic as an immediate solution to the pandemic. This paper explores various innovative approaches that educational institutions, communities and the government can institute in order to increase access and promote inclusion of all members from different societal backgrounds and essentially build resilience and promote retention and completion amidst pandemics which have become more of a norm than exception. The proposed approaches will revolve around individuals, communities and society to identify and customise good practices that can be able to sustain resilient against COVID-19 and other related pandemics.

Key words: *access, education, inclusion, innovation, pandemics, resilience.*

INTRODUCTION

Background to the study

Education is a major human right and the foundation for every society. In 1948, discrimination in education was solved by recognising education as a basic human right (UNESCO 1960). UNESCO GEM Report II, 2020 states what governments must do to enhance equality of treatment in education. According to GEM report, 2020, 17% equivalent to 258 million of children globally have not had the opportunity to access education despite the fact that education has the potential to transform lives. Education is both a fundamental human right in that it aids in realisation of other human rights. Education is seen to be primary driver on aspects of progress across all seventeen Sustainable Development Goal and a global common good (UN Policy Brief, 2020). To date, education has continued to be seen as an important instrument in driving progress towards sustainable development (commonwealth-educationhub.net). The Sustainable Development Goal 4 adopted as one of the 17 SDGs addresses education in as far as inclusive and equitable quality education is concerned as well as promotion of lifelong opportunities for all. In this regard, member states are obliged to develop mechanisms that will enhance access to quality education to all, irrespective of position, gender, race, colour, physical and economic abilities in times of normalcy as well as in adverse conditions.

As a result of the COVID-19 pandemic the largest disruption of education in history has been witnessed. The disease has affected education systems and has become a real challenge to

children, parents, sponsors as well as government. 94% of learners worldwide were affected by the pandemic by mid-April 2020, representing almost 1.58 billion children and youth, from pre-primary to higher education, in about 200 countries (UN Policy Brief, 2020). This resulted in a near universal impact on learners and teachers around the world, from learning establishments.

In Kenya, the extended school closure due to COVID 19 has significantly affected the education system. The pandemic has deeply aggravated school system and social inequalities in the country (Njenga, 2020). To contain its spread, the Kenyan government closed all learning institutions countrywide on March 15th 2020. Data from Ministry of Education (MoE), Kenya, shows that the pandemic affected both the basic and tertiary institutions resulting in the closure of about 30,000 primary and secondary schools being closed indefinitely to mitigate the impact of COVID-19. This closure of schools was unexpected and affected about 18 million learners and over 310,000 teachers countrywide threatening the education gains made in the last few years and the implementation of a new the new education system and the Competency Based Curriculum (CBC). Major effort to counter the effects the school closings have had to be put in place to mitigate the effects of this closure such as to learning loss, increased dropouts, and higher inequality (MOE, 2020). Even before COVID 19 crisis, learners especially those from low-income families, children with disabilities, children in marginalized communities, children from refugee camps and internally displaced places and children in conflict areas had lower education and social outcomes as compared to their peers and were already facing barriers to participating in education and learning (UNICEF, Europe & Central Asia 2020).

It is clear that the right to safe, quality, inclusive and equitable education has to continue even during the times of emergency. The results of long and prolonged school closure will be felt in future as many of the children and youth may be unable to attend school and more likely never to return, especially girls and those from low-income households. 1.6 million learners depend on Government supported school meals program. Girls in public upper primary schools benefit from the government by accessing sanitary towels through the Government's sanitary towels programme. Such learners may be affected by the school closures due to COVID 19 (MOE,2020). To Mitigate lasting repercussions to learners, families and the society in both social and economic terms, the government and communities need to rise to this situation. The government should address drivers of social exclusion such as low income, ill health, social capital housing unemployment, and local networks.

This paper presents some innovative approaches that may be used to initiate, promote and sustain resilience in education at individual and community sphere in the wake of COVID-19 pandemic and other pandemics that continue to bedevil education and society. Africa and indeed, Kenya has had its fair share of the COVID-19 pandemic where schools have remained closed, curriculum left uncompleted and time lost to graduate students from one level to another and young boys and girls dropping out of school to help parents look for food while young girls are married off early due to economic hardships brought about by COVID-19 pandemic among other pandemics. Due to limited resources, many countries in Africa have low testing rates which undermine continental efforts in the war against the pandemic (Soy, 2020). This suggests that innovative and inclusive approaches in matters education need to be seriously rethought to help anticipate pandemics, take appropriate actions to mitigate the pandemic to reduce its severity,

develop systems to manage the pandemic and ensure that there are adequate activities or programmes to retain the condition to a level that is acceptable to community.

Education is a value laden enterprise that has the potency to not only provide sustainable solutions but also resilience against the challenges posed by unending pandemics human history. Globally, prosperity, modernity, civilization and peace in every nation is anchored on the quality of content in innovative knowledge, values and skills contained in her education. Education content has the potency to change mindsets and negative attitudes that stand in the way to achieve development in embracing innovative ideas that can enable individuals and communities to promote healthy living and enable longevity of life. Education can enable individuals and communities to explore and adapt innovative traits within their means to promote resilience against COVID-19. Education has the transformative content that can initiate and sustain a paradigm shift to empower individual, communities and societies to bounce back when faced by catastrophes and calamities. Education promotes training and research that midwifes innovative knowledge, values and skills that are potent tools for humanity to fight diseases and pestilences to safeguard gains made from development and modernity. Education that is loaded with accurate scientific content on COVID-19 has the potency to outdo false information, fallacies and conspiracy theories that have led to increase resistance and hesitancy to vaccines against COVID-19 (Geopoll, 2021). Human beings by nature are creatures who enjoy the benefits of education for survival in the face of pandemics. Indeed, from the cradle of humanity, every pandemic that accosted humanity has been outsmarted through education that promotes resilience and tenacity to ensure livelihood and sustainability. Education on the what/why and how brings forth innovative knowledge and resilience which are quintessential tools in the war against pandemics. Education that is inclusive, accessible has the potency to promote values, skills and knowledge that can be used as weapons to combat pandemics that accost humanity.

The Kenya government like other global governments underscores the need for innovative Education to promote and sustain development of her citizens and communities by empowering them to acquire essential knowledge, skills and values for self and national development. Education is a tool for prosperity of individuals communities and nation at large.

Statement of the problem

The potency of education to provide innovative solutions that promote resilience in any society to overcome any pandemic cannot be gainsaid. The COVID-19 experience has taught individuals and communities about hard lessons on resilience and adaptability to not only endure deep but enduring humanitarian crisis that threatens lives and livelihood across the globe. COVID-19 has caused untold suffering to global education community, Kenya included. COVID-19 experience in education sector has taught individuals and communities hard lessons on the need to put in place systems and programmes that can enable education systems, organizations or businesses to withstand any form of disturbance, undergo changes and yet be able to retain the same functions, structure and identity in the face of ongoing disturbances or pandemics. Lockdowns, prolonged institutions and county closures, containment measures put in place to slow down the spread of the virus have had immediate and long-term ramifications to education as a social institution in Kenya; where inclusion, access, retention and completion have adversely been affected. Based on the understanding that COVID-19 has taken a huge toll of disturbances on education there is need to continuously explore and landscape inclusive, innovative, proactive and reactive

strategies that can be used to promote resilience to safeguard access, retention and completion of education by learners amid vagaries of COVID-19 and other pandemics. The paper proposes innovative approaches that could be deployed in education systems to enhance resilience, access and inclusion in education even during a pandemic.

Research objectives

This study sought to; interrogate innovative strategies to promote and sustain resilience among educational stakeholder in Kenya, explore innovative ways to promote access, inclusion, retention, completion in education amid COVID-19 in Kenya and explore innovative strategies to promote individual and community resilience amid COVID-19

Significance of the study

This paper landscapes proactive and reactive innovative strategies to promote resilience, access and inclusion in education during COVID-19 and other related pandemics that continue to devour gains made in sustaining and promoting access, inclusion and completion in education. The innovative findings, conclusions and recommendations suggested in this paper can be used to initiate and sustain resilience among stakeholders in education industry to outsmart novel COVID-19 pandemic and others.

LITERATURE REVIEW

The reviewed literature is organized thematically on three broad areas: access, inclusion and finally innovative approaches that can be devised to prepare, mitigate, adopt or adapt any form of disaster and bounce back despite all odds.

Access to Education

Universal access to education is basically the mechanisms in which educational institutions strive to ensure that students have equal and equitable opportunities to take full advantage of their education (www.edglossary.org; 2021). At Independence, many African countries saw Education as the means to help eradicate poverty, ignorance and disease (Kenya). To date, education has continued to be seen as an important instrument in driving progress towards sustainable development (commonwealth-educationhub.net).

Kenya like other nations of the world acknowledges that Education is vital to her socioeconomic development and the right to education is enshrined in her constitution and supported by various legislations. The Constitution of Kenya (2010) article (43.1.f) obligates the government to ensure that “every person has the right to education” while article (53.1.b) obligates the government to ensure that “every child has the right to free and compulsory education”. Further the constitution avers that “a person with any disability is entitled to access educational institutions....” (Article 54.1.b) and the state is obligated to put in place “affirmative action’s programs to ensure that youth access relevant education and training” (Article 55). In addition article 56 obligates the government to ensure that “marginalized groups re provided with special opportunities in education”. The Children’s Act (2001) equally reiterates the above clauses by stressing that “every child shall be entitled to education the provision of which shall be the responsibility of the government and the parent” (Article 7.1). Hence, the need to explore innovative ways of promoting resilience in education amidst COVID-19 to empower individuals and communities in the war against COVID-19.

Despite above interventions, the Education system is still bedevilled by widening inequalities in access. Gender disparity in the education sector has been exacerbated by the outbreak of Covid-19. A UNESCO (2020) report by the Institute for Statistics, points out that large gender gaps exist in access, learning achievement and continuation in education in many settings. The prolonged closures of schools during COVID-19 pandemic and associated economic challenges has led to a sharp rise in teenage pregnancies as well as early marriages. Globally statistics point out that 1 in 4 women are married off as children thus having a negative impact on gender equality in learning and teaching. Though teenage pregnancies have always been there in Kenya, the issue has shown a steady and a dangerous rise during COVID-19 period (Ajayi & Mwoka, 2020; Moraa 2020) thus contributing to high levels of school dropout levels. This will affect learning as the young girls take up a dual responsibility at a very early age which will affect academic performance.

These statistics should be of great concern to education planners who should be challenged to think creatively and innovatively to address this disparity and ensure education for all is a reality.

COVID-19 pandemic has amplified in a significant manner the pre-existing inequalities of the gender digital divide in education. Several studies on use of internet (Diogo, et al., 2020; Melhem *et al*, 2014; UNESCO, 2020) have established the continuing digital divide in access and use of information communication technologies thus limiting access to education by women and girls particularly in developing countries and hence deter women's absorption and adoption of ICTs to access information and knowledge" (p.22). They continue to add that in some cultures such centers are often not open for women. To ensure equality of access to education for all despite the various unfavourable environment, socioeconomic and cultural conditions, governments must work out ways to control these.

The outbreak of COVID-19 pandemic and resultant use of online teaching and learning has contributed to a great challenge in access to education due to a number of factors such as poverty, socio-cultural factors as well as ignorance. In Kenya, a study by Azizi Afrique Foundation (2020) to access continuity of learning as well as the vulnerability of learners in poor households across Bungoma, Turkana and Tana River Counties, Kenya established that ownership of gadgets for remote learning was a great impediment. Only 20% and 8% owned a radio and a TV respectively. Access to education to special needs learners is amplified during periods of adverse conditions. The situation is aggravated due to the diversity of users with special needs who normally encounter a variety of challenges to access education but in times of a pandemic like COVID-19 the situation becomes worse.

Inclusion in Education

Inclusion is a term that means a process or act of including someone or something as part of a group or list (Cambridge Dictionary) and becomes part of it. In the education arena it is education that incorporates everyone with non-disabled and disabled children learning together in mainstream schools. Inclusion in education focus on including all children with/out disabilities so as to promote greater social change. Initially inclusion in education was focused on including children with disabilities but it has changed and become much broader in its interpretation. The main focus now, is greater social change and restructuring of schools to accommodate all forms

of diversity. All learners need to be included in education, both boys and girls regardless of their linguistics and ethnic diversities.

Other groups of learners include those from rural populations, the marginalised, learners with disabilities for instance those with difficulties in learning. An 'inclusive and equitable' education is at the core of the SDG 4, that aids to achieve "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Inclusion can enable every child, youth and adult to learn and fulfil their potential as it is the foundation of good quality education. The global community targets achieving right to quality education for all adolescents and children by 2030. Issues such as location, poverty, disability, gender, age, ethnicity, indigeneity, or displacement status, incarceration, language, religion, migration beliefs and attitudes should not be reason of exclusion of any learner from quality and relevant education (UNESCO GEM report, 2020).

The COVID-19 crisis has put SDG 4 and other international goals on education into jeopardy more than ever before. Beside the already existing exclusion factors, the pandemic has added another form of exclusion in relation to accessibility of distance learning opportunities, as it is seen to affect the new categories of the population. The COVID 19 crisis has sliced opportunities for many of the most vulnerable youth, children and adults – those living in poor or rural areas, persons with disabilities, girls, refugees and forcibly displaced persons – to continue their learning and aggravated the pre-existing education disparities. Learning losses as result of this crisis threaten to extend beyond this generation and erase decades of progress (UN Policy Brief, 2020).

Online learning and challenges

Though the Kenya Institute of Curriculum Development (KICD), has tried to engage learners and mitigate loss of essential learning time, by stepping up key measures needed to facilitate teaching and learning processes through different platforms such as radio, ed-tech apps, the Kenya Education Cloud, TV, and mobile phones access and inclusion has continued to be a big issue. The Kenya Education Cloud is the home of interactive digital content, radio lessons on demand, textbooks for all levels, to serve learners and teachers, and online courses on curriculum implementation and use integration of ICT in learning for teachers (MoE Sessional Paper, 2019). All these are effective modes of learning but only a few students who have access to computers and smart phones at home, appropriate technology may benefit from them.

Learners from most rural communities who lack electricity and smartphones and those with low literacy levels and limited education resources may not benefit much from E-learning as those from urban areas. Therefore, online learning may result in the exclusion of many rural and marginalized children in remote villages including those in refugee camps as well as those living with various disabilities including learners who have poor digital skills and the least access to the hardware and connectivity required for distance learning solutions implemented during school closures. Most of these children are among the most vulnerable and may lose learning due to the school closures (UN Policy Brief, 2020). Despite the high advocacy for learning solutions loaded on radio amidst the COVID-19 Pandemic, ownership of radio in arid and semiarid areas in Kenya is below 30%, which is a major challenge for learners in continuing with learning. In addition, TV ownership in arid and semiarid areas is less than 10%, 15% for smartphones while

18% of the households do not even own a mobile phone. This points to further learning vulnerability for learners in arid contexts in the wake of the pandemic. All this suggests, learners in arid and semi-arid areas are likely be left behind by those in other areas unless deliberate measures are not put in place to accelerate inclusive learning (Zizi Afrique, 2020).

Online learning and radio learning cannot replace classroom learning as it is only intended to supplement knowledge that children already have and therefore, learners who are already behind cannot benefit effectively from these modes of learning (Kathula, 2020). This may further create a wider gap in relation to education inequality, inclusivity in education, equity and access in education (Njenga, 2020). This paper focus on measures the government and other stakeholders can put in place to not only mitigate a pandemic but to prepare in advance, put measures in place, adopt or adapt to the disturbance and eventually come out stronger than before.

STUDY METHODOLOGY

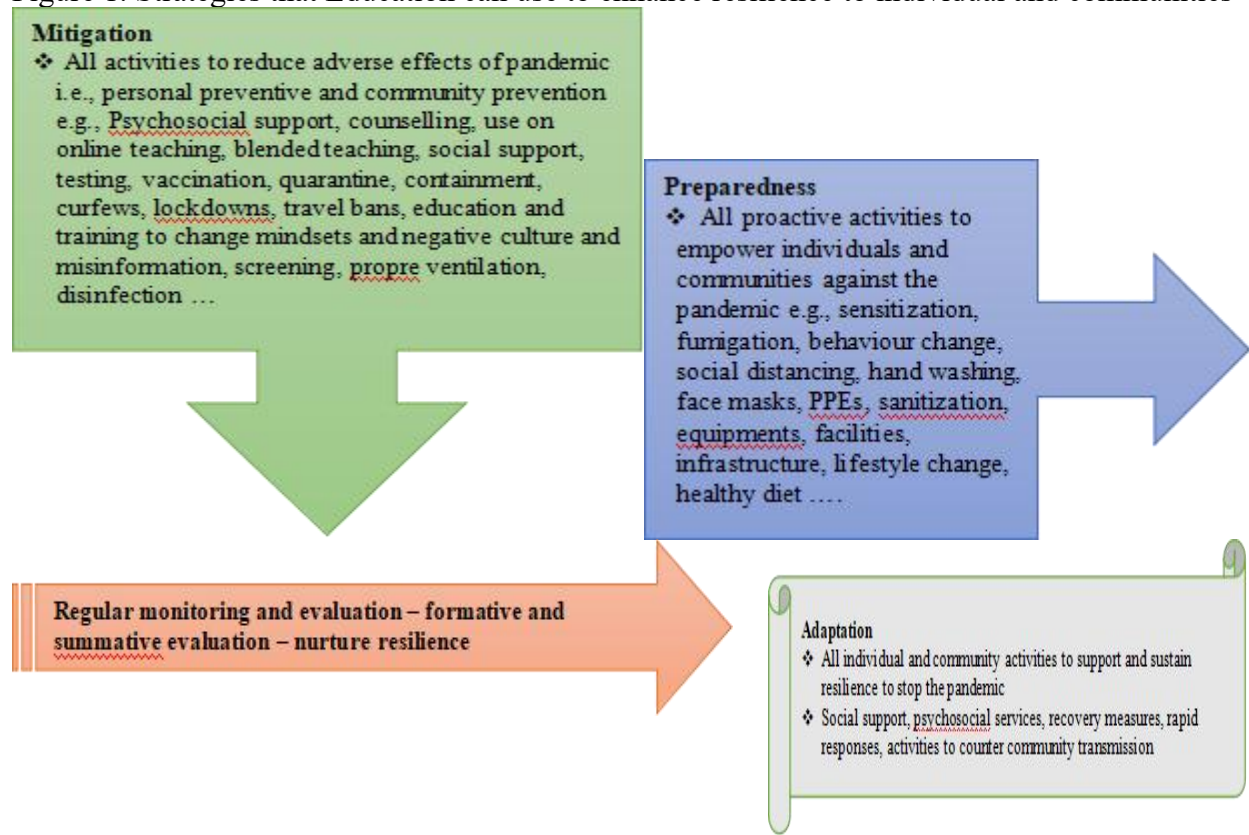
The study used descriptive survey design to conduct incisive landscaping of available peer reviewed published articles, abstracts, policy documents and other relevant references. This is critical to document proactive and reactive innovative strategies to promote education and educational stakeholders in Kenya in the era of COVID-19 to safeguard gains in access, inclusion, retention and completion in education. The centrality of education to resilience among stakeholders and government is quintessential in times of crisis and pandemics.

The concept of resilience

Pandemics by their nature, scope, ferocity and aggressive nature require resilience that is inclusive in terms of individual and communities to explore opportunities available to fight the pandemic.

The conceptual framework

Figure 1. Strategies that Education can use to enhance resilience to individual and communities



In figure 1, in order to ensure proactive resilience, preventive measures such as advocacy, sensitization and induction for capacity building on issues related to COVID-19 prevention. In addition, use of personal protection equipments (PPE) such as face masks and other recommended protection equipments for members of school community and fraternity need to be used.

Findings on innovative models and approaches in promoting resilience

Stakeholders' engagement

Wide stakeholder's engagement at all levels and at all steps of planning cycle in education is critical to promote resilience, access and inclusion in education amidst COVID 19 pandemics especially in times of uncertainty. All stakeholders, students, teachers and parents and local communities have to be involved in the planning and execution of education goals. Local communities need to be empowered to make their own choices about education, nurturing local contexts and building an innovative school practices. Scenario planning may be necessary for the next one or so depending on the evolution of the pandemic planning, revising plans regularly and early mobilizing human resources as situations evolves become key. In uncertain times, ensuring strategies and plans are well understood by users, stakeholders and beneficiaries is of utmost importance. There is need to ensure continuous monitoring on how proposed measure are implemented and perceived by students, teachers and parents and education community. As a community-based initiative caregiver will be given a voice to be heard and knowledge management platforms will be developed where innovative ideas, success stories, lessons learnt are captured for dissemination. Use of existing initiatives such as 'nyumba kumi' will ensure

that scarce resources will be shared among members within these households and reduce the gaps in education. Heads of neighbourhoods to be empowered and motivated to monitor progress. Resources distribution will be easier and issues of congestion dealt with. Meetings will either be in open spaces within the neighbourhood and where learning facilities are provided to ensure equality of access to education for all despite the various unfavourable environment, socioeconomic and cultural conditions. The government of Kenya need to expand the existing remote learning opportunities for learning continuity for all students in basic education in primary and secondary school through the Stakeholder Engagement Plan (SEP) in order to support access and delivery of online content to all students, (MOE, 2020).

Support for parents

To promote resilience, access and inclusion to education it is necessary to support parents in the engagement of their children in schooling. Studies have revealed that parents, have found themselves involved in supporting learning during the pandemic shut-down irrespective of their level of education. Learners from less developed households face several challenges such as poor living conditions, economic stress, and low education levels of parents, including lack of digital skills, which makes it difficult to benefit from digital content even when they can access it. According to UN Policy Brief, (2020), children from lower socio-economic backgrounds are more likely to lack parental support during school closure, access to quiet room, and other reading opportunities. A stable environment and learning support needed to adapt to these new modes of instruction was reported to be lacking in most of these learners. This implies parents require alternative support structures such as community-based teachers to mediate the literacy gap for those households without a literate adult. (Zizi Afrique, 2020). Digital literacy should be declared our motto right from ECD level of education up to university. Children should be introduced to tablets early enough and teachers provided with laptops as tools of their work. The slogan should be “One Child One Tablet “.

Innovative community approaches to promote resilience

COVID-19 had taken aggressive community transmission where the novel variant is spreading fast. This unprecedented nature of spread requires communities to adapt various innovative strategies to promote resilience. Education has the wherewithal to ignite broad and collective innovative community approach to promote resilience against pandemic using resources and ideas available. Education can break negative mindsets and barriers that prevent either prevent ability, agility and resolve to adapt to preventive paradigms that accommodate change to prevent the spread of the COVID-19 pandemic. Studies have observed that agility and flexibility to adapt bold, decisive action to embrace out-of-box solutions because unprecedented times call for unprecedented actions (Research report, 2020). This is critical since voracity of COVID-19 is self-evident due to its rapidly mutating tendencies. The resilience of the community may be enhanced when the subsystems, infrastructures, economy, civil society and other social service providers to mobilize the community to prevent and combat rapid spread of the pandemic (Carison et al., 2012). Education and awareness campaigns on behaviour change communication needs to sensitize communities that when containment measures are eased that the virus has not sopped but it's a temporary reprieve to open the economy; so individual and communities need to proactive preventive measures every time everywhere.

Innovative measures that school communities can use to enhance resilience

Education is one of formal social institution in human society and schools are social institutions through which schools socialize socializees to acquire values, knowledge and skills that can enhance individual and collective resilience to avert pandemics. Since COVID-19 has taken community transmission which leaves us with us with not safe places then schools have to assume their social responsibility to inculcate proactive and reactive measures to combat the pandemic by including the content on education about the virus. Schools need to use up-to-date scientific knowledge about the ABC of novel virus to teach and train learners on the what/why/how so that can enhance their individual and collective resilience. Pathways and opportunities that schools can use include school assemblies, parades, integration and mainstreaming of COVID-19 content in teaching content in all subjects in various languages that are used in curriculum. Schools can also use local dialects and languages to sensitize local communities in and around the school peripheries. Schools need to use teachers and fellow students to provide psychosocial support to each other and share experiences to learn collaboratively on handwashing, social distancing, screening, testing, using empty spaces in schools and neighborhoods keep safe. School can train pupils on how to improvise masks, handwashing soaps and other resources that can help to preventive rapid spread of the virus. Inclusive strategies to combat the virus need to involve everyone including persons living with disabilities. Teachers can use transparent masks to enable learners with hearing challenges to benefits from teaching and learning. Schools need to train and teach pupils how to grow and prepare to eat health promoting foods to boost immunity of the body to fight any infections.

Accelerated learning

Accelerated learning modes such as simplifying the planned curriculum to accelerate learning can promote resilience, access and inclusion to education amidst COVID 19 pandemics and support recovery when learning loss is likely to have occurred for entire cohorts. Sierra Leone used a simplified and accelerated curriculum to cover two academic years in one year following the Ebola pandemic. This experience of Sierra Leone suggests that accelerated learning can help get students back on track, facilitate quality catch-up with a simplified curriculum of select core components to cover thoroughly in the time available. Therefore, accelerated curriculum can help recover lost learning time. (Carvalho et al, 2020). Zizi Afrique jointly with the Ministry of education, Kenya and county-based community organizations has been implementing the Accelerated Learning Program (ALP) in Bungoma, Tana River and Turkana since 2018 targeting learners lagging behind in foundational literacy and numeracy skills, selected from grades 3 to 5 aimed at equipping them with skills to ‘read with understanding’ and ‘reason with numbers. Zizi Afrique found out that in only 30 days, more than half of the learners acquire the desired level of proficiency in foundational literacy and numeracy (Zizi Afrique, 2020).

Innovative psychosocial support

In order to promote resilience, access and inclusion to education amidst COVID-19 pandemics, all learners, teachers and parents require psychosocial support. The government need to plan and develop flexible national education systems, to give teachers and caregivers the right support to deliver distance learning and maintain adequate funding even to the vulnerable children to ensure none is left behind. By conducting mentorship and psychosocial counselling service programs for the psychologically and socially affected members of the school community as well as strengthening of guidance and counselling departments and programmes in schools through building the capacity of teachers and instructors in life skills, guiding and counselling to

efficiently respond to variations in social behaviour, the Ministry of Education will make education more inclusive. MoE plans to enhance collaboration with Department of Children Services to promote safety and protection of children to increase awareness of reporting protocols for incidences of child abuse and neglect (Kathula, 2020). To support student's transition back to school, ensure safe school environments, and provide remedial learning activities, teachers have to be equipped and trained with the right skills to facilitate remote learning (Carvalho et al, 2020). The government, through the Stakeholder Engagement Plan (SEP), 2020, intends to train teachers in interactive remote learning pedagogies. It entails supporting capacity building of teachers in online and distance learning pedagogies to ensure teachers play a role of supporting remote learning. Teacher training interventions builds on the existing trainings for teachers for the digital learning programme (Digi school) conducted by Ministry of ICT, Information and Communication Technology Authority (ICTA) and TSC where over 92,000 teachers in early grades were trained.

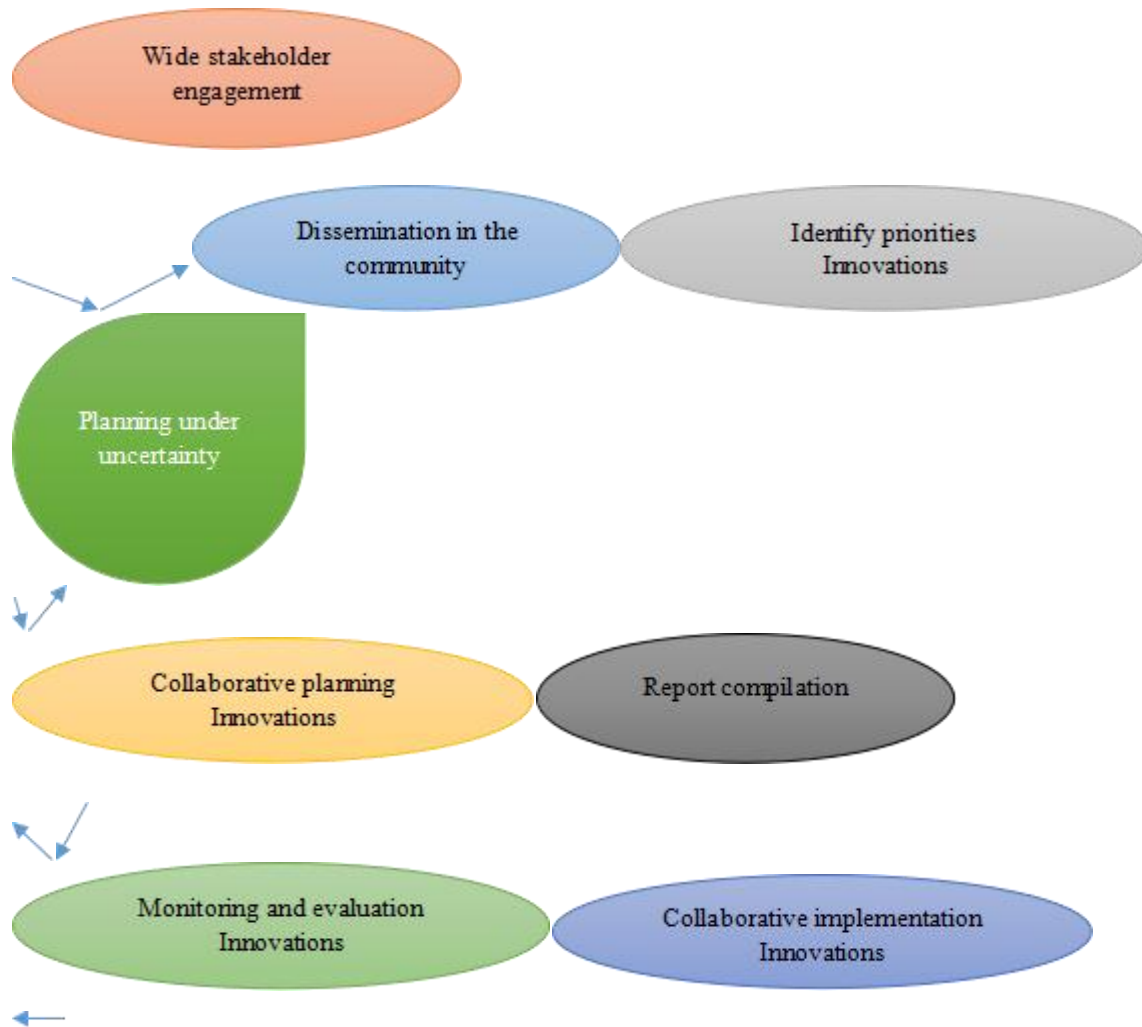
Open access

Another approach to promote resilience, access and inclusion to education is to enhance open access to education resources. To enhance open access the government needs, enhance learners and educators have accessibility to open education resources, do away with online and copyright restrictions tied to online learning resources and other materials. Publishers and authors, in some countries like New Zealand and Australian, came up with exceptional measures that aided libraries to provide educational content and allow for virtual public readings of their materials from classroom settings and libraries.

Innovative planning with active stakeholders' engagement during COVID-19

All stakeholders, students, teachers and parents and local communities have to be involved in the planning and execution of education goals. Local communities need to be empowered to make their own choices about education, nurturing local contexts and building an innovative school practices to combat COVID-19 and related pandemics. Scenario planning may be necessary for the next one or so depending on the evolution of the pandemic planning, revising plans regularly and early mobilizing human resources as situations evolves is key. In uncertain times, ensuring strategies and plans are well understood by users, stakeholders and beneficiaries is of utmost importance. There is need to ensure continuous monitoring on how proposed measures are implemented and perceived by students, teachers and parents and local community

Figure 2 shows innovative collaborative planning model in the context of uncertainty



The innovative collaborative model planning model in figure 2 can be effective with involve of all stakeholder in any local community where the school is located. Collaborative efforts of the community with synergize community and individual resilience towards fighting the pandemic. The collaborative approach in community education is inclusive and participatory which makes effective in promoting resilience amidst pandemics.

Studies have demonstrated that education that promotes curiosity and mindsets that are open and willing to explore new opportunities and pathways among individuals and communities to solutions enable innovative answers and solutions that promote the best course of action that may address local challenges and problems created by the pandemic (Research report, 2020).

CONCLUSION AND RECOMMENDATIONS

The review has come up with a variety of innovative individual, whole school and community approaches and strategies to initiate, promote and sustain resiliency amid COVID-19 and related

pandemics through Education. Education has the wherewithal and transformative preventive and curative measures to avert excess of COVID-19 and other pandemics. Education had the content, skills and pedagogy to avert pandemics by empowering individuals and communities on how to survive and live amidst challenges posed by novel COVID-19 and related pandemics. The onus is on governments as the custodians of lives of her citizens to mobilize human, capital resources to ensure sustainable resilience is in place among individual and communities to social good and survival of humanity, which education loaded with innovative content on COVID-19 and related pandemic is quintessential.

There is need to mark all places in the school to promote social distancing. Social distancing needs to be observed in transport vehicles that ferry students to and from school. In all school facilities everyone needs to observe safety measures to immunize human contact. Regular temperature taking needs to be done. Schools and communities need to come up with innovative policies guidelines on prevention of COVID-19 and socialize members of their fraternities to observe them. Regular monitoring and evaluation (M/E). Schools can sensitize parents in the immediate communities to observe safety measure at home.

The war against a pandemic ought to be inclusive and everyone is equally predisposed to the virus. This implies that each of us in every community is predisposed to COVID-19 infection, hence a need to empower each with innovative preventive education about the virus to prevent, slow down or stop infections altogether. Occasional resurgence of highly transmissible variants of the virus in deadly waves has indicated that occasional closures, containment measures and partial lockdowns in some regions are inevitable to slow down the aggressive spread of the virus. These and other proactive measures can be instituted where need arises to secure gains in the war against aggressive variants of COVID-19.

Pandemics like COVID-19 that are smart and tricky require extraordinary measures aka abnormal treatment where all arsenals need to be mobilized on target. The government being the overall custodian of national interests and protection of all can mobilize and marshal different players in society to create multiple battle fronts to educate and train individual and communities on various initiatives to outsmart the virus. This is critical because the pandemic has taken community transmission where every section of community and society is a battle zone to combat this invisible enemy and every innovation counts.

The government can prevail and mobilize different types of mass media channels to disseminate preventive and promotive public health education content through electronic and print media in different languages to promote inclusion and access to preventive knowledge and skills that can be used in various community settings to prevent the spread of the virus. The media can use media creativity and innovation to create various innovative products loaded with health content on the virus and preventive strategies that can be used to educate and train members of public on finer details of the evolving virus.

The government at national and county level can proactively guide communities and institutions to proactively identify preventive measures and opportunities that can be adapted to protect the spread of the contagious virus. Innovative measures can use the available resources, safe spaces to adapt to scientific preventive measures guidelines by ministry of health.

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Implication of Climatic Change on Sustainable Environmental and Natural Resource Management in Africa: Individual and Collective Responsibility

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Abstract

The impact of climate change is quite evident: Increasing aridity, disruption of livelihood in term of food and drinking water supply, risking the collapse of marine eco-systems, food insecurity, Arctic melting, loss of glaciers, Amazon and Siberian fires, droughts and floods. Several studies analyzing the content of scientific articles on climate show that almost all articles that take a position on the causes of global warming support the scientific consensus that global warming is due to human activity. This is explained first of all by the use of fossil fuels, and secondly by the balance of emissions from changes in land use. The ocean has absorbed about 30% of human made carbon dioxide emissions which has led to acidification of the waters. Global warming relies mainly on the greenhouse gas emissions, which are currently increasing. There is need to redesign our curricula and demand that ecology be at the Centre for the curriculum today at all educational levels; young people need to be taught about the urgency, severity and scientific basis of the climate crisis. Unless we make a paradigm shift in our curriculum design and development and also change our lifestyle, we risk suffering the worst impact of climatic change aforementioned. The paper is a review of both theoretical and empirical studies on impact of climate change in Africa. It brings to the limelight the global views of this impact in Africa. The paper contributes to new knowledge by suggesting the need for the African nations to collectively take responsibility to address the impact of climate change by recommending a Pan African Ecological Curriculum.

Key words: *Collective Responsibility, climate change, Pan African Curriculum, African Nations,*

INTRODUCTION

Climate change is a global phenomenon and has been identified as a leading human and environmental crisis of the 21st century and is rooted in the human interference with mother nature mostly for economic purposes (Singh & Shishodia,2007). Francis (2015) explains that marine life in rivers, lakes, seas, and oceans, which feed a great part of the world's population, is affected by uncontrolled fishing, leading to a drastic depletion of certain species and the livelihood of the poor. The adverse impact of climate change is experienced in developing counties and specifically in Africa evidenced by; increased aridity, disruption of livelihood in term of shortage of drinking water supply, risk of the collapse of marine eco-systems, food insecurity, loss of glaciers, droughts and floods among others (Religious of Assumption Newsletter 2020; Sing & Shashikala 2007; Awojobi, & Tetteh 2017; Iregbenu, Uzonwanne, & Nwogwugwu, 2014 and Francis 2015).

The paper reviews both theoretical and empirical studies with the main objective of bringing to the limelight the impact of climate change in Africa and what African nations ought to do in order to address the challenges of the climate change. The paper specifically appeals to the African nations to collectively address the adverse effect of climate change and improve the livelihood of the poor people in the continent without heavily relying on the foreign aid. This

paper adds to new knowledge by suggesting the need for the African nations to make a paradigm shift from their individual curriculum to a Pan African ecological curriculum where all the young people in Africa at all educational levels will be taught about the urgency, severity and integration of scientific and traditional methods to address the impact of climate change. The paper is keen on showing that through participatory spirit and wisdom from the African scholars, the African nations have the potential to mitigate some effects of climate change in the continent.

The paper is divided into five sections. The first section reviews global literature on the impact of climate change in Africa, the second focuses on the environmental education. The third section proposes and discusses a Pan African Ecological education, the proposed content, benefits and the sustainable model. The fourth and last section provides the summary and conclusion.

Global Literature on the Impact of Climatic Change in Africa

The UNEP Report of 2012 points out that the problem of understanding climate change (or global warming) is one of the major challenges confronting African people, their governments and the African Union. Africa suffers significant threats from climate change yet it is the lightest polluter and responsible for a negligible amount of total global greenhouse gas emissions (UNDP,2018-2020, Tadesse 2010; Besada & Sewankambo, 2009). It is predicted that the temperature in Africa continent will rise by 2 to 6°C over the next 100 years and in terms of economy, the Sub-Saharan Africa will lose a total of US\$26 billion by 2060 due to climate change (Gemedu, & Sima, 2015). Predicted changes to rainfall regimes indicate that southern African will become drier, and eastern and western Africa will become wetter, with more intense rain and increased risk of floods.

Some projections indicate that 250 million Africans could face water shortages by 2020 if nothing is done – and done quickly (UNDP,2018). Further still, some economists predicted that in order to achieve “climate resilient” Millennium Development Goals over the whole continent, Africa will require US\$100 billion a year in the 2010-2020 period with approximately US\$82 billion required for standard development assistance, and an additional US\$11-21 billion for adaptation. A scenario analysis undertaken by the Food and Agriculture Organization (FAO) indicates that by 2080, Gross Domestic Product from agriculture could decline in Africa from 2 to 9%. FAO stresses that changes in agricultural practices will be required to respond to these impacts including changes to crop species, new irrigation techniques, the use of different fertilizer inputs, seasonal changes and sowing dates. It is clear that all the projections are inconsistent and unreliable

On a different note, Sigh & shishodia (2007) opine that it is not possible to eliminate land degradation altogether but it can be minimized. They assert that Prevention is far often more cost effective than rehabilitation of degraded lands. They point out that that once land has been excessively degraded, restoration cost is higher and effectiveness is low. They stress that not only is a 100 percent abatement of land degradation technically difficult but economically not viable. They ascertain that what is needed is an integration policy for management of natural resources to ensure that they address the adverse impact of climate change.

The impact of climate change has weakened Africa's capacity to grow and develop and has posed a great threat to the continent's agricultural production, food security, health, water and energy and infrastructure as evidenced by the elongated and heightened droughts in the Eastern Africa, exceptional floods in the Western Africa; reduction of rainforests in equatorial Africa; and a rise in ocean acidity across Africa's southern coast coupled with extremely altered weather patterns leading to food shortages due to crop failures and loss of livestock that has endangered rural and pastoralist populations (Tadess,2010, Awojobi & Tetteh, 2017, UNEP,2012; Besada & Sewankambo, 2009). Francis (2015) points out that tropical forests that possess the ecosystems of enormously complex bio diversity are senselessly burnt down or leveled for the purposes of cultivation to the detriment of countless species and the poor people are most affected. A majority of African people are poor and live on the front lines of pollution, disaster, and degradation of resources and land (Besada & Sewankambo, 2009).

Vulnerability of the continent to adverse impact of climate change has compelled UNEP to call upon decision makers in Africa, to help reduce negative consequences. UNDP (2018) opines that the time is now for the African nations to support bold, innovative approaches to foster low-carbon climate-resilient development across sub-Saharan Africa and the rest of the continent. This means that African nations need to become active participants in finding solutions to the impact of climate change. To address these climatic challenges, the UN Environmental Programs in collaboration with other stakeholders, is promoting capacity development for future professionals through environmental education. Francis (2015) affirms that ecological education can lead to new habits and lifestyles that can promote a new relationship with the environment and all creation and with God.

Environmental Education

Education plays a major role in alleviating environmental problems and promoting sustainability. The relationship between education and sustainable development was first officially recognized at an international level at the 1972 Stockholm Conference on Human Environment (Kawa,1991). Proper and relevant environmental education should provide appropriate knowledge and skills needed to address the adverse effects of climate change and simultaneously improve a country's economy and people's way of life. In the same vein, Wahyuni (2016) points out that education provides answers or solutions to the world's pressing conditions and problems such as those related to climate change, politics, and socio-economic as well as other issues related to poverty and sustainable development. In order for the education to yield the aforementioned outcomes, it must be well designed with relevant content and pedagogy.

Otewa *et al* (2007) in their studies on *Environment and sustainable Development: A Guide for Higher Education in Kenya Volume II* observe that since the teaching of environmental concepts were integrated in various core subjects in Kenya's school curriculum, environmental deterioration continues to amount. These scholars assert that learners have failed to comprehend the meaning of environment. This implies that the content of environmental education is probably shallow and therefore ineffective in making the students to act responsibly towards the environment. The learners may not be aware of how their individual and collective lifestyles could be impacting on environmental degradation and in the long run to climate change. Caduto (1989) similarly elaborates that ecological education includes spiritual values and the spiritual aspects of children' lives. It helps children to assimilate the symbols that are necessary for

developing an ecology of mind that will enable them to understand the earth in all of its aspects, to solve problems, and to adapt their behavior so as to create a means of living in an ecologically balanced, sustainable way. Religious of Assumption Winter Newsletter (2020) summarizes that young people need to be taught about the urgency, severity and scientific basis of the climate crisis.

Francis (2015) asserts that effective education is critical for creating awareness, enhancing values, changing people's attitudes and improving skills consistent with environmental sustainability. This means that is not enough to merely integrate environmental concepts in various core subjects as is done in the schools in Kenyan and perhaps in many educational systems in African Nations. Francis further explains that environmental education in its broad sense can achieve ecological equilibrium and is capable of producing "ecological citizens." He enumerates that environmental education needs educators capable of developing an ethics of ecology, and helping people, through effective pedagogy, to grow in solidarity, responsibility and compassionate care of the environment. He asserts that it is only by cultivating sound virtues that people will be able to make a selfless ecological commitment.

Le fay (2006) supports the idea of ecological education by explaining that *If we are to make the shift to an ecological worldview, then the principles of ecology must become the principles of education. That is, the education system must be radically redesigned using ecological principles at every level: curriculum, pedagogy, philosophy, organization, management and architecture, and in its relationships with the wider community and environment. It is not enough to teach ecology as a 'subject' in a still fragmented and industrially orientated 'curriculum'; education systems must embody ecological principles in their total design.*

The views of the scholars on environmental education clearly calls for a paradigm shift in the way environment education is delivered in general and particularly in Africa. Although UNDP is working to help African countries address the challenges of climate change through various projects, and remains the largest service provider in the UN system globally on climate change adaptation and mitigation, African nations need to take both individual and collective responsibility to understand the impact of climatic change and speedily address the climatic crisis in the continent. Relying solely on foreign and international policies with their inconsistent statistics and projections aforementioned will not help the African nations to address the adverse effects of climate change in the continent.

Anesu (2013) observes that Africa's voice in international climate change negotiations has been very limited and the continent has struggled to influence global policies to tackle its particular challenges without much success. limited financial resources have always been made available to the continent. This clearly shows that excessive reliability on the EU-funded research projects in finding solutions of the impact of climate in Africa will not help the continent to grow and develop. There is need for the African nations themselves to actively participate and be part of the solutions. The nations to affirm themselves and devise viable and affordable means to curb the impact. One of these means is drawing wisdom from the research findings from the African scholars such as the one from Egeru (2012) on *the Role of Indigenous Knowledge in Climate Change, Adaptation in the Teso Sub Region, Eastern Uganda.*

The study of Egeru (2012) examined the role of indigenous knowledge in climatic change adaptation in Uganda with specific focus on the Teso -Sub-Region. Data was collected using semi structured questionnaires, individual interviews, focused group discussions and observations of the cultural practices. The findings revealed that the Iteso people have been very good custodian of their immediate environment. The study further shows that the Iteso have acquired detailed knowledge about the functioning of their immediate environment and have been vital in responding to environmental challenges including droughts, diseases and pest infestations. Citing the Iteso as an example, Eguru explains that many traditional societies have built up knowledge over a long period about their environment and have developed strategies to recognize and cope with these changes. Unfortunately, wide applications of traditional knowledge systems in mitigation and adaptation to climate change have long been neglected in developing and implementing climate change policy. Consequently, he recommends incorporating indigenous knowledge into climate change policies and is quite optimistic that this will lead to the effective adaptation strategies that are cost effective, participatory and sustainable. Eguru emphasizes that traditional and indigenous people have valuable lessons to offer about successful and unsuccessful adaptations to climate change. He concludes that that it is important for education institutions, including primary schools, secondary schools and universities to work with communities to validate and strengthen community practices.

The study of Eguru (2012) is in line with that of Tosam (2019) which argues that it is time for African governments to start appraising and encourage the re-institution of traditional conservationist values and practices to help extenuate the adverse effects of climate change in Africa and promote sustainable development on the continent. Just like Eguru (2012), Tosam is emphatic that there is an urgent need to seek indigenous solutions to environmental crisis in Africa without compromising the much-needed development in the continent. In the same vein, Le fay (2006) ascertains that we must learn to create educational communities that model ecological communities, to devise educational structures and processes that are patterned on ecological principles earlier mentioned, that mirror the web of life.

These scholars provide insights on the kind of environmental education needed in Africa and by Africans. This will mean collective participation and solidarity among African nations to explore and come up with a common and comprehensive environmental education that will equip learners at all levels with appropriate knowledge and skills to address environmental challenges for the common good of the African continent. Unless this is done, African nations risk leaving a desolate continent for the future generations.

To come up with a common environmental curriculum will require a paradigm shift in the way African nations perceive themselves. Positive self-image will enable them to grow and develop together valuing each other's nation. This collaboration will open their eyes to realize their potentials and abilities to change the environmental face of the continent. Ahunna Eziakonwa Assistant Administrator and Director Regional Bureau of Africa UNDP is optimistic that when African Nations enhance partnership, they can tap Africa's vast resources and human talents to transform the continent and ensure a brighter future for generations to come. For them to significantly transform the continent this paper suggests that they enliven and embrace the slogan of the former US president Barak Obama of 'Yes, We Can.' They need to believe that together they can find indelible solutions to the impact of climate change in Africa. Just the way the

slogan worked for Obama, and saw him rise to becoming the first black president of the coveted United States of America, it can also work for them as the leaders of the African nations in finding solutions to the environmental crisis.

There is power in working together and in self-affirmation. In Kiswahili we have a saying that *umoja ni nguvu* (unity is power). America is the most powerful nation on earth because of the unity of the states (United States of America). African nations need to borrow good practices. What is required is collective good will of the nation so that they cease act as isolated and dim stars that shine separately. The lack of unity of the African nations has led to the detriment of these nations making them to remain at the periphery in international decision making. It is time for the nations to collectively break away from the mundane of “*twaomba usaidizi*” (we ask for aid) through their various social media whenever they are hit by environmental challenges. This paper proposes a new thinking in regard to the collaboration of the African nations in addressing the impact of climate. It proposes a common curriculum- a **Pan African Environmental Curriculum (PAEC)** at all levels of learning from primary to tertiary levels. The paper expounds on the content, methodology and the envisioned benefits for African nations in the continent.

The content of the Envisioned Pan African Environmental Curriculum and Benefits

This curriculum will be holistic and will borrow and integrate indigenous and scientific knowledge and skills in finding solutions to environmental crisis in Africa and beyond. It will be designed to cover in details the causes, effect and appropriate, practical and sustainable solutions to the impact of climate change. Topics that will be covered include but not limited to: impact of individuals’ family, friends, schools, governments and developed nations and society at large on climate change. Issues of poverty, corruption and financial management will also be covered in details and at different levels. Moral and ethical values and the link to the impact of climate change will included. Some of the ecological principles outlined by Le fay (2006) will also be part of the content; philosophy, organization, management and architecture. The curriculum will be practical and compulsory at all levels and will inculcate values in the citizens and continuously raise their awareness of how their individual and collective lifestyles contribute to the impact of climate change. Francis (2015) affirms that it is by cultivating sound virtues that people will be able to make a selfless ecological commitment that will benefit the entire society.

Teaching methods

To achieve the desired outcomes, the educators will employ different pedagogies such as field trips, research, reflection papers, demonstrations, community engagements including case studies of environment heroes and heroines from different nations to inspire people of different cadres to participate in activities that will improve the environment and consequently reduce the impact of climate change. For example, in Kenya, the case of the late Wangari Maathai an environmentalist and a Nobel laureate will serve as a perfect example of the case study Her environmental and work, largely contributed to a greater consciousness of the crisis in Kenya of climate change; and the specific challenges facing Africa (Awori, 2006). Children will be taught through stories, riddles, songs and poems and nature walk on the causes and effect of climate change. Through nature walk, they can visit different places where the environment has been cared for and where people have polluted it. learning in this way will make them individually grow up respecting the environment. They will learn good practices of planting trees

to avoid soil erosion, not to through away materials that harm the environment, the culture of recycling and many other values that will slowly but conspicuously transform the continent. The code of the curriculum across the continent will start with PAEC then the first letter of each nation for example for the case of Kenya, it will be PAEC(K). The countries that share the initial letters can use other abbreviation for identification. For example, the case of Tanzania it can be PAEC(TZ) followed by the level of the learner.

The Envisioned Benefits of the Pan African Environmental Curriculum to the African nations

This curriculum will benefit the African Nations in many ways:

- Ecological virtues will be inculcated in all the learners translating to all citizens of each nation taking responsibility to care for the environment.
- The nations will significantly contribute to solutions to the impact of climate change in the continent.
- The collective African voice will be heard in global policy formation and implementation in regard to matters concerning climate change and adaptability.
- The Nations will reduce the syndrome of over dependance on the foreign aids that for years have failed to significantly solve African problems.
- They will generate, document and avail realistic data in matters of impact of climate in the continent of Africa for future plans.
- The nations will be able to develop customized and relevant tools to monitor and evaluate the impact of climate variability.
- They will have collective decisions in coming up with budgetary allocations for the sustainability of the curriculum.
- The nations will improve their self-image and esteem to the global world because they will no longer be at the receiving end.
- The level of corruption will reduce because each nation will be made to account for the funds allocated.
- The unity of African nations will be enhanced
- The African nations will be proud of them identify
- Other nations will learn good practices from them
- The general lifestyles of all the people of Africa will improve

The Model of sustainability of the PAEC Curriculum

The paper proposes the adoption of the Savings and Credit Co-Operative Society (SACCOS) Economic Model. This is a model with many success stories in many countries worldwide. It is a transparent model that will help the nations to enhance their collaboration and remain accountable in implementing the curriculum and purchasing the required resources. The SACCO S created will specifically be for addressing the impact of climate change and adaptability. The nations will come up with modalities and logistics for evaluating the effectiveness.

CONCLUSIONS

The paper has shown that there are inconsistent projections about the impact of climate change in Africa and that most of the projections are from international and western perspectives. The paper has brought to the limelight that the African voices are largely missing in the decision

making and in projecting the impact of climate change in Africa. The paper has elaborated on the importance of environmental education in addressing the impact of climate change. The paper has used the case study of Eguru to explain the need to integrate the indigenous and scientific knowledge in solving the climatic challenges. The paper has generated new knowledge by passionately suggesting the need for designing and implementing a Pan African Environmental Curriculum through collective participation by the African in order to understand the impact of climatic change and get solutions without heavily depending on the foreign aids. Lastly the paper has outlined the benefits of the envisioned curriculum and suggested the content, pedagogies and sustainable model (SACCOS). In conclusion, the paper has shown that collective effort is mandatory if the African nations have to have a voice in the decision making in matters of climate change and development of the entire continent.

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The Role of Knowledge Sharing in Enhancing Innovation Performance: A Study of Commercial Banks in Kenya

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Abstract

Modern organizations are exposed to challenges arising due to a complex and an unpredictable competitive environment. Over the years, knowledge sharing has become a major strategic necessity that organizations require to succeed in the global business atmosphere. Knowledge as one of the most vital assets of all corporate organizations must be effectively shared in order to achieve sustainable competitive advantage. The study sought to examine the role of knowledge sharing in enhancing innovation performance amongst Commercial banks in Kenya. The study adopted descriptive survey research design. This study targeted 15 commercial banks in Kakamega County. Structured questionnaires were used to collect data targeting forty five managers who were purposively sampled. A census study was done. Data was analyzed using descriptive and inferential statistics. For descriptive statistics mean and standard deviation were used. For inferential statistics the study utilized Pearson's product moment correlation and simple regression analysis. Data was presented in form of tables. Study findings revealed that knowledge sharing had a positive and significant influence on innovation performance. The study recommends that bank managers should pay keen interest to knowledge sharing strategies in order to enhance innovation performance. The paper contributes to scholarly debate on the role knowledge sharing plays in enhancing innovation performance. The results may assist managers to facilitate knowledge sharing in commercial banks in order to boost innovation performance.

Key words: Commercial Banks, Knowledge Sharing, Innovation Performance

INTRODUCTION

Background to the study

According to Jelenic (2011) the globalized business environment has experienced changes in business conditions, liberalization of markets, high costs of production, flexible organizational structures, improved ICT and increase in partnership development. This shows that there is stiff competition and companies have been left with just a few aspects that they may effectively compete on. Tanaji (2012) posited that in a world having demanding business, a firm's competitive edge depends on its ability to manage as well as deploy its assets. The assets can either be tangible or intangible. Knowledge is an example of intangible asset of a firm. A firm's knowledge is a vital asset that guarantees its survival in a business environment that is fiercely competitive. Due to the rise of knowledge-based economy businesses have found it necessary to initiate ways of effectively acquiring and managing varying organizational knowledge. Choi, Kim, Kim and Kim (2006) posited that the production and dissemination of knowledge in

organization can add value. According to Pinho, Rego and Cunha (2012) knowledge management practices is the process of acquisition, creation, utilization, and also sharing of knowledge. Dahiya, Gupta and Jain, (2012) defined knowledge management as being a management strategy that is systematic and integrated which can improve a firm's efficiency and effectiveness through developing, transferring, transmitting, storing, and implementing. Feleagă, Feleagă, Dragomir and Răbu (2013) regarded Knowledge management as a businesses' organizational as well as technological infrastructure that enhances knowledge sharing and reuse and the business' ability to identify, manage, and also share all organizational information. According to Gray (2011) the process of Knowledge management protects assets of intellectual nature from decay, seeks opportunities for enhancing decisions, services as well as products through addition of intelligence, increasing value and also provision of flexibility.

Knowledge sharing has been recognized as a central theme in knowledge management practice and it has also been extensively researched on as it has presented a pressing as well as a challenging research issue for understanding and advancing knowledge management (Heisig, 2009; Chen & Mohamed, 2010). Hsiu-Fen (2010) explained that knowledge sharing involved to capture, organize, reuse and transfer experience-based knowledge which resides within the firm by availing it to others in the business. Knowledge sharing is the process of exchanging personal as well as organizational knowledge. Frappaolo (2006) defined knowledge sharing as a process of conveying knowledge from an individual to another, from individuals to groups or from one firm to another firm. Nonaka (1994) postulated that through knowledge sharing firms are able to integrate any knowledge that is emerging into its strategic development. Knowledge sharing can enable firms to create new knowledge and also develop new products at a lower cost and even at a faster rate than competitors. Hawamdeh (2005) alluded that knowledge sharing resulted to new knowledge creation and innovation that would enhance organizational performance. Geiger and Schrevogg (2012) pointed out that sharing of knowledge was critical in using and leveraging of knowledge resources which were considered as being vital resources by most organizations. Bhatt (2001) Cyr and Choo (2010) identified factors that affected knowledge sharing in organizations such as organizational culture, Individuals attitudes and values towards knowledge sharing and the technology utilized to share knowledge. Knowledge sharing leads to firm success through faster deployment of knowledge to specific parts of the firm that can benefit from it in a great way (Syed-Ikhsan & Rowland, 2004). Andrews and Delahaye (2000) ascertained that knowledge sharing could result to individual and organizational learning. Bartol and Srivastava (2002) noted that it leads to creation of knowledge, organizational learning and even to improved performance. According to Foss (2009) and Foss and Husted and Michailova (2010), knowledge sharing fosters a person's problem-solving ability, resulting to superior knowledge-based capabilities as well as better performance outcomes within an organization. Knowledge sharing establishes a link between an individual and the firm as knowledge is transferred from the individual to the firm level which can create economic value and be a source of competitive advantage (Hendriks, 1999). Davenport and Prusak (1998) reiterated that it was necessary to develop strategies for spontaneous knowledge exchanges with special emphasis on informal relations.

Vision 2030 for financial services is to create a vibrant and even a globally competitive financial sector in Kenya resulting to job creation and also promoting savings in order to finance the overall financial needs (GOK, 2013). Banks play a crucial role in the economic development of

nations and according to Kariuki (2015) they have been envisioned to deliver an economic growth rate of 10 percent per annum. Commercial banks provide payment services as well as financial products which enables households and organizations to take part in the wider economy.

Problem Statement

In Africa, the banking sector's stability has been threatened due to the likelihood of a sharp increase in non-performing loans (Tyson, 2020). The COVID-19 shock has posed downside risks to the credit profiles of banks in Kenya. Moreover, competition is so intense in the banking sector and it has been noted that banks come up with products that are imitable leading to the products being copied by competitors and being modified (Omondi, Rotich, Katuse & Senaji, 2017). Competition may be due to increased level of innovations amongst players and the threat of new entrants into the arena. Banks must identify strategies to assist them to stay on top of competition. This study assumes that through knowledge sharing as a strategy banks can enhance their innovation performance.

Studies on knowledge sharing have been done in diverse industries such as manufacturing firms (Kombo, k'obonyo & Ogutu, 2015, Naisiae & Gitari 2018), Software Outsourcing Vendors (Yang, 2011) and legal firms (Nguthari & Kwasira, 2015). Further an array of studies done have also established that knowledge sharing is significant with regards to different organizational performance aspects such as individual and organizational learning (Andrews & Delahaye, 2000, Bartol & Srivastava, 2002); Knowledge creation (Bartol & Srivastava, 2002); Organizational innovation (Kombo, k'obonyo & Ogutu, 2015) and Product innovation (Yang, 2011). Still, there is a dearth of research into knowledge sharing, especially with respect to its role in enhancing innovation performance. Thus there is a need to understand the role of knowledge sharing in commercial banks in order to amplify its benefit in terms of innovation performance.

Study Objective

The study sought to examine the role of knowledge sharing in enhancing innovation performance amongst Commercial banks in Kenya, hence the hypothesis

H₀₁: Knowledge sharing has no significant influence in enhancing innovation performance amongst Commercial banks in Kenya

LITERATURE REVIEW

Theoretical review

This study was embedded on Nonaka and Takeuchi's (1995) theory of organizational knowledge creation. Earl (2011) pointed out that, when there was an interaction between tacit and explicit knowledge, they would result into four knowledge conversion steps which included socialization, externalization, combination and internalization. Chong (2010) viewed socialization, externalization, combination and internalization as the basis for knowledge creation and even transfer process. Thus on-going collaboration results to knowledge sharing and creation which may be captured and also retained in a firm. The theory views the interaction of tacit knowledge and explicit knowledge as being essential in knowledge management. The theory explains the creation, sharing and conversion and management of organisational knowledge. Socialization refers to sharing of tacit knowledge and also experiences possessed by persons with other group members. According to Nonaka and Konno (1998) this can be achieved

by capturing knowledge by interacting with external agents and internal organizational members, by physical proximity or even virtual interaction, The socialization of the tacit knowledge is disseminated through externalization (Nonaka, 1994; Nonaka & Takeuchi 1995; Nonaka & Konno, 1998). According to Nonaka (1994), combination involves conversion of the explicit knowledge into the firm's tacit knowledge that rests in an intangible form. It is transformed and shared into tacit form. Knowledge sharing is a critical knowledge process for a firm's knowledge creation (Nonaka & Takeuchi, 1995). Knowledge needs to be moved from individuals to the entire organization so that it may be utilized to fulfil organizational goals.

Review of Variables

Knowledge Sharing

Knowledge sharing is the exchange of knowledge among organizational employees. According to Lin (2007) knowledge sharing involves exchanging of employees knowledge, experiences and also skills throughout the firm so as to devise new routines as well as mental models. Sharing knowledge can leverage expertise across a firm thus accelerating organizational performance. Knowledge can be shared through departmental meetings, knowledge exchange seminars, informal and even formal workshops, summary reports, mentoring, brainstorming, notice boards, face to face interactions and emails (Wamundila, 2008). According to Dalkir (2011) knowledge sharing can be facilitated by communication and even collaboration technologies that are produced within the firm. Information can be distributed through tools for instance internet, phones, emails, video conferencing, chat rooms, messages, discussion forums, tweets, wikis, webinars, social networks and various other work flow management tools.

Innovation Performance

Daft (2016) posited that Performance was a firm's ability to achieve its goals by utilizing its resources effectively and efficiently. It is a firm's results in comparison to outputs expected. Innovation entails introducing new products, new methods of production, new market entry, new sources of supply and new ways of competition. (Schumpeter, 1934). Griffith, Huergo, Mairesse and Peter (2006) asserted that innovation was an imperative cornerstone in performance with regards to improvement of productivity, performance and also growth. Innovation performance can be attained by firms through the devising certain cultural as well as behavioural practices (Anne, 2012). As such the culture of knowledge sharing can be considered by banks. This study focused on product and market innovation as aspects of innovation performance.

Empirical Review

Yang (2011) established examined the Knowledge Management effect on Product Innovation of Software Outsourcing Vendors in china and found that internal knowledge sharing and also external knowledge assimilation significantly and positively affected product innovation. However the study just focused on product innovation and was done in china. Lin (2007) found that an employees' willingness to donate and also collect knowledge enabled the firm to enhance its innovation capability. Hsiu-Fen (2010) contended that knowledge sharing facilitated generation of new ideas and development of new business opportunities by socialization and workers learning process. Ipe (2013) confirmed that knowledge sharing accelerated learning and innovation. Further, O'Neill, Beauvais and Scholl (2012) suggested that knowledge sharing positively affected organizational outcomes of company's innovation, product improvement as well as employee improvement.

Using cross sectional research design Kombo, K'obonyo and Ogutu (2015) conducted a study to examine whether knowledge strategy affected organizational innovation. The study targeted 655 manufacturing Kenyan firms. Structured questionnaires were administered on managers. The results showed that knowledge strategy positively and significantly affected the firm's innovation activities. However, the study focused on knowledge exploration and knowledge exploitation unlike the current study which focused on knowledge sharing.

Nguthari and Kwasira (2015) carried out a study on the influence of knowledge management practices on legal firms performance. The study utilized descriptive research design and established that knowledge management practices such as knowledge sharing, knowledge implementation amongst others influenced performance. Focusing on Kenyan Commercial banks, Gakuo and Rotich (2017) researched on the effect strategic knowledge management had on performance. The study used descriptive research design and data was collected from a sample of 116 management staff. Results indicated that knowledge acquisition knowledge conversion knowledge protection and knowledge applications influenced performance. The study focused on performance generally unlike the current study which focused on innovation performance. Using descriptive research design Naisiae and Gitari (2018) conducted a study in Nakuru County's manufacturing firms and confirmed that between strategic knowledge management practices. Specifically, the study found that knowledge transfer, application and management policy had a statistically significant positive influence on organizational innovation. Knowledge transfer was significantly and positively correlated to organizational innovation. Knowledge transfer significantly influenced organizational innovation. However, the study was done in a different setting which is the manufacturing firms unlike the current study which was done in Commercial banks.

METHODOLOGY

The study adopted descriptive survey research design. According to Kothari (2004) descriptive survey as a research design is flexible as it provides an opportunity for taking into account diverse aspects of the problem being studied. This study targeted 15 commercial banks in Kakamega County. Structured questionnaires were used to collect data from forty five managers who were purposively sampled. The respondents included branch managers, operations managers and customer relations managers. A census study was done as the study population was small. The questionnaires were administered using a drop and pick later method. Data was analyzed using descriptive and inferential statistics. Descriptive statistics employed were standard deviation and mean. Inferential statistics used were Pearson moment correlation and simple regression analysis. The simple regression model below was used;

$$Y = \beta_0 + \beta_1 X_1 + e$$

Where Y = innovation performance, β_0 = Constant, β_1 =Coefficients of determination, X_1 =knowledge sharing, ϵ = Error term

RESULTS AND DISCUSSION

Response Rate

45 questionnaires were issued and 40 were filled and returned which represented a response rate of 88% response rate. Fincham (2008) concerted that researchers should aim at 60 percent as the response rate.

Descriptive statistics

*Descriptive Analysis results for knowledge sharing***Table 1 Statements on knowledge sharing**

	N	Mean	Std. Deviation
Staff meetings held to discuss business trends and developments	40	4.12	.790
Employees exchange knowledge and experiences with coworkers	40	4.30	.648
Knowledge shared between supervisors and subordinates	40	4.35	.622
Technology used to disseminate knowledge	40	4.17	.780
Valid N (listwise)	40		

As shown in table 1, majority were in agreement with the statements on knowledge sharing that staff meetings were held to discuss business trends and developments with a mean of 4.12 (SD =.790), employees exchange knowledge and experiences with coworkers with a mean of 4.30 (SD =.648), knowledge is shared between supervisors and subordinates with a mean of 4.35 (SD =.622) and that technology is used to disseminate knowledge which had a mean of 4.17 (SD =.780).

*Descriptive Analysis results for innovation performance***Table 2: Statements on innovation performance**

	N	Mean	Std. Deviation
New products introduced in last 3 years	40	4.25	.898
The organization has improved on quality of its products and services	40	4.35	.622
New products has made us better than our competitors	40	3.82	.747
The organization has identified new potential market	40	3.85	.833
The organization has generated new ways to serve target market	40	4.35	.622
Valid N (listwise)	40		

Majority were in agreement with the statements on innovation performance that new products introduced in last 3 years with a mean of 4.25 (SD =.898), the organization has improved on quality of its products and services with a mean of 4.35 (SD =.632), new products has made us better than our competitors mean of 3.82 (SD =.747), the organization has identified new potential market mean of 3.85 (SD =.833) and that the organization has generated new ways to serve target market with a mean of 4.35 (SD =.622). This statistics are shown through table 1.

Inferential Statistics*Correlation Analysis Results*

Pearson's product moment correlation analysis was used to assess the relationship between knowledge sharing and innovation performance.

Table 3: Correlation Results

		Knowledge sharing	Innovation performance
Knowledge sharing	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	40	
Innovation performance	Pearson Correlation	.734**	1
	Sig. (2-tailed)	.000	
	N	40	40

*. Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows that Knowledge sharing is strongly positively correlated with innovation performance and its significant at 99 % confidence level ($r=0.734$; $p<0.01$). These findings are in agreement with those of Nguthari and Kwasira (2015) who established that there was a strong positive and significant association between knowledge sharing and law firm performance ($r = 0.664$). The findings are also consistent with those of Naisaei and Gitari (2018) who confirmed that knowledge transfer was positively and significantly correlated to organizational innovation ($r = .696$, $p=0.000$, $\alpha= 0.05$).

Simple Regression Analysis Results

Table 4: Model Summary^b

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate	Change Statistics				
					R Change	Square F Change	df1	df2	Sig. F Change
1	.734 ^a	.539	.526	.37876	.539	44.359	1	38	.000

a. Predictors: (Constant), knowledge sharing

b. Dependent Variable: innovation performance

The regression results in table 4 shows that 73.4% of the innovation performance can be explained by knowledge sharing (R squared = 0.734) while the remaining 26.6% can be attributed to other factors which are not covered in the study. According to Alsaed (2005) when Durbin-Watson is between (1) and (3) there is no autocorrelation problem. Thus Durbin Watson value is 2.213 therefore no autocorrelation problem exists on the regression model.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.364	1	6.364	44.359	.000 ^b
	Residual	5.451	38	.143		
	Total	11.815	39			

a. Dependent Variable: innovation performance

b. Predictors: (Constant), knowledge sharing

The F change was statistically significant because the p-value was 0.000 and thus significant at 99% confidence level. Therefore the regression model can be used to assess the association between the dependent and independent variable.

Table 6: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.536	.542		.988	.330		
	Knowledge sharing	.847	.127	.734	6.660	.000	1.000	1.000

a. Dependent Variable: innovation performance

From the regression findings the substitution of the equation $Y = \beta_0 + \beta_1 X_1 + \varepsilon$ became

$$Y = .536 + 0.847X_1$$

This implies that a unit increase in knowledge sharing leads to 0.847 increase in innovation performance. Further the VIF are <10 hence no multi collinearity problem (Cooper & Schindler 2003). For testing the research hypothesis, regression results in table 4.6 were used. The null hypothesis that knowledge sharing has no significant influence on innovation performance in Kenyan commercial banks is rejected at 0.01 significant level, $P(0.000) < 0.01$. The findings of the study are congruent to those of Naisaei and Gitari (2018) who confirmed that knowledge transfer had a statistically significant influence on organizational innovation, however the study was done in manufacturing firms thus exhibiting a sectoral gap. Similarly, Yang (2011) confirmed that knowledge sharing influenced product innovation in China. Lin (2007) noted that an employees' willingness to donate and also collect knowledge enabled the firm to enhance its innovation capability.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study concludes that knowledge sharing has an influence on innovation performance. The study affirms Nonaka and Takeuch's (1995) knowledge creation model that points out that through human interaction, socialization facilitates exchange of ideas, skills and even experiences in organizations. This subsequently results to innovation performance in Commercial banks. The study demonstrates the value of knowledge sharing for better innovation

performance. Moreover, commercial bank managers should perceive the significance of Knowledge sharing in enhancing innovation performance especially in the wake of COVID 19 which has posed a serious challenge in the economy.

Recommendation

Commercial banks should encourage a corporate culture that prioritizes knowledge sharing for staff to actively pursue knowledge sharing activities. Bank managers should encourage information sharing through meetings where staff get to discuss new trends in business. Employees should also be encouraged to deliberately share information amongst themselves as colleagues so as to generate new knowledge. Knowledge should also be freely shared between employees and their supervisors. Moreover, appropriate information technology resources should be utilized to share knowledge within an organization such as internet, phones, emails, video conferencing, webinars etc. Lastly, managers need to understand the knowledge sharing key enablers.

Suggestions for Further Research

The study findings were derived from commercial banks in a Kakamega County. Future studies should be done on a larger sample to include commercial banks in other counties and countries. Future studies should be conducted in diverse industries in other sectors for instance higher education institutions and manufacturing sector. In addition the study would benefit from a qualitative investigation through interviews to provide more insights regarding the study phenomenon. Further studies may be done which incorporate intervening variables. Moreover, studies may be done on factors influencing knowledge sharing in organizations.

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Influence of Trade credit on the Growth of Small and Medium Size Manufacturing Enterprises in Rwanda

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Abstract

The purpose of this study was to analyze the influence of trade credit on the growth of manufacturing SMEs in Rwanda. To achieve the objective, the study used a mixed research approach involving both qualitative and quantitative methods. The target population of this study consisted of all the 868 small and medium manufacturing enterprises registered with Rwanda Development Board from which a sample of 273 firms was taken by way of stratified random sampling technique. Close-ended questionnaires were used in data collection. The data collected was analyzed using Statistical Package for Social Science 22 to generate descriptive statistics including percentages, frequency tables and mean scores. Multiple regression analysis was used to explore the relationship between Trade credit finance structure and the growth of small and medium size manufacturing enterprises in Rwanda. R^2 was deployed to measure the extent of the goodness fit of the regression model. The findings from the study show beta values of ($\beta=0.082$, $p=0.047$) for trade credit finance. Hence, trade credit influences the growth of small and medium manufacturing enterprise in Rwanda. Among recommendations, the management of the SMEs should learn how to use account receivables and account payable to fully take advantage of trade credit finance. This will ensure SMEs continue producing or manufacturing during time of low liquidity and financial constraints.

Key words: *Trade credit; Small and Medium Size Manufacturing Enterprises; Rwanda*

INTRODUCTION

Background to the Study

Al-Qaisi (2018) argues that trade credit is a key source of funds for firms especially where external funding via credit institutions is not a viable option and so, an important alternative to bank loans for the SME sector in developed and developing economies alike. Hence, Paul, Guermat and Devi (2018) note that in the UK, at least 80% of corporate sector transactions take place on credit. The authors report that the value of trade credit in the UK exceeded 59 billion pounds in 2006. In the US, they maintain that the size of trade credit supply exceeds the credit supplied by the country's entire banking system and remains the most important supplier of short term business credit. In France and Italy accounts receivable amounts to 29% of firm's total asset. Trade credit is equally important in Eastern Europe where the ratio of accounts payable to total liabilities vary between 21% in Hungary and 49% in Bulgaria while evidence from Asia shows that the private sector firms in China also largely based on trade credit. In East Asia, Tan and Ma (2016) shows that firms make use of trade credit to stimulate their growth during financial crises while Aslam and Hussain (2017) in Pakistan demonstrate that trade credit is a growing source of finance for industrial sector in Pakistan.

In Africa, despite the impressive contribution made by SMEs, most of them perform below capacity as a result of inaccessibility to credit financing. SMEs in Africa are highly limited by credit constraints compared to larger firms which hinders their growth and expansion potential. In South Africa for instance, Abor, (2010) estimates that 91% of the business entities are SMEs accounting for 57% of GDP while in Ghana, SMEs make up to 81% of the private business entities. In East Africa, SMEs have increasingly acted as a key instrument for job creation and income generation through self-employment and hence according to Arinaitwe and Mwesigwa (2015), SMEs contributed to reduction of poverty and supply the economy with ideas and innovation required to foster competitiveness and proper resource allocation.

Rwanda's SMEs sector contributes to national economic development. However, the main strategic bottleneck they face is limited access to finance which hinders their growth and expansion (Akimana, 2017; Ndikubwimana, 2016; Gamba; 2019 and Harelimana; 2017). Hence, although Rwanda is among the ten fastest growing economies in Africa, limited access to finance makes its manufacturing sector fail to keep pace with the overall national growth (Behuria, 2019). The sector currently contributes an estimated 6% to GDP per year compared to the service industry which stands at 48% to GDP (NISR, 2016)

Furthermore, the manufacturing sector is less well diversified as 92 percent of the country's total manufacturing is generated from only seven sub sectors: food, beverages and tobacco, textiles and clothing, wood, paper and printing, chemicals, rubber and plastics, non-metallic minerals as well as furniture (United Nations Industry development Organization, UNIDO 2013). Thus, according to MINECOM (2014) Rwanda's manufacturing sector has failed to attract the required investment for growth and expansion thereby remaining a small player in the Rwanda economy.

Problem Statement

Sindani, Namusonge and Sakwa (2016) observe that majority SMEs fail due to limited finances and poor management of the available scarce resources citing millions of bankrupt and cash strapped SMEs due to poor cash flow in form of uncollected accounts receivables. According to Wongma (2016) SMEs need to efficiently and effectively acquire finance in order to grow and compete in the market. Yet, according to Sharmilee and Hoque (2016) financial institutions credit processing is cumbersome with most commercial banks reluctant to provide SMEs with adequate capital.

Moreover, in Rwanda, the private sector has limited access to credit instruments as most Rwandan banks are conservative and risk averse, trading in a limited number of commercial products (International Trade Administration, ITA, 2020). Furthermore, Harelimana (2017) intimates that a significant number of firms in Rwanda (35.5%) operate their enterprises using internal finance sources with a further 61.3% having their loan applications rejected due to lack of collateral and lack of information on their operations.

Casey and O'toole (2014) further find that constraints on available credit from banks and other financial institutions force firms to resort to use of trade credit. Hermes, Lensink and Meesters (2018) equally argue that firms having troubles accessing important resources need to rely on suppliers to partially offer key resources. Yet, Gamba (2019) highlights that available research on Rwandan SMEs financing especially with regard to use of trade credit is scanty. Hence, there is a gap in extant literature on firm use of trade credit as a finance alternative and its benefits for

SMEs in Rwanda. A study on the influence of trade credit on the growth of SMEs in Rwanda therefore becomes crucial since SMEs play a vital role in a private sector led economy.

Objectives of the study

This study set out to investigate the influence of trade credit finance structure on the growth of small and medium manufacturing enterprises in Rwanda, hence the research question, “what is the influence of trade credit finance structure on the growth of small and medium manufacturing enterprises in Rwanda?”

LITERATURE REVIEW

Agostino and Trivieri (2014) in a study of 4,543 firms in Italy confirm that there is indeed a positive correlation between trade credit and bank loan accessibility for SMEs. Huang, Shi and Zhang (2015) use data from Chinese firms to highlight evidence of substitution of trade credit for bank credit which show counter-cyclical pattern. Kapkiyai and Mugo (2015) further use evidence from several studies which concur that SMEs with low credit worthiness are likely to be more financed by trade credit suppliers. Hence, there is a positive linear relationship between trade credit finance structure and the performance of firms arising from the fact that the advantages associated with trade credit transcend the costs of vendor financing. Furthermore, the benefits of a firm using trade credit might differ based on certain firm attributes. For instance, larger and more creditworthy firms tend to advance trade credit to smaller customers’ thereby growing the firm’s sales and creating an implicit rate of return. Hence, larger and more liquid firms gain superior returns on receivables as opposed to smaller and less liquid firms.

According to Nanyondo (2017) in Egypt, most SMEs are inclined to use alternative finance in the form of trade credit. Using secondary data from the Central Bank of Egypt (CBE), analysis indicated that 19% of SMEs use formal bank finance, compared to 81% usage by large enterprises. In addition, the descriptive statistics indicated that fewer than 50% of SMEs in Egypt sought formal bank finance in the period 2012 to 2013. The respondents indicated that SMEs dislike the bureaucracy that surrounds access to formal finance. Likewise, loan officers indicated that nearly 80% of SMEs lack accepted collateral to secure the loans and insufficient guarantors to secure the finance.

Daskalakis, Balios and Dalla, (2017) explored the contributing factors to the use of trade credit by small English firms. Key among their findings is that large firms with better access to both internal and external finance at favorable cost require less trade credit from suppliers and that firms with larger growth opportunities make more use of trade credit so as to fund their additional sales volumes.

Aslam and Hussain (2017) aimed to analyze the role of trade credit in upgradation of cement sector using 17 listed firms in the cement sector of Pakistan Stock Exchange (PSX). The analyses were carried out by using 8 year data, starting from year 2007 to 2014 and study findings indicate that trade credit has a very significant positive affect on sales growth of the firms.

Muchuri and Shukura (2017) highlight trade credit aspects that influence a firm’s financial performance of SMEs registered with the private sector federation in Rwanda. The factors highlighted include: the term to maturity of the loan with (mean 3.56) implying to a great extent

and uncertainty about loan amount to a moderate extent (mean 3.24). High interest rates were found to affect the firm's financial performance to a great extent (mean 3.86) while mismatch of funds was revealed to influence a firm's financial performance to a moderate extent (mean 3.21). Finally, undue pressures for repayment was found to affect a firm's financial performance to a great extent (mean 3.83)

Ferrando, Popov and Udell (2017) argue in addition that firms are likely to supply more trade credit to buyers who are temporarily in short supply of cash flow. This subsequently fosters their sales, as the otherwise distressed clients would be unable to acquire the goods. Firms will however only offer additional trade credit when they believe there is a prospective likelihood for a long term relationship with that customer.

Mateut and Chevapatrakul (2018) have demonstrated that trade credit provides a safety valve for firms facing distinctive liquidity shocks as they transfer a quarter of shocks to suppliers through acquisition of more trade credit. Thus, trade credit helps SMEs to build a stable commercial relationship in the long run despite the fact that it may increase customers' reliance on suppliers, leading to a higher implicit interest rate. According to Rodriguez (2016) trade credit helps suppliers reduce transaction costs related to insolvency of each individual commercial exchange.

RESEARCH METHODOLOGY

Research design

Coopers and Schindler, (2008) define a research design as a framework for guiding a study which connects the questions or objectives of the study to the data gathered. This study adopted mixed methods research design. Elahi and Dehdashti (2011) argue that the mixed methods research design is ideal when the study objectives require determining the degree to which study variables are associated and making predictions regarding the occurrence of phenomena.

Population and Sampling

Castillo, Olivos and Azar, (2018) defines a target population as the whole set of individuals or objects to which researchers are interested in making generalizations. The target population for this study is all SMEs in the Rwanda manufacturing sector. According to Rwanda Development Bank (RDB 2017) there are 868 SMEs in the Rwandan manufacturing sector.

Kothari (2014) refers to sampling as the process of acquiring information on an entire population by testing only a part of it. The study adopted stratified random sampling technique. Orodho (2009) argues that stratified random sampling method ensures that small-categories in the population are adequately represented in the sample. Hence, stratified random sampling technique was adopted to ensure that sub-groups in the population get an adequately representation in the sample. Afterwards, simple random sampling was deployed in choosing respondents from each stratum. SMEs owners and finance managers were interviewed as well. Thus, the study used simple random sampling to select SMEs from each stratum.

Data Collection Methods

Both primary and secondary data were collected for this study. Saunders (2019), defines data collection as a way in which information gets acquired from the selected subjects of an

investigation. The author stresses that the most prevalent instruments used in data collection are interview schedules, questionnaire, observational forms and standardized tests.

In this study, questionnaires were deployed in collection of primary data from the proprietors or the manager of SMEs selected in the study sample. Both open and close ended questions were integrated in the questionnaire. Secondary data was collected from Rwanda's National Institute of Statistics (NISR), Rwanda Development Board, (RDB) and Ministry of Trade and Industry since they are main Government departments that oversee the SME sector.

Data Processing and Analysis

Data analysis entailed use of statistical package for social science (SPSS) version 22. Cronbach coefficient alpha values were utilized in checking the goodness of fit of the data as well as the consistency and reliability of measures obtained from the Likert scale items. According to Adeniran (2019) Cronbach's Alpha values should not go below the traditional cutoff mark of 0.7 as a rule of thumb. The study deployed inferential statistical approaches; correlation and regression analysis to test for relationships between variables.

RESULTS AND DISCUSSIONS

Introduction

This part presents and discusses the results of data analysis. The section has findings on demographic features of study participants, descriptive and inferential statistics showing the effect of independent variables on the dependent variable.

In this study, 273 questionnaires were administered to selected respondents. The questionnaires that were dully filled and returned equaled 225 while 48 were not properly filled and some not returned. A response rate of 82% was recorded which according to Mugenda and Mugenda (2009) is deemed adequate for one to proceed with data analysis.

Summary of the Scale Reliability Results

Table 1 shows a summary of findings from the reliability test obtained from pilot study. The finding indicates the Cronbach Alpha scores on trade credit of 0.887. These findings point to a high reliability measure for the scale deployed to assess the study variables and so, all attributes used to measure the variable were maintained in the final survey.

Table 1: Summary of the Reliability Statistics

Variables	No of Items	Cronbach's Alpha	Remarks
Trade credit	9	0.887	Accepted

Demographic Information

This section analyzed the demographic information of the respondents which included age bracket, gender, highest level of education, among other characteristics. Background information enabled the researcher to understand the respondents and whether their characteristics reflected attributes of the entire the population so as to make generalizations.

Age Bracket of the Respondents

Table 2 presents findings on the age bracket of respondents. As indicated, 34.7% of the respondents were aged between 31 and 40 years, 32% between 21 and 30 years and 22.7% between 41 and 50 years.

Table 2: Age Bracket of the Respondents

Age Bracket	Frequency	Percent (%)
21-30 years	72	32
31-40 years	78	34.7
41-50 years	51	22.7
51-60 years	18	8
Over 60 years	6	2.7
Total	225	100

Gender of the Respondents

Table 3 shows findings on the sex of respondents. As revealed in the table, 55% of the study participants were male while 45% of the respondents were female. This study finding implies that information collected by the study was gender representative.

Table 3: Gender of the Respondents

Sex	Frequency	Percent
Male	123	54.7
Female	102	45.3
Total	225	100

Highest Level of Education attained

The results on the highest level of education attained in Table 4 show that 38.3% of the respondents had attained secondary education, 32% had primary education, and 20% were undergraduates.

Table 4: Highest Level of Education

Highest level of education	Frequency	Percent
Primary School	72	32
Secondary School	86	38.3
Undergraduate	45	20
Graduate	22	9.7
Total	225	100

Influence of trade credit finance structure on SMEs growth

The objective of the study was to investigate the influence of trade credit finance on the growth of manufacturing SMEs in Rwanda. Thus, the study used various tests such as factor analysis, descriptive and inferential statistics to answer the study objective.

Factors Analysis for Trade Credit Finance Structure Indicators

Table 5 reveals findings of factor analysis which show that all constructs used to test for trade credit finance structure have factor loading values above the threshold of 0.4 as recommended in related studies. Hence, all the attributes used under trade credit finance structure reached significant levels in terms of explaining the variable and so none of them was eliminated.

Table 5: Factors Analysis for Trade Credit Finance Indicators

No	Statements	Factor Loading
1	Customers honor their commitment to pay in agreed credit period	0.759
2	Appropriate credit period creates repeat business for the company	0.753
3	The business considers the length of credit period for the customer before trade credit approval	0.689
4	The business prefers giving favorable credit terms and standards to customers than cash sales in return of long-term relationship building	0.587
5	The business receives payments from suppliers based on contract credit terms and standards	0.728
6	Shorter and strict credit terms and standards reduce sales revenue for my business	0.695
7	The business trade discounts do not conflict with the liquidity demands of my firm	0.637
8	Customers' loyalty and goodwill increase whenever I offer favorable trade discount facilities	0.805
9	The business grants trade discount only to big organizations	0.726

Extraction Method: Principal Component Analysis.

Correlation Analysis for Trade Credit Finance structure and SMEs Growth

The study used correlation analysis to check for the nature of relationship between trade credit finance and growth of manufacturing SMEs in Rwanda. Table 6 reveals that trade credit finance has a moderate positive association with growth of manufacturing SMEs in Rwanda as shown by the correlation value of $r = 0.428$ and $p=0.000$. The correlations were found to be significant at

0.05. The results imply that increasing trade credit finance leads to a rise in growth of manufacturing SMEs in Rwanda. The finding corroborates those by Nasr and Pearce (2012) in Egypt, who found that most SMEs deploy alternative finance in the form of trade credit as it helps firms generate growth and expansion unlike debt. Ogawa, Sterken, and Tokutsu (2014) equally maintain that firms tend to rely more on trade credit when distressed financially and this plays a crucial role in substituting bank credit while helping financially constrained firms leverage their growth and expansion prospects.

Table 6: Correlation Analysis for Trade Credit Finance structure and SMEs Growth

Variable	Statistics	Trade Credit	
		Finance	Growth SMEs
Trade Credit Finance	Pearson Correlation	1	.428**
	Sig. (2-tailed)		0
	N	225	225
Growth of SMEs	Pearson Correlation	.428**	1
	Sig. (2-tailed)	0	
	N	225	225

** . Correlation is significant at the 0.05 level (2-tailed).

4.5.3 Univariate regression analysis of trade credit finance structure and SMEs growth

The study further used univariate regression to test the influence of trade credit finance on the growth of small and medium manufacturing enterprises in Rwanda. The results of the regression analysis are presented in tables 7 and 8.

Table 7: Model Summary trade credit and SMEs growth

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.428 ^a	0.183	0.179	.43433

a. Predictors: (Constant), Trade Credit Finance

Table 7 shows coefficient of determination (R-square) =0.183 which reveals that other factors held constant, trade credit finance accounts for 18.3% of the variation in the growth of the manufacturing SMEs in Rwanda. The findings further imply that trade credit finance is a good predictor variable for growth of small and medium manufacturing enterprises. The results are congruent with Shao, (2019) who argues that trade credit helps direct resources flow to the financially constrained SMEs hence increasing their aggregate productivity and fostering their growth prospects. According to Fu, Matous, and Todo, (2018) trade credit is the most important source of short-term financing for firm growth and expansion in Japan where 78 percent of small and medium enterprises (SMEs) in the manufacturing sector utilize trade credit, and 34 percent rely more on transactions using trade credit than on immediate payments. Rodriguez (2016) also found that SMEs receive more capital from market, gaining more investment and growth opportunities through the use of trade credit finance structure.

Table 8: ANOVA for Trade Credit Finance structure and SMEs Growth

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.421	1	9.421	49.941	.000 ^b
	Residual	42.067	223	.189		
	Total	51.488	224			

a. Dependent Variable: Growth of SMEs

b. Predictors: (Constant), Trade Credit Finance

Table 9 highlights findings from analysis of the variance (ANOVA) of the model used to link manufacturing SME growth to use of trade credit. As it is quite evident, the result of $F=49.941$ with a corresponding $p=0.000$ imply that the model was found to be statistically significance. This means that the study failed to reject the null hypothesis on the goodness of fit and so, trade credit finance was found to significantly explain the variation in growth of manufacturing SMEs in Rwanda. Such finding is concomitant with one earlier found by Boissay and Gropp, (2007) as well as Cunat (2007) who maintain that trade credit provides a safety valve for firms facing distinctive liquidity shocks. Cole (2012) in addition finds that 20 percent of small firms used trade credit to boost their firm growth, and about 40 percent used both bank and trade credit which is evidence that trade credit can be complementary to bank credit since trade credit is primarily short term.

Table 9: Regression Coefficients for Trade Credit Finance structure and SMEs Growth

Variables	Unstandardized coefficients β	Std. Error	Standardized coefficients Beta	t	Sig.
(Constant)	2.743	0.115		23.9	0.000
Trade Credit Finance	0.25	0.035	0.428	7.067	0.000

a Dependent Variable: Growth of SMEs

Table 9 presents the findings of regression coefficients for trade credit finance structure and growth of manufacturing SMEs. The findings reveal a beta coefficient value of $\beta=0.250$, $p=0.000 < 0.05$ which implies that trade credit finance has a positive and significant effect on growth of manufacturing SMEs in Rwanda when all other factors are held constant. Hence, a unit increase in trade credit finance would results into a proportionate rise of 0.250 units in growth of manufacturing SMEs in Rwanda when all other factors are put on hold. The findings concur with those of Rodriguez (2016) who maintains that trade credit helps suppliers reduce transaction costs related to insolvency of each specific commercial transaction thus fostering survival, growth and expansion of firms. Hermes, Lensink and Meesters (2018) argue that firms need to rely on suppliers to for key resources.

CONCLUSION AND RECOMMENDATIONS

The study concludes that manufacturing SMEs in Rwanda that use trade credit finance in their financial structure have high probability of the achieving their growth objectives. Trade credit ensures that firms continue to be serviced by their suppliers on credit and the available resources can be channeled for alternative growth opportunities.

The management of the SMEs should further learn how to use account receivables and account payable to fully exploit advantages of trade credit finance structure. This will ensure the SMEs continue producing or manufacturing during times of low liquidity. Also, both the government and SMEs should come up with a proper legal framework to regulate the use of trade credit finance in Rwanda.

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Influence of Customer Relationship Management on Performance of Manufacturing Firms in Kenya

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Abstract

The study sought to determine the influence of customer relationship management on performance of manufacturing firms in Kenya. This study employed descriptive research design. The targeted population of this study is comprised of 499 manufacturing companies which are all located in Nairobi and its environs. In order to come up with a representative sample, stratified random sampling method was used since the population is heterogeneous. The stratified technique ensured that each sector in the target population has an equal chance of being selected. There were 217 respondents sampled from the 499 manufacturing firms out of 217,180 respondents returned the questionnaires for analysis. The study adopted a descriptive survey design. Data was collected using self-administered questionnaires which were tested for validity and reliability using 10% of the total sample respondents. Quantitative data was analyzed using both descriptive and inferential statistics and with the help of SPSS version 23 while qualitative data was analyzed descriptively. Linear and multiple regression models were used to show the relationship between the dependent variable and the independent variables. The information was presented using tables, charts, frequencies, percentages and graphs. The study established that there exists a positive influence of customer relations management on performance management of manufacturing firms in Kenya at 5% level of significant ($\beta=0.595$, $P<0.05$). This indicates that as customer relationship management increases to certain level then performance of manufacturing firms in Kenya also increases significantly and vice-versa. The study has proved that indeed customer relationship management as a strategic alliance influences performance in these organizations. The study recommends that the government of Kenya should create awareness of their policies through training of the key stakeholders, there is need to improve on quality production and lead time and more strategies must be put in place to incorporate technology which will aid to improve the quality and also maintain required lead time in these organizations.

Keywords: customer relationship management, performance and manufacturing firms.

INTRODUCTION

Background to the study

The manufacturing sector in Kenya is believed to be the third largest industrial sector after transport, communication and agriculture (KPMG, 2014). It is the third top sector contributing to gross domestic product in Kenya. The manufacturing sector is made up of only 10% of the industrial sector benefaction even though Kenya is said to be the most highly industrially developed country in East Africa (RoK, 2014). According to the US Department of State, this

exposes a gap in the country's ability to achieve a fully industrialized economy by 2020. It argues that there is still a lot of room for development in countries manufacturing sector, but for this to happen, reforms to the business environment need to be made to factor in the influence of strategic alliances in supply chain in the sector (KPMG, 2014). The manufacturing sector has a great potential on promoting economic growth and competitiveness in the country like Kenya.

Business environment has become complex and requires flexible operations, firms have become more susceptible to supply chain disruptions and (Wieland & Wallenburg, 2013). Jüttner and Maklan, (2011) argue that supply chain resilience, which decreases the impact of supply chain risks by actively pointing out on strategies that enable supply chains to respond and recover to their original state or an even better condition is very vital to many firms survival. Firms are now actively involved in forming supply chain strategies so as to develop new and improved processes, practices and strategies according Peter et al., (2017). Literature shows that there are many benefits of forming strategic alliances but despite those benefits, many organizations have not entered into formal alliances because they lack adequate knowledge of what strategic alliance entails and its impact on the performance of their (Ramanathan et al., 2011).

According to NAM (2015), USA's 12% GDP is accounted for by its manufacturing sector, while it employs about 9% of countries workforce, every dollar spent in manufacturing adds \$1.37 to the US economy, and every 100 jobs in a manufacturing facility creates an additional 250 jobs in other sectors. USA's manufacturing output growth has over the years outperformed that of most European countries and Japan, however, it has continued to lag behind that of China, Korea and other Asian countries (Levinson, 2015).

In most of Africa, performance of manufacturing has been particularly poor over the decades compared to that of developing countries (WB, 2014). According to a report by ODI (2016), Kenyan manufacturing sector is growing slower at the rate of 7% than those in Ethiopia at 24%, Rwanda 35% Tanzania 25% and Uganda 22%. Governments in East African Countries seem to be putting more pronounced effort into building manufacturing through creation of industrial parks like Ethiopia and making land available for manufacturing and particularly labor-intensive manufacturing (ODI, 2016). Ethiopia's manufacturing sector responsibility in the nation's economic development has been increasing year after year according to the Ethiopia Economic Association (EEA) (EEA, 2011). At present, the government seems to have given increased attention to the industrial sector, especially to manufacturing, as it is expected to take the lead in the economy as of the year 2014/15 (EEA, 2011).

In Kenya, competitive pressures are forcing manufacturing companies to continuously seek new ways to manage their production capabilities more effectively in order to meet the demands of the market. The manufacturing industry in Kenya contributes 14% to the country's gross domestic product and employs over two million people (Republic of Kenya (RoK), 2013). However, this sphere has seen a decline in its contribution to GDP from 13.6 percent in the early 1990's to 9.2 percent in 2012. According to KNBS, (2016), the manufacturing sector in Kenya has been growing at 3.5% and 3.2% in 2014 and giving about 10.3% of the GDP. The third largest economic sector after agriculture, transport and communication was found to be manufacturing sector (KPMG, 2014), with building and construction, mining and quarrying cumulatively contributing the remaining 30% (KAM, 2016). The decline trend calls for better

ways of doing business within the sector. The adoption and implementation of Strategic Alliances on the supply chain is seen as a way of reducing manufacturing costs and also distributions cost. This in turn enhances the performance of the manufacturing sector. This study focusses on manufacturing sector; reason being it has been performing minimally at 10% in the last decade.

Strategic Alliances in Supply chain

Strategic alliance is viewed as an open relationship which is based on reciprocal need between autonomous organization so as to achieve mutually determine and individual objectives, where decisions are made together and risks and benefits, knowledge and resources are shared (Cao & Zhang, 2011). These alliances also entail sharing of information, dedicating investment, making joint decisions, and aligning incentives (Nyaga et al., 2010). The perspective of collaborative advantage enables supply chain partners to view strategic alliances as a positive venture rather than a risky one, and therefore partners endeavour to gain favourably and gain competitive advantages (Evelyn et al., 2017). According to Latour (2001), in 2000, a fire destroyed the entire production capacity of a plant of Phillips Electronics in Albuquerque, which was a sub supplier of the Scandinavian cell phone maker of Nokia and Ericsson. Zhu et al., (2016) added that Nokia decided to enter an alliance with Phillips to chip its chip orders to other Phillip plants so as to use their extra capacity whereas Ericsson who did nothing incurred a loss of \$400 million.

This shows that the changes of the focal firm strategy can be attributed to formation of strategic alliances. This formation of strategic alliances encourages information sharing, joint decision making and resource sharing (Lavie, 2006). These actions in return will benefit the firms to acquire and retain customers faster (Wei et al., 2012) as well as focal firm's financial performance (Cao & Zhang, 2011). BAT Kenya strives for the development of people capabilities through continuous training. In 2016, BAT formed an alliance with its distribution partners ran training programs named POSITIVE to equip its distribution partners with skills to operate in challenging environment (BAT Kenya, 2016). This paper focuses on the strategic alliance practices specifically customer relationship management and its role of as a driver for firm performance

Statement of the Problem

Economic Review 2014 indicated that the manufacturing sector in Kenya contributes 10 percent of the Gross Domestic Product (GDP). The Government of Kenya views the manufacturing firms as the key pillar of its growth strategy. The sector is expected to play a key part in the advancement of the Kenyan economy by contributing 20 percent of Gross Domestic Product (GDP). The manufacturing sector has however not yet achieved 20 percent of the GDP as stipulated in the Kenya Vision 2030 (Waiganjo, 2013). The manufacturing sector's contribution to GDP has remained at an average of 10 percent for more than ten years (KNBS, 2015). For example, KAM, (2012); KNBS, (2013) revealed that the manufacturing sector contribution to GDP worsened from 9.6 per cent in 2011 to 9.2 per cent in 2012, while the success rate deteriorated from 3.1 per cent in 2012 to 3.4 per cent in 2011.

According to the report from World Bank the manufacturing sector is the third largest contributor to GDP at 10.3% after transport and communication which stands at 11.3%, followed

by agriculture and forestry at 23.4% (KNBS, 2016). Statistics point out that manufacturing firms in Kenya function at a technical efficiency of approximately 59% in relation to their counterparts in Malaysia that average approximately 74% (Odhiambo, 2015). This makes it hard to believe that the sector is capable of achieving the goals of Vision 2030 (Guyo, 2015). The manufacturing sphere contribution to GDP has lagged at 10% for more than a decade with a growth of 3.1%, significantly lower than the overall economic growth of 5% (World Bank, 2016). Kenyan exports to the EAC have been declining, Manufacturers through KAM can partner with institutions such as Trade Mark East Africa, which works to increase access to EAC markets (Achuka, 2016).

Further statistics from the Kenya Association of Manufacturers have shown that certain manufactures implied that they were to close shop and move their businesses to other low-cost countries like Egypt because of low profits (KAM, 2014). Manufacturing firm achievements in Africa has been particularly poor over the last decade (WB, 2014). Kenya's share of manufacturing exports to global market is about 0.02%, and whereas this compares favourably with neighbouring countries like Uganda and Tanzania, the performance is very low compared to countries like South Africa, Singapore, China and Malaysia (WB, 2015). Creation of strategic alliances along the supply chain can be the way in which firms in Kenya improve on performance.

Objective of the Study

The main objective of this study was to determine the influence of customer relationship management on performance of manufacturing firms in Kenya.

LITERATURE REVIEW

Theoretical Review

This study used Social Exchange Theory to determine the influence of customer relationship on the performance of manufacturing firms in Kenya. Social exchange theory is used to reproduce the results of procedural and distributive justice in supply chain relationships. Social exchange theory is based on the concept of individuals or groups interacting due to the expectation of rewards and the avoidance of penalties or punishment (Emerson, 1987; Bandura, 1986). Increased competition has focused attention on the development of policies to build effective on-going relationships with customers and managing those alliances (Hult, 1998). A basic tenet of supply chain management is that on-going relationships among supply chain members and especially with customers increases efficiency and effectiveness (Choi and Hartley, 1996; Shin et al., 2000).

The advantage of taking a social exchange perspective is due to the fact that customer relationship management has a strong impact on supply chain processes, alliances and firm performance (Srinivasan et al., 2011). Social Exchange Theory is composed of a series of propositions outlining the system of social exchange. A fundamental proposition of this theory is that for all actions taken, if an action is rewarded, more likely a member to an exchange is to perform that action again (Wu et al., 2014). Social exchange theory argues that individuals or

groups adept to form contact with others for the expectation of a reward (Yang et al., 2008). Based on the social exchange theory a business network may be seen as a type of exchange network (Blakenburg & Johanson, 1992), and can be defined as a set of interconnected exchange relationships (Prenekert & Hallen, 2006).

SET assumes that attitudes and behaviors can be assessed by the rewards of interaction minus the cost of that interaction. Empirical studies argue that high procurement performance can be obtained if there is close understanding and trustworthy collaboration between the supply chain partners such as suppliers, customers and manufacturers (Narasimhan et al., 2009; Wu et al., 2014). Chetty and Eriksson, (2001) argue that the main focus of such a system is on the transformation and exchanges of resources, and less on the social exchange component. It is from this perspective that buyer-supplier networks sometimes referred to as supply networks are most frequently analyzed. Claro (2004) also emphasizes how business networks; supply chains networks and buyer-supplier relationships are all types of business relationships ranging from a web of connections to a dyadic relationship with often blurred boundaries.

Hausman, (2010) in his study argues that committed customer relationship and commitment to core concepts in various transactions between the company and its partners are considered to improve the supply chain performance of a firm. Social Exchange Theory can be well used for explaining supply chain management practices and especially formation of alliances with customers and the influence it has on the performance of an organization. Adopting a social exchange perspective, a consumer makes a contribution to its manufacturer through their partnerships and helps in reaping the benefits of quality and affordable products (Eriksson, 2001). Therefore, Social Exchange Theory was beneficial in explaining the influence of customer relationship management and performance of manufacturing firms.

Conceptual Framework

Orodho (2012) defines a conceptual framework as a road map that the study intends to follow with the aim of looking for answers to the problems raised by the research questions. According to Kothari (2011), a variable is a measurable characteristic that assumes different quantitative values among the subjects. Linked to the statement of the problem, conceptual framework creates the base for presentation of the specific research question that steer the analysis being reported (Shields & Rangarjan, 2013). The conceptual framework below shows the diagrammatic representation of the relationship between customer relationship management and firm's performance.

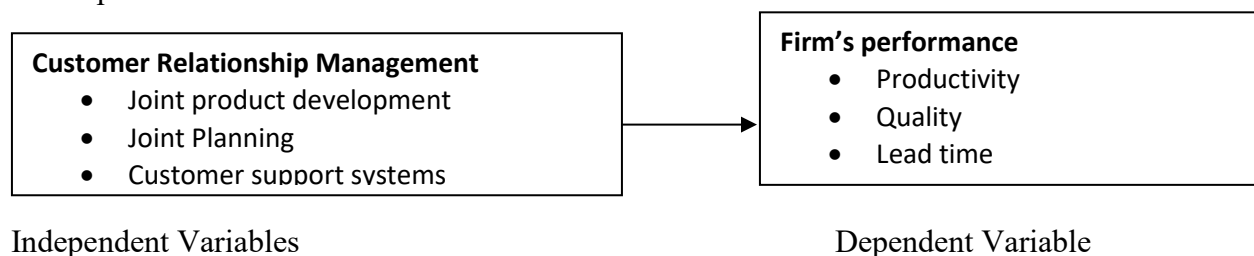


Figure 1: Conceptual Framework

Empirical Review

Mohammad and Nicolette, (2016) in their study on knowledge integration with customers in collaborative product development projects found that the customer's knowledge contribution is aligned with the specific requirements of each phase of the product development. Three specific customer roles are identified and connected to the customer's knowledge contribution. The capability of customers and the degree of initiative of the product development project are affecting the prerequisites for knowledge integration with customers. Michael and Jürgen (2012) found that customer integration was important in-service provision process so as to enhance the operations of the firm and to meet the customer's needs adequately. They argued that customer integration should be included in the operations of a firm by first identifying the type of customer integration need and how much integration. The firm also has to identify the impact of integration and the mechanism that will be used to measure the integration.

Roya and Metin (2017) in their study on customer relationship management, they discovered that managing customers can bring many benefits to the hotel business, though there are some associated challenges. Such challenges often bring a significant risk of failure, and these risks become more significant in budget hotels. The study considered the changes that have emerged in the last decade as regards customer expectations when staying in budget hotels. The study used qualitative approaches to investigate the overlaps between customer expectations and managers' perceptions of CRM applications. The findings revealed that regardless of all changes, value for money and core products continue to play a critical role in customers' overall satisfaction with budget hotels.

Gharakhani et al. (2012) argued that good customer relation has a positive impact in the entire supply chain. Customer relationship management implies that all the customer needs are met by having all right goods, in the right condition and at the right time for customers (Sundram et al., 2011). This will enable a firm to gain new customers and retain them, the firm will also be able to respond quickly to customer demands and meet customer expectations (Gawankar et al., 2013). Customer relationship management considers customer opinions and involves them in the production process through methods that facilitate the relationship between the customer and the manufacturer or provider (Lotfi et al., 2013).

Research Gaps

There is limited literature on the position of strategic alliance, not much has been researched on the strategic alliances in the past. There is neither adequate literature on future of strategic alliances as it pertains to the performance of organizations. This calls for research so as to provide direction and insight and fill the literature gap in strategic alliances in supply chains and their effect on organizational performance, whether real or simply perceived. This will provide guidance on what form and degree of alliance to make (Ralston et al. 2017). Hassan et al. (2015) investigated measurement for strategic alliance and organizational performance of manufacturing firms. The study concluded that strategic alliance has a positive impact on organizational performance. However, this study was conducted in Malaysia manufacturing firms and not the Kenyan manufacturing firms. Likewise, this study discussed only three strategic alliances practices not including channel alignment and supply chain partnering. As reflected by the presented theoretical and empirical literature there is an inadequacy of research done on strategic alliance and performance of manufacturing firms. This proposed study was unique in that it

adopted an integrative approach that captured not only manufacturing firms in Kenya but also the core four factors in successful implementation of customer relationship management through customer support systems. It is therefore a more comprehensive and integrative study that has not been the focus of researchers.

METHODOLOGY

This study, based on the Positivism research philosophy, employed descriptive research design. The targeted population of this study is comprised of 499 manufacturing companies which are all located in Nairobi and its environs. In order to come up with a representative sample, stratified random sampling method was used since the population is heterogeneous. The stratified technique ensured that each sector in the target population has an equal chance of being selected. There were 217 respondents sampled from the 499 manufacturing firms out of 217, 180 respondents returned the questionnaires for analysis. The study adopted a descriptive survey design. Data was collected using self-administered questionnaires which were tested for validity and reliability using 10% of the total sample respondents. Quantitative data was analyzed using both descriptive and inferential statistics and with the help of SPSS version 23 while qualitative data was analyzed descriptively. Linear and multiple regression models were used to show the relationship between the dependent variable and the independent variables. The information was presented using tables, charts, frequencies, percentages and graphs.

RESULTS AND DISCUSSION

Pilot results

The cronbach's alpha was computed in terms of the average inter-correlations among the items measuring The respondents that were piloted were not included in the main study. The pilot results for 18 participants were distributed as per the organization in the table 1 and 2 below.

Reliability study tool

Reliability analysis was done to evaluate survey construct using Cronbach's alpha. The table 1 shows the reliability results for the pilot study.

Table 1: Reliability

Variables	Cronbach's Alpha	Number of Items	Conclusion
Customer Relationship Management	0.768	9	Reliable
Performance	0.788	3	Reliable

From table 1, the pilot results proved that the variable statements were highly reliable with Cronbach's Alpha for the results being 0.768 and 0.788 for Customer Relationship Management and organization performance respectively. Sekaran and Bougie (2013) stated that coefficient greater than or equal to 0.7 is acceptable for basic research. Bagozzi (1991) explains that reliability can be seen from two sides: reliability (the extent of accuracy) and unreliability (the extent of inaccuracy). The most common reliability coefficient is Cronbach's alpha which

estimates internal consistency by determining how all items on a test relate to all other items and to the total test- internal coherence of data. The reliability is expressed as a coefficient between 0 and 1.00. The higher the coefficient, the more reliable is the test.

Test for Construct Validity

The test for construct validity for the study is the Kaiser-Meyer-Olkin (KMO) test for construct validity which according to Field (2005), KMO Value/Degree of Common Variance of between 0.90 to 1.00 is “Marvelous”, 0.80 to 0.89 is “Meritorious”, 0.70 to 0.79 is “Middling” 0.60 to 0.69 is “Mediocre”, 0.50 to 0.59 is “Miserable”, 0.00 to 0.49 is “Don't Factor”. Thus, a KMO coefficient of above 0.800 is “Marvelous” for the study and were evaluated as per Table 2 which indicate the KMO and Bartlett’s test of construct validity for each of the dependent and independent variables.

Table 2: Factorial Test Results for Construct Validity

	KMO	Bartlett's Test of Sphericity			Validity
		Approx. Chi-Square	df	Sig.	
Customer Relationship Management	0.594	39.625	36	0.011	Valid
Performance	0.666	16.403	3	0.001	Valid

From table 2 the values of the KMO Measure of Sampling Adequacy for all the variables were above 0.500. The significance of the KMO coefficient was evaluated using a Chi-Square test and a critical probability value (p-value) of 0.05. A Chi-Square coefficient of 16.403 and 39.625 and a p-value of < 0.05 imply that the coefficients were significant. The result further implies that there was a significant correlation between Customer Relationship Management and organization performance of the firms.

Descriptive Statistics Results

Customer Relationship Management and performance

Respondents were required to rank the customer relationship management indicators in order of preference by ranking the performance of the indicator as Least Preferred =1, Moderately Preferred =2, Neutral =3, Preferred =4 and strongly Preferred =5. The results were analyzed and displayed in table 4.8

Table 3: Descriptive Statistics

Indicators	N	Mean	Std. Deviation
Joint Product Development	180	3.64	1.240
Joint Planning	180	3.52	1.235
Customer Support Systems	180	3.89	1.133

From table 3, respondents ranked joint product development for customer relation management with (mean=3.64≈4, SD=1.240), this indicates that majority of the respondents rated the indicator as preferred for customer relation management. It had a small standard deviation which indicates that majority had a common rating on joint product development as preferred for customer relation management. On joint planning had (mean=3.52≈4, SD=1.235), this indicates that majority of the respondents rated the indicator as preferred for customer relation management. It had a small standard deviation which indicates that majority had a common rating on joint planning as preferred performance for customer relation management. On customer support systems had (mean=3.89≈4, SD=1.133), this indicates that majority of the respondents rated the indicator as preferred for customer relation management. It had a small standard deviation which indicates that majority had a common rating customer support systems as preferred performance for customer relation management. Both of the indicators for customer relationship management were rated preferred indicators in these organizations, this is in line with the study by (Tarafdar & Qrunfleh (2017). which fund out that interaction with customers and involving them product development, planning, processing customer feedback and managing customers' complaints improves customer relationship management in an organization. It also enables organizations to develop customized products (Li et al. 2005), thus addressing the attribute of flexibility and enables tracking of and addressing changes in customer demand preferences and trends, thus addressing the attribute of responsiveness (Vickery et al. 2010).

Implementation of Customer relationship management system in your organization

Respondents were asked to state how effective customer relationship management system is implemented in their organization and they respondent as shown in figure 1.

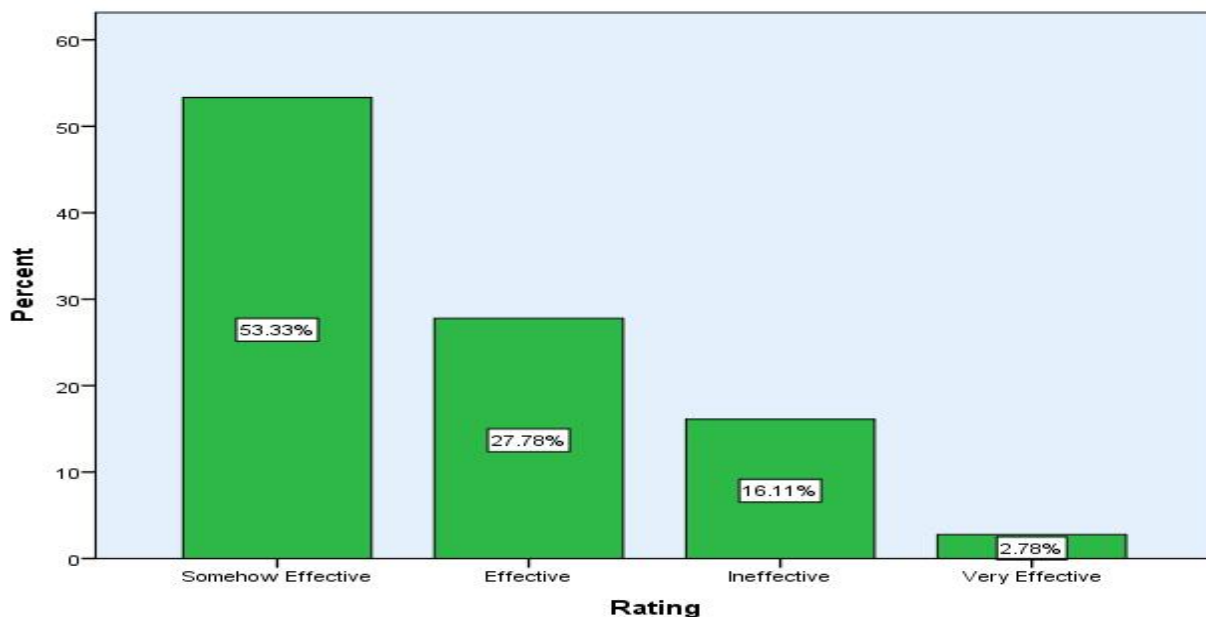


Figure 1: Implementation of Customer relationship management system

From figure 1, majority of the respondents about 53.33% indicated that the implementation of customer relationship management system is somehow effective, 27.78% indicated that

implementation was effectively done, 16.11% indicates that it was ineffective and only 2.78% indicated that the Implementation of Customer relationship management system was very effective in their organizations.

Customer Relationship Management Process

Respondents were required to rank the customer relationship management process in order of preference by their performance as Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4 and Strongly Agree =5. The results were analyzed and displayed in table 4.

Table 4: Descriptive Statistics of Customer Relationship Management process

	N	Mean	Std. Deviation
Joint Planning is very key in improving Productivity	180	4.16	.783
Joint Planning is very crucial in improving quality	180	4.13	1.085
Joint Product Development is very paramount in improving quality	180	4.11	1.128
Customer support systems are vital for maintaining quality	180	3.96	1.207
Customer Support systems play a significant role in improving productivity	180	3.93	1.153
Joint Product Development is very crucial in increasing Productivity	180	3.59	1.302

From table 4, respondents rated joint planning is very key in improving productivity with (mean=4.16≈4, SD=0.783), this indicates that majority of the respondents agreed that joint planning is very key in improving productivity. It had a very small standard deviation which indicates that majority had a common rating on joint planning is very key in improving Productivity. Joint planning is very crucial in improving quality had (mean=4.13≈4, SD=1.085), this indicates that majority of the respondents agreed that. Joint planning is very crucial in improving quality. It had a small standard deviation which indicates that majority had a common agreement joint planning is very crucial in improving quality. On joint product development is very paramount in improving quality had (mean=4.11≈4, SD=1.128), this indicates that majority of the respondents agreed that joint product development is very paramount in improving quality. It had a small standard deviation which indicates that majority had a common agreement that joint product development is very paramount in improving quality. On customer support systems are vital for maintaining quality had (mean=3.96≈4, SD=1.207), this indicates that majority of the respondents agreed that customer support systems are vital for maintaining quality. It had a small standard deviation which indicates that majority had a common agreement that customer support systems are vital for maintaining quality. On customer support systems play a significant role in improving productivity had (mean=3.93≈4, SD=1.153), this indicates that majority of the respondents agreed that customer support systems play a significant role in

improving productivity. It had a small standard deviation which indicates that majority had a common agreement that customer support systems play a significant role in improving productivity. This is inline with the study by Miguel and Brito (2011) who argued that the main advantage of building long-term relationships with suppliers is to reduce the costs of transactions through trust and this increases supply of the manufactured products. Thus, for a firm to remain competitive then extensive understanding of the buyer-supplier relation is indispensable (Berkowitz, 2004). On joint product development is very crucial in increasing productivity had (mean=3.59≈4, SD=1.302), this indicates that majority of the respondents agreed that joint product development is very crucial in increasing Productivity. It had a small standard deviation which indicates that majority had a common agreement that joint product development is very crucial in increasing productivity.

Inferential Statistics Analysis Results

Influence of customer relationship management on performance

The analysis started by testing the equivalent researchable hypothesis on the customer relationship management on performance of manufacturing.

Ha: Customer relationship management improves performance of manufacturing firms in Kenya.

Using Anova table the regression model with selection and recruitment as a predictor was not significant (F=99.19, p- value =0.512) which shows that there is a significant influence of Customer relationship management on performance in of manufacturing firms in Kenya. This leads in failing to reject the researchable hypothesis as predicted that: Customer relationship management improves performance of manufacturing firms in Kenya. Thus, the customer relationship management improves performance in manufacturing firms. The objective is to boost the alliance between the organizations and their clients by controlling all activities related to customers including sales, service delivery, and support and after sales so as to discover and preserve the most valuable customers and revamp the less loyal or less profitable clients (Wang, 2012). This implies that the client’s value is not only weighed from the transactions they make but from how they add to the overall survival of the organization (Ekinci et al., 2014).

Table 5: ANOVA of Customer relationship management

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.978	1	14.978	99.19	0.512b
	Residual	26.928	178	.151		
	Total	41.906	179			

a. Dependent Variable: Organization Performance

b. Predictors: (Constant), Customer Relations management

Based on the regression model and table 6 below, the coefficient of determination (R squared) of 0.357 shows that 35.7 % of the variation in performance management in manufacturing firms in Kenya can be explained by Customer Relations management. The adjusted R square of 0.353

depicts that all the Customer Relations management in exclusion of the constant variable explained the variation in performance management by 35.3% the remaining percentage can be explained by other factors excluded from the model. The R shows the correlation coefficient of the combined effects of mapping skills, an $R = 0.598$ shows that there is a strong positive relationship between performance management and Customer Relations management. The standard error of estimate (0.413) shows the average deviation of the independent variables from the line of best fit is very small and thus a model to predict with less errors are achieved. This finding concurs with the study by Valmohammadi and Yousefpoor (2014) who points out that CRM enables organizations to provide value added products and services through identifying most valuable customers, working on retaining them by providing quality services since they exist a strong relationship between CRM and performance management. The Anova results were displayed in table 5.

Table 6: Model Summary Customer relationship management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.598a	.357	.353	.413

a. Predictors: (Constant), Customer Relations management

The study objective was to determine the influence of customer relationship management on performance of manufacturing firms in Kenya. Based on regression analysis, the model indicated a positive significant effect (coefficient) of ($\beta = 0.595$ and $p \text{ value} < 0.05$). This was shown in the equation below

$$\text{Organization Performance} = 1.556 + 0.595 * \text{Customer Relations management}$$

This indicates that as level of Customer Relations management increases also level of performance management increases in manufacturing firms. This finding was in line with the study by Zhao et al. (2008) that found out that as customer relationship management increases market information, operational effectiveness, product quality and feedback also increases (Danese & Romano, 2013). Thus, the benefits of increased loyalty are becoming better understood, customer satisfaction is increasingly becoming a more important corporate goal (Das et al., 2010). The results were shown in the table 7 below.

Table 7: Coefficient of Customer Relations management

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error			
	(Constant)	1.556	.256		6.080	.014
1	Customer Relations management	.595	.064	.598	9.375	.002

a. Dependent Variable: Performance Management

CONCLUSION AND RECOMMENDATIONS

The objective of the study was to influence of customer relationship management on performance of manufacturing firms in Kenya. Based on regression analysis, the model indicated a positive significant effect (coefficient) of ($\beta= 0.595$ and $p \text{ value} < 0.05$). This indicates that as customer relationship management increases to certain level then performance of manufacturing firms in Kenya also increases significantly and vice-versa.

Conclusion

From the analysis of data, the study concluded based on the hypothesized relationship that:

H1: There is significant influence of customer relationship management that improves performance of manufacturing firms in Kenya.

Recommendations

The study has proved that indeed customer relationship management as a strategic alliance influences performance in these organizations. In addition, the study is of benefit to the government of Kenya who should create awareness of their policies through training of the key stakeholders for this organizations since the majority of the respondents 53.17% indicated that the government policies and strategies are ineffective. Customer relationship management had significant effect on organization performance and this requires that to improve on quality production and lead time, manufacturing firms must also improve their customer relationship management. Since the quality of the products has not significantly improved for the last 5 years, more strategies must be put in place to incorporate technology which will aid to improve the quality and also maintain required lead time in these organizations. Other researches and scholars may want to build on this study and explore other areas of interest that were not covered in this work.

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Co-Design: Catalyst for Inclusion in the Design Process

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Abstract

Older persons are considered custodians of culture and the knowledge they possess need to be preserved for posterity. Is there a good approach to extract this knowledge and package it for posterity? This paper is an analysis of co-design approach and how it can be used to induce, capture and collect the knowledge, ideas, wishes and hopes of a group of older persons for the preservation of a cultural museum. Through the use of co-design tools, the older persons provided visual narratives that were used to redesign RAMA Cultural Centre in Homabay County. A field survey in Homabay County in August 2016 revealed that RAMA Cultural Centre had many cultural artifacts that were not well preserved and were at a great risk of destruction from environmental factors such as pests, molds and theft. Besides these, the older persons who were the curators of the cultural museum, had not been able to successfully integrate the youth in the management of the museum leading to a possible extinction of this indigenous knowledge. The methodology describes the co-design tools and how they were applied to include the older persons in the design of the RAMA Cultural Museum. The discussion is on co-design approach for novice researchers, possibilities and challenges of co-designing with older persons and concludes with learning on how to effectively co-design with non-designers, specifically older persons, tapping into their dreams and aspirations so as to inform as well as inspire the design development process.

Key Words: *Co-design, Co-create, Participatory Design, Probes, Prototypes, Generative Design Tools, Older Persons*

INTRODUCTION

Background to the study

Co-design refers to designers and people not trained in design working together in the design development process (Sanders & Stappers, 2014). The 1960s and 1970s witnessed a design community, concerned with the involvement of users in the design process for production of more acceptable products (Cross, 1971) and this has evolved to a present day where co-design has become rigorous and is a widely used approach across a range of contexts such as healthcare management, natural resource management, community mobilizations and so on. Co-design is considered collective creativity as applied in the whole design process. According to Steen, et al., (2011) co-design is an approach that enables a wide range of people with diverse abilities to make a creative contribution to the solving of a problem. It is on this basis that co-design is considered a panacea to solving a myriad of problems leading to a great interest in it from different sectors such as business, healthcare sector, government and private sector, the reason being, through co-design, users are empowered and the design process becomes democratic.

THEORY

How do designers and non-designers engage in a design process? How is information shared between them to the point of a design solution? According to Sanders & Stappers, (2014) co-design considers the 'user' as the custodian of knowledge. The role of the designer is then to develop tools and methods through which this knowledge can be harnessed from the user. Brandt et al., (2013) in looking at ways to engage 'users' talks about their diversity and how the same can affect the nature of engagement. This diversity is a factor of age, gender, language barriers, literacy levels, all of which necessitate creativity in approaches to engagement.

Co-design with communities

One of the key differences between co-design and traditional design processes is that the design team will face a community and not a 'client' and will involve several stakeholders including government officials and NGO representatives amongst others. The designers will work to co-create with people for whom design, design concepts or design processes have not yet been part of their experience. This is one of the reasons why in preparing for such a task, it is important for the designer to immerse into the community in order to understand its culture, needs and structure. It becomes very important to be observant of social dynamics. The co-design process should never be driven by individual interests, but should be communal and collaborative. To effectively collaborate with the community, the following considerations need to taken:

Build empathy

Get to know the community before engaging in co-design. Each community is unique and cultures differ from one to the next. Start by knowing the basics; levels of education, language, social structures, expected code of conduct and so on. When a designer becomes one with the community the co-design process becomes easier.

Make use of visual materials

For the community, it may difficult to understand conceptual ideas on an abstract level. Visualizations have proven to be very useful as a means of presenting ideas and as a basis of discussion and involving the community. Visual clues will reduce complexity and make contexts and correlations tangible and thus comprehensible and will allow people with diverse abilities participate in the design process. Visual aids also form a basis for storytelling and narratives and will complement spoken explanations and written concepts.

Assign roles to the community

One of the greatest challenges of co-designing is that of treating the community and other stakeholders as equal partners in the design process and allowing each to create. Sometimes the assumption the community makes is that someone has come to solve our problems. It also sometimes becomes very difficult to avoid providing ready-made solutions to the community. Misunderstandings of roles and in consequence frustration can be avoided when processes and roles are continuously and critically reflected upon and explained. The role of the designer is often that of a facilitator and not a creator and for some designers, this becomes difficult. Co-design means that the community should be actively integrated into the design process and be

allowed to provide their solutions to their challenges and all parties must be aware that they can or must take a creative role in the process.

Feedback

Providing timely feedback is very important in co-design. It creates a platform for further reflection on the outcomes of the process and can be a breeding ground for greater ideas. Timely feedback also builds trust amongst participants.

Co-design with older persons

Our ageing populations make it critical that older persons continue to live and participate in their communities. The ageing of individuals is associated with a decline in abilities such as sight, hearing, working memory, fine motor control, speed of response and mobility (Siu, Ng, & Chan, 2011). Accompanying these are degenerative illnesses that come with age and a lack of effective social and family support system for the older persons. These challenges, coupled with policy and governance issues, have led to a surge in the number of studies that seek to address the well being of the older persons (Beverfelt, 1984; Lindsay et al., 2012; Margot et al., 2015; Siu, Ng, & Chan, 2011; Massimi & Baecker, 2006), mainly focusing on co-design for health management, housing needs, access to technology and use of assistive devices. Little has been done in terms of research on how to tap into the tacit knowledge the older persons possess. Studies done by Beverfelt, (1984) on life histories of elderly Norwegians, show that the older persons can make significant contributions to culture in general as well as gerontology. Most older persons have a responsibility as culture bearers and their experiences may be used to teach younger generations about culture and for cultural posterity. The challenge is often how to engage the older persons in harnessing this knowledge and expanding its access to the world as a whole.

RESEARCH METHODOLOGY

Co-design approach for design research

In recent decades, co-design has become a widely used approach in design research. In it, users and designers work together to create, propose and develop their ideas and solutions together. Co-design is a versatile approach that offers all stakeholders a means of engagement in collective action, creativity, understanding and mutual learning (Sanders & Stappers, 2014). Through co-design, participants offer constructive solutions in relation to products, services and systems. This approach to design has several advantages as compared to classical design approaches shown in Figure 1 below.

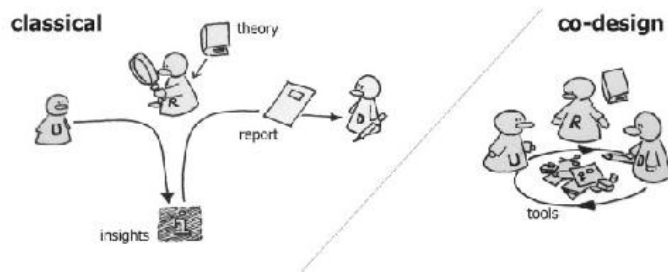


Figure 1: Classical roles of users, researchers, and designers in the design process (on the left) and how they are merging in the co-designing process (on the right).

Source: Sanders & Stappers (2008).

One key advantage is that in co-design, there is direct involvement of people in producing tangible ideas as a means to generate insight and creativity. In addition, the collaborative design experience often helps to uncover and address previously unmet or unrecognized needs. Lastly, the shared decision-making involved in co-design allows people to progress towards shared goals in ways that offer mutual benefit for all participants. It has been observed that involving local stakeholders is crucial in the design of products, services and public facilities (King, 2019). As a result, social researchers and design practitioners are involving local stakeholders in developing a knowledge pool for their specific needs through co-design. This participatory process is considered a means to stimulate creativity in developing effective design interventions.

This project aimed to collect and organize local communities observations and to use their insights to improve the existing designs and operations of RAMA Cultural Centre. Members of the local community in charge of the day to day running of the centre were assembled in a two-day workshop to share knowledge and insight through a participatory design process. This approach allowed a multi-perspective view of problems and design solutions.

Co-designing with RAMA Cultural Centre members

The researcher in this project applied co-design approach in exploring possible solutions to problems that affect the sustainability of RAMA Cultural Centre. The main objective in establishing RAMA Cultural Centre was to conserve and preserve Luo heritage through collecting, curating and exhibiting Luo material culture. This is intended to lead to the establishment of a vibrant community-based tourism enterprise. To grow into the greater vision, the center is currently involved in cultural festivals within and around the Nyanza region. They also organize tourism excursions within Karachuonyo to Lake Simbi Nyaima, Homa hot springs, Gor Mahia Shrine and Otok Pottery. However, the centre faces several challenges, key being that the already collected cultural materials are not well curated and are at risk of destruction from environmental factors. The center itself is also in a debilitated state, putting at risk the cultural materials stored in it. Existing exhibition and display does not effectively promote the cultural materials nor provide knowledge on the same. It was therefore evident that there was need for greater public participation in the refurbishment of RAMA Cultural Centre. Based on these challenges, the researcher conducted a co-design workshop with an aim of building on tacit knowledge of the local community and riding on their vision to build a sustainable centre in terms of activities, visitor numbers and economic benefits. The main objective of the co-design workshop was to

improve on the exhibition and display at RAMA Cultural Centre, which the participants agreed on as the backbone of their enterprise. The participatory design research exercise involved a group consisting of six older persons, a designer (undertaking the role of the researcher) and a research assistant. These people were engaged in sharing their views about material culture, how to promote it in the community and best ways of exhibiting and displaying the material culture so as to engage visitors and enable them learn more.

Co-design tools and techniques

Participation in co-design is not a one approach, but a myriad of design activities that together provide the basis for the envisioning of the new. Designers and non-designers engage in activities focusing on telling, making and enacting as ways of enhancing participation.

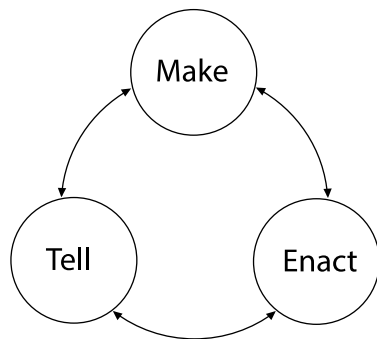


Figure 2: A participation in design by stakeholders involves tools and techniques that combine telling, making and enacting. The tell-make-enact diagram is circular with double-headed arrows to illustrate how the actions are connected and to indicate that participation goes both ways in the circle.

Source: Brandt, Binder, & Sanders, (2013)

Stappers and Sanders, (2008) suggest that in order to participate in the design process, the users must be given appropriate tools to express themselves. They suggest the development of co-designing tools and techniques such as three-dimensional toolkits that allow common people to communicate their own ideas.

The main objective of this project was to improve on the exhibition and display at RAMA Cultural Centre. One of the agreed on approaches by the participants on achieving this was to first align the exhibition and display along certain themes. The researcher used probes to enable participants come up with themes for the exhibition and display. Probes refer to design-led approaches that invite participants to express their experiences, feelings and attitudes in forms and formats that provide inspiration for designers (Gaver, Dunne, & Pacenti , 1999). Probing is a form of exploratory and design oriented self documentation method. Probing kits come in endless variations such as post cards, diary books, maps, instant cameras and so on. In this project, the researcher provided the participants with cards (Figure 3) that had images of all the cultural materials in the museum².

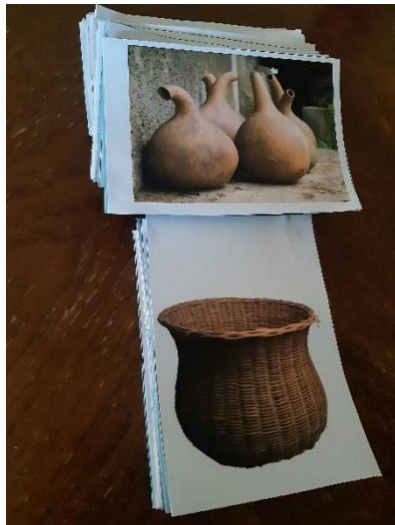


Figure 3: Pictures of cultural materials to be used in Card sorting

Source: Author (2019)

Once the themes had been identified, the second step was to come up with a prototype of the physical exhibition and display which would align to the identified themes. The researcher came up with three-dimensional toolkits as shown in Figure 4, Figure 5 and Figure 6 below:



Figure 4



Figure 5

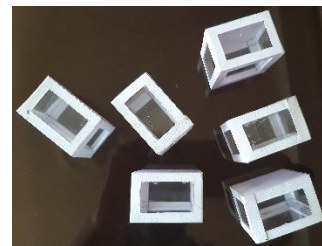


Figure 6

The use of 3D models was informed by the research of Sanoff (2000; 2010) who provided participants with small scale paper based representations of physical components (trees, buildings, people) to allow them to explore physical design options for interior and exterior environments. Similarly, also informed by the research of Sanders, (2003) who has been exploring with the use of 3D prototypes for hospital planning and architecture. Basing this project on the works of the mentioned researchers, participants at RAMA cultural centre were provided with small scale paper models of display units and a model of the interior of the centre and were asked to explore different options of displaying the cultural objects. As they were working on the exhibition and display of the interior space, they also explored the flow of movement within the centre.

RESULTS AND DISCUSSION

Results

Current State of RAMA Cultural Centre

The physical structure at RAMA Cultural Centre is in a deplorable state. The exterior is made from iron sheets, which are not well reinforced (Figure 7). This has led to instances where the centre has lost some items to thieves who can get easy access to the museum. The interior (Figure 8) is dark with no lighting and poor ventilation. This results to a humid environment, which can cause molds on objects and is also a good breeding ground for such rodents such as rats, which are a danger to the artifacts.



Figure 7 (Left) and Figure 8 (Right): RAMA cultural centre museum, exterior and Interior spaces.

Source: Author (2019)

The cultural items on display needs to be protected from environmental effects such as dust, insects, rodents and accidental breakages through proper displays and preservation. Figure 9 below shows objects displayed on the ground without a barrier around to prevent them from accidental breakages. Figure 10 below shows items stacked on to each other probably due to lack of space. This display makes it difficult for visitors to get a full experience of the items. Figure 11 below shows breakages on items due to improper display. Figure 12 below shows books and other texts on display but they are not protected from dust and are susceptible to destruction by insects or rodents.



Figure 9: Items on the floor



Figure 10: Items stack together



Figure 11: Breakages



Figure 12: Dusty books

It is on this backdrop that this project was about redesigning the exhibition and display at RAMA Cultural Centre.

Exhibition and Display Themes

The older persons came up with a display proposal meant to tell the story of the Luo people. The story revolved around food and according to the group, everything about the Luos can be discussed around food. The story tells how food is gathered, prepared, served, stored and how food by-products are used. Table 1 below shows items under each category of the story:

Table 1: RAMA cultural centre display narrative

CATEGORY	ITEMS
Gathering	Bows and arrows, Fishing nets, Ropes, knives etc
Preparation	Pots, Grinding stone, Spoons etc
Service	Calabashes, bowls, stools, mats etc
Storage	Baskets, Pots, Food holders, calabashes etc
By-products	Musical instruments such as drums, nyatiti etc
Others	Books

Source: Author (2019)

The visual representation of the proposed exhibition and display of RAMA cultural centre can be summarized in Figure 13 below:

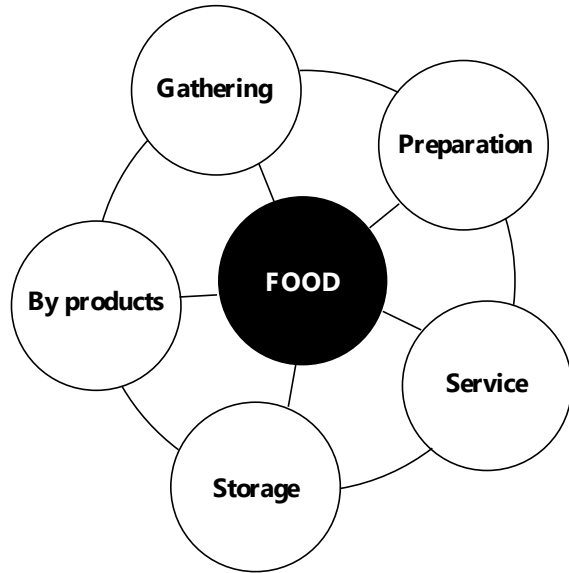


Figure 13: Display narrative at RAMA cultural centre

Source: Author (2019)

Using the provided 3D models, the participants agreed on exhibition and display layout is shown in Figure 14 below.

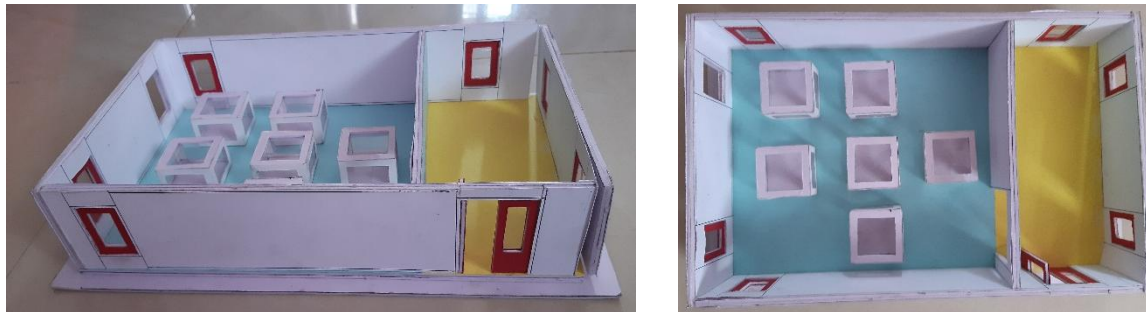


Figure 14: Display design for RAMA Cultural Centre

Source: Author (2019)

Discussion

Navigating Co-design as a Novice Researcher

From literature, it is noted that there are a myriad of co-design tools and techniques but no guidelines on the choice of tool or technique for a particular project. This makes it very difficult

for young researchers to engage in co-design as an approach for creating. To avoid a ‘hit and miss’ as related with the tools and techniques, some learnings from this project include but not limited to:

Having an indepth understanding of the participants Demographics

Demographic is the statistical characteristic of a population such as age, gender, income, education, race and so on. Having a prior knowledge of this can help the researcher determine the appropriate tools and techniques. For instance in this project, the participants were male, elderly, had a form of basic education and would be considered to be of low-income bracket. As a result of this, the choice of tools and techniques to use needed to be visual, quite easy to navigate and devoid of technical jargon.

Mindset

Mindset, especially when co-designing has been a challenge in design circles for long. Co-design is basically a collaborative process that engages with users in equal partnership with an aim of achieving meaningful, realistic and workable solutions to real social issues. The designer needs to acknowledge the community as the ‘expert’ while at the same time, the community have to be confident in their ability to create. A designer getting into this space need to be open and facilitate co-design sessions without undermining the community. This may need a level of education in co-design as a practice. The designer needs to raise awareness in the community and enable them to engage in a way that gives them the confidence in their ability to create.

A community that has a history of political injustices, retrogressive cultural practices and sometimes low literacy levels, may rarely view themselves as capable. In this project, the researcher came to the realization that members of RAMA Cultural Centre have a long history of reliance on aid from the government and aid agencies. Most of them perceived the planned workshops as sessions where the researcher will present her ideas, implement them and engage them in different ways. It took a while for them to adjust to the idea of co-design. The researcher on the other hand had to develop tools and techniques that put them on the creators pedestal.

Facilitation

A facilitator is a person who monitors the design process and develops strategies to create new encounters between the community and the design problem. One important characteristic of a facilitator is to play a neutral role. Community participation may involve large numbers of people, each with diverse opinions. The dynamics of large group discussions may often lead to awkward disagreements and dead end discussions. The facilitator then becomes the person to guide the group through such challenges by offering a supportive voice to every participant during the co-design sessions. Facilitation therefore becomes management of team dynamics

Successful facilitation in this project begun by choosing the right tools and techniques, based on the type of participants and the problem to be solved. The next was in guiding the participants along the phases of co-designing. Each activity was clearly defined and expected end result agreed upon. The community was also provided with real-time representation of what was going on during the sessions.

Experiences of engaging with older persons in Participatory design

Empirical research proves that older persons are capable of engaging effectively in participatory design activities (Lindsay et al., 2012; Massimi & Baecker, 2006). However, every designer needs to be cognizant of the fact that age brings with it challenges that may limit the choice for the methods and tools for participatory activities and necessitates that the process is well thought out. Lindsay et al., (2012) observed that while engaging in participatory design with people living with dementia in the design of safe walking aids, there was a lot of struggle amongst the participants in envisioning the new technologies. A similar observation was made by Massimi & Baecker (2006) when engaging older persons in the development of mobile phones.

Several observations were made in this project as regards working with older persons in a participatory design process. One of this was that the older persons were delighted by the opportunity to discuss their experiences, with a hope that those experiences would be a springboard for great design ideas. The choice of co-design tools and methods should be those that encourage discussion, whether visually or verbally. The language used in design sessions and the structure of the sessions need to acknowledge the limitations brought about by aging. One of these limitations is the inability of older persons to stay focussed on a single issue for a considerable duration of time, making it necessary to have several short sessions with breaks in between. Other limitations included physical and sensory disabilities, difficulty in envisioning future scenarios which is important in participatory design.

The challenges of engaging with older persons in participatory design

Any engagement with older persons is not without its challenges and findings from other studies in this area correlate with the findings of this study. Identified are four key factors to consider in participatory design with older persons.

Make use of simple and intuitive co-design tools and methods

Technology is considered good and can make work easier and faster. However, for older persons, adapting to technology is sometimes a challenge. In co-designing with older persons, there is a need to use simple and basic technology, which is intuitive to use. In this project, one co-design approach would be to ask participants to build a photo diary of what they thought a good exhibition and display of a cultural museum would look like. One challenge of this approach is that most of the older persons have mobility challenges and when there was need for travel, it was often not for leisure. This approach would also be limited in case the older persons do not have access to cameras and even if they could get access, they may be limited in the knowledge of how to use it. Alternative to this co-design approach was the use of sketches. The participants would be allowed to describe in detail examples of good exhibition and displays they have seen. The designer then would translate these into an illustration and all would provide feedback as the sketch is developed. In this project, the older persons were given 3D models to use to reconstruct the exhibition and display at RAMA Cultural Centre.

Build a rapport and relationship with the older persons

It is often so easy for the designer to focus on getting information from co-design sessions instead of seeking to build a relationship with the older persons. Doing this helps build trust that

leads to better participation and a sense of ownership of the project by the older persons. The co-design tools should be those that engage in a way as to create a deeper connection with the older persons. Create an atmosphere where the older persons can freely express themselves either visually or verbally.

Anticipate potential physical and cognitive limitations of older persons

Based on research, all five senses (taste, touch, sight, hearing and smell) decline with age and as such, you find that most older persons may suffer from low vision, hearing loss and mobility impairments. To mitigate the effects of these limitations on the outcome of the participatory design, start by choosing an appropriate venue. Avoid staircases because there will be those on wheelchairs and walking aids. When communicating, use bigger print sizes and when talking, try to be audible. When addressing older persons, stand or sit in a location where everyone can see your face clearly since some older persons with hearing loss rely on lip reading.

Be flexible and have shorter sessions

When engaging in participatory design with older persons, be flexible. Allow for time outs when is needed. Let the choice of co-design tools and methods be varied and choice of use optional. Older persons often do have a short concentration span and that must be put into consideration during the planning phase.

CONCLUSION

This project has identified co-design as a versatile approach that offers all stakeholders a means of engagement in collective action, creativity, understanding and mutual learning. As a participatory process that stimulates creativity in developing effective design interventions, it provides a multi-perspective view of problems and solutions. Due to the physical and cognitive limitations of older persons, a lot of consideration needs to be put in place when developing co-design tools for use by them. One key observation is that the co-design tools need to be more visual other than textual. It is also possible to make use of tell activities, make activities and enact activities while co-designing. Preferable would be use of story telling, probes, scenarios and various generative toolkits.

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A Review of Dietary Intake and Nutritional Status of Children with Cerebral Palsy

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Abstract

Cerebral palsy (CP) is a group of neurologic disorders typically caused by a non-progressive lesion or abnormality of the developing brain that appears in infancy or early childhood and permanently affects body movement, muscle coordination, and balance. It is the most common cause of physical disability in childhood and is a significant health problem with major effects over the lifespan. The global prevalence of CP ranges between 2-10 per 1000 children in community-based samples with prevalence varying widely from country to country. Children are vulnerable to protein energy malnutrition (PEM) as well as micronutrient deficiencies because of their continuing growth that hikes their bodies' demand for nutrients. This risk of malnutrition is increased in neurologically impaired (NI) children due to a number of nutritional and non-nutritional factors. Among the nutritional factors is insufficient dietary intake due to feeding difficulties resulting from impaired chewing and swallowing. Cerebral palsy may be associated with a host of comorbidities such as undernutrition (46% to 90% of the patients), Studies have reported increased prevalence of morbidity and mortality secondary to compromised nutritional status among children with CP compared to their normal counterparts in the same age group. This review is aimed at assessing the effect of dietary intake on nutrition status of children with cerebral palsy. A review of various publications was conducted using the key words, Cerebral Palsy, disability, and feeding difficulties. This review shows that feeding difficulties due to motor dysfunction is common in children with CP and may reduce their dietary intake resulting to poor health and nutritional status. There is need to develop effective interventions aimed at improving the dietary intake of children with CP. Such interventions could help mitigate poor nutritional status as well as improve their quality of life.

Key Words: *Cerebral Palsy, Dietary intake, Nutrition status, feeding difficulties*

INTRODUCTION

Background to the study

Cerebral palsy is a common childhood disability that affects sensory motor functions and leads to impaired motor behaviour and oral motor dysfunction. It is a physical disability that affects 0.4% of children globally (Pulgar et al., 2019). According to the World Disability Report (2011), 15% of the global population constitutes persons with disability. In Kenya, the overall disability rate is 4.6% translating to 1.7 million Persons with disabilities. Of this, the largest proportion is physical impairment, amounting to 24% (413,698), of which CP is inclusive (KNBS; NCAPD, 2008). CP is thought to be even more common and severe in low-income countries due to lack of access to early intervention and obstetric, neonatal, and rehabilitation services (Claudia et al., 2018). Studies conducted in Kenya by Auka and Afedo in 1986 and Kennedy in 1990, showed

that CP affected about 0.25% of children. In the same study, CP was noted to be the second most common neurological condition causing physical impairments after poliomyelitis in Kenya (Auka and Afedo, 1985; Kennedy, 2001). Current data on prevalence of CP in Kenya is lacking.

Malnutrition, either under or over-nutrition, is a common condition among neurologically impaired children. Energy needs are difficult to define in this heterogeneous population, and there is a lack of information on what normal growth should be in these children. Non-nutritional factors may influence growth, but nutritional factors such as insufficient caloric intake, excessive nutrient losses and abnormal energy metabolism also contribute to growth failure. (Aggarwal et al., 2015; Penagini et al., 2015).

Depending on the severity of the impairments, children with cerebral palsy have feeding difficulties due to their inability to put food into their mouth and due to chewing and, or, swallowing problems. This situation makes them dependent on others, risking malnutrition, which negatively impacts on the quality of their life (Kakooza-Mwesige, 2015). Various studies have reported high prevalence of malnutrition among CP children in different settings (Almuneef et al., 2019; Penagini et al., 2015b; Rajikan et al., 2017). A study conducted by Koriata (2012), in Kenya among children with CP attending Kenyatta National Hospital outpatient clinic, showed that 70.3% were malnourished.

Food intake is one of the factors that determine malnutrition. Feeding dysfunction such as Oropharyngeal dysphagia due to motor dysfunction is common in children with CP and may reduce their food intake, resulting to poor health and nutritional status (Rempel, 2015) Adverse consequences of malnutrition among children with CP are widespread. Evidence from different countries reveals that malnutrition among children with CP results in poor health-related outcomes, poor quality of life and premature mortality (Power et al., 2018).

Nutritional requirements of children with CP

Studies reviewed indicate that many children with CP have decreased energy requirements in comparison with typically developing groups and that these differences increase with increasing severity of gross motor impairment. Differences are partly because of decreased basal metabolic rate and largely because of reductions in physical activity levels. (Bell and Samson, 2013). It is reported that the energy requirements of CP children who are able to walk and have athetosis are higher than those unable to walk (kakooza-mwesige et al., 2015). A healthy child requires 2000 kcal/day. However, energy requirements of children with severe CP who utilize a wheelchair for mobility have been reported to be between 60 and 70% lower than healthy typically developing children (Walker et al., 2012), so their energy requirements are between 1200-1400 kcal/day. Children with mild to moderate CP, who can ambulate often require more calories to perform daily activities than their normal counterparts (kakooza-mwesige et al., 2015).

Adequate protein intake is required to build and repair tissue, for adequate growth and development in childhood. There is currently no data available for protein requirements of children with CP therefore their requirements do not differ from the typically normal developing children and recommendations can be applied (1.0 g/kg of bwt/day) Severely malnourished children with CP, require additional protein for 'catch up' growth. Overall, an intake of 2.0 g/ kg of bwt/day of protein intake is considered to be sufficient in these instances (Pencharz, 2010).

Many studies have found that children with cerebral palsy have poor bone density. Factors leading to this are both nutritional and non-nutritional. Non-nutritional factors are lack of weight bearing activity due to long periods of immobilization; anticonvulsant medication interfering with vitamin D metabolism (sodium valproate); lack of exposure to sunlight; and metabolic bone disease associated with prematurity. Nutritional factors include oral motor dysfunction resulting in poor nutrition and low calcium intake. The development of healthy bones is dependent on adequate Vitamin D, Calcium intake and Weight bearing or resistance physical activity. Vitamin D deficiency can lead to osteopenia, which in turn can lead to chronic bone pain and fractures. The most common site of fracture in children with immobility is the distal femur (Herderson et.al., 2002).

Children with cerebral palsy that are high risk for vitamin D deficiency include those, with low exposure to sunlight living in residential care, with dark skin those taking anticonvulsant medications as they can cause increased degradation of hydroxy vitamin D in the liver

A study by Henderson et al., (2002) found that bone mineral density (BMD) in the femur of children with spastic cerebral palsy was lower than recommended calcium intakes. Regarding fluid intake, studies reviewed show that some children with cerebral palsy experience fluid losses through excess salivation or sweating and unable to consume adequate quantities of fluid and/or to communicate thirst (Bell and Samson, 2013).

Children with cerebral palsy are at risk of inadequate micronutrient intakes because of their reduced energy requirements and subsequent intake. (Bell and Samson, 2013) Micronutrient deficiency can impair immune function, lower cognitive function, reduce bone density, and stunt growth. There has been little research on micronutrient adequacy in children with cerebral palsy. Estimated Average Requirement (EAR) or approximately 70% of the Recommended Dietary Intake (RDI) or Adequate Intake (AI), with specific note to: Iron, Zinc and vitamin C for pressure ulcers, Calcium (Schoendorfer et.al.,2010).

Causes of Malnutrition in CP

According to Claudia et al., (2018), a large number of children with special needs are malnourished. Malnourishment in children can lead to serious problems and they may constantly feel cold and loose muscle mass and body tissue. Over time, their skin may become dry and pale. Malnourished children also tend to get sick at higher rates. They also take longer to heal from wounds and illnesses, and they may experience respiratory failure. These health complications are serious, and severe cases of malnourishment can lead to death. It is important therefore to ensure that children with cerebral palsy receive the necessary nutrition to remain healthy.

Some of the factors that lead to malnutrition in children with CP are;

- 1) **Inadequate nutrient intake** due to feeding dysfunction. Feeding difficulties(FD) interferes with the child's ability to adequately consume essential nutrients required for growth (Bell and Samson, 2013), impaired chewing and swallowing Coughing/choking during feeding, inability to take solid foods, inability to self- feed, vomiting/regurgitation and drooling.
- 2) There is also **increased nutrient losses** due to frequent regurgitation. Reflux esophagitis may cause discomfort leading to food refusal and further decreasing food intake.

3) **Altered metabolism** is another factor. The resting energy expenditure is lower in children with CP than in controls matched for age and weight. Hypotonic CP Children require few calories above the resting energy expenditure to thrive. Children with increased muscle tone (athetoid) forms of CP may require an increased amount of calories.

4) **Longer Duration of feeding;** Children with CP often take longer duration to eat as compared to normal children. Parents have reported mealtimes to be stressful and time consuming. It can take up to 7 hours a day to feed these children. Mealtimes are often interrupted with repeated spillage of food, coughing, choking and regurgitation. Several studies have reported the mean duration of feeding session among these children to be 30 minutes (range 10-60 minutes). Children with more number of feeding problems took longer to eat.

5) **Chewing problem;** Chewing food with solid textures is difficult for children having eating impairments. They often have difficulty in transitioning to solid food and can better withstand liquid and/or semi-solid diets (Aggarwall, 2015). Children with CP can develop atypical and compensatory movements during oral functioning, evidenced by the difficulty in coordinating swallowing and breathing, as well as in dissociated oral movements, determining eating disorders, which affect different aspects of the child's life.

MATERIALS AND METHODS

From the studies reviewed, all caretakers were interviewed and informed consents were obtained. Information on demographic characteristics and feeding disorders were gathered by using a questionnaire. For feeding problems, the Parent Nutrition Screening Checklist questionnaire was used. The questionnaire comprised of questions which included subject's general health, feeding problems, behavior problems and dietary habits based on the parent's perception. Information on nutrient intakes was collected from parents/caregivers by recording their child's food intake for three consecutive days (two weekdays and one weekend) in the food diary that was provided. Their mean daily energy and macronutrient intakes were calculated. Energy intakes of subjects were compared to their energy needs based recommendation which were adjusted for their age, gender and level of physical activity. The macronutrient and micronutrient intakes were compared to the Recommended Nutrient Intake (RNI) distribution values based on sex and age (walker et.al.,2013)

In other studies, a 24-hr dietary recall questionnaire and a feeding observation schedule were also used. The 24-hr dietary recall recorded feeding frequency, types of food, and food modification methods. The feeding observation used a structured observation checklist during observation of one meal. (Claudia et.al,2018) The interview guide, food recall questionnaire, and observation checklist were all based on tools developed for a study by Adams et al. in Bangladesh (Adams, 2009). A recent study on children with cerebral palsy in Uganda confirmed that use of the WHO standard deviation scores (Z-scores) provides accurate parameters for assessing malnutrition in patients with cerebral palsy (Kakooza-mwesige ,2015).

RESULTS AND DISCUSSION

In many studies, it was observed that children with CP had significantly lower caloric intake in comparison to controls (CG). The ratio of daily nutrient intake of being under 80% of RDA, were lower in the children with CP than the CG, although the differences were not significant. The mean daily caloric intake of the children with CP was lower than the CG ($p < 0.05$). In a study carried out in Kenya by Koriata (2012), it indicated that Overall, 70.3 % of children with CP were malnourished, 35.0 % were severely wasted and 10.7% were severely stunted. Some of the factors that were significantly associated with moderate to severe wasting were; vomiting/regurgitation after feeding ($p = 0.031$). A Study carried out in Uganda reveal that more than half (52%) of the children with cerebral palsy were malnourished, as they had a Z-score of below 2.0 in at least one of the indicators. Underweight was the most common form of malnutrition, recorded in 53 of 127 children (42%), followed by stunting in 48 of 128 (38%). Notably, 4% of the children were overweight (Kakooza-Mwesige et.al,2015). A study in Ghana, which assessed feeding difficulties and nutritional status among 76 children with CP and explored the impact of a 12-month, community-based, parent training program revealed that caregivers found mealtimes stressful due to time demands, messiness, and the pressure of providing enough quality food. They felt that the training program had helped reduced this stress and dietary recall data suggested some improved dietary quality. However, there was neither improvement nor deterioration in anthropometric status of the children (Claudia et.al.,2018).

In a study by Rajan and Zakaria (2017), it shows that fiber intakes amongst subjects were very poor (24%), lower than the recommended levels with significantly lower intakes amongst the severe subjects (20%) compared to subjects with mild severity ($z = -2.361, p < 0.05$). This happens due to subjects' poor ability to chew vegetables and fruits, causing parents to feed these children with smaller vegetables and fruit portions.

Quality of life (QoL) scores were significantly lower among caregivers whose children had the greatest difficulties with feeding (median score 9.0) compared to those with least difficulties (24.6, $p = 0.004$) even with adjustment for potential confounders (caregiver and child age, SES, north/south and cerebral palsy severity). QoL was similar for caregivers with a child with cerebral palsy who was underweight (10.8) compared to caregivers whose child was not underweight (11.8, $p = 0.12$).

CONCLUSION AND RECOMMENDATION

Conclusion

Children with CP experience difficulties during eating and drinking, which if not managed properly may result in stressful mealtimes, chronic malnutrition, respiratory disease, reduced quality of life of child and caregiver and reduced life expectancy. Further, lack of medical care facilities, cultural barriers, minimal formal education and extreme poverty, worsen the condition of disabled children in developing countries (Aggarwal et.al,2015).

The findings of this review points out mealtime challenges encountered by children with CP and their caregivers which are largely reported in studies from many countries. The results suggest

that caregiver training can alleviate some of the difficulties faced in relation to feeding their child with CP, and some of the stress associated with these. However, in some studies which the intervention involved caregiver training alone, there was no significant improvement in the children's anthropometric nutritional status (Claudia et.al.2013).

Researches have shown that an improvement in nutritional status results in improvements in general health. This review shows that feeding difficulties due to motor dysfunction is common in children with CP and may reduce their dietary intake resulting to poor health and nutritional status. Caregiver burden is also a significant concern, the feeding process may require considerable time and may be associated with stress and caregiver fatigue, therefore impacting on their quality of life (Sullivan,2005).

Emphasis should be therefore placed on an early identification, treatment and correction of FD. Management of feeding problems should co-exist with timely assessment of growth among these children. Increasing awareness among caregivers/ parents, government and health care providers, regarding the needs of children with disabilities and their feeding difficulties is urgently warranted (Aggarwal et.al, 2015).

Recommendations:

Based on the study results, there is need to develop effective interventions aimed at improving the dietary intake of children with CP. Such interventions could help mitigate poor nutritional status as well as improve quality of life of children with CP and secondly parents' should be taught on ways to incorporate higher portions of vegetables and fruits in their children's diet in order to increase their fiber intakes.

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Factors Influencing Public Participation in Environmental Impact Assessment Process of Nairobi-Thika Superhighway Improvement Project in Nairobi City County, Kenya

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Abstract

Public participation is a key component in environmental impact assessment and governance. Public participation is a process by which public concerns, needs and values are incorporated into governmental and corporate decision-making with the overall goal being decisions that are supported by the public. Public participation is also important in the development and management of natural resources. Environmental impact assessment (EIA), on the other hand, is a procedure which seeks to ensure that adequate prior information is obtained on likely environmental consequences of development projects, on possible alternatives and on measures to mitigate the adverse impacts. The objective of this study was to examine key factors influencing public participation in the EIA process for the Nairobi-Thika Superhighway Improvement Project in Nairobi City County. The study adopted a descriptive research method with a total sample of 120 respondents/households sampled from along the Nairobi-Thika Superhighway within the County. The key finding of the study is that despite high levels of public awareness about the project, there was low knowledge on the need to participate and low level of actual participation in the EIA process. The reasons for low participation were attributed to lack of time, lack of knowledge about the need for participation and lack of trust and transparency in the EIA process. The study recommends enhancement of public education about public participation in development projects. Project planners and implementers need to observe transparency in the EIA process for increased public trust, acceptability and support.

Keywords: *Public Participation, Environmental Impact Assessment, Public Education, Transparency, Trust, Acceptability*

INTRODUCTION

Background to the study

Public participation (PP) has increasingly become a significant and integral part of environmental governance. The global environmental instruments emphasize the need for public participation in environmental matters (Shelton, 2004,p.2).Public participation is defined as the process by which public concerns, needs and values are incorporated into governmental and corporate decision-making with the overall goal of better decisions that are supported by the public (Creighton,2005,p.7). The ‘public’ or ‘publics’ potentially include everyone (Coffey, 2005,p.28). Public participation plays a key role in enhancing environmental democracy and there is an increasing recognition that environmental issues must be addressed by all, or at least

a majority of those affected by their outcome, not just by the minority comprising the governments and leading private sector actors (Mumma, 1999, March). Public participation in decision-making is essential for local development in general and in the management of natural resources in particular (Okidi, 2008, p.30; Muigua *et al*; 2015 and Pring, 2001).

Public participation is regarded as the cornerstone of Environmental Impact Assessment (EIA) and is critical in informing decision makers of the potential environmental harms of a proposed project or action (Zhao, 2010). EIA is defined as ‘the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made’ (IAIA, 2015). First introduced through the National Environmental Policy Act (NEPA) of the United States in 1969; it is now an internationally accepted aspect of decision-making processes on issues affecting the environment. This law also embedded in the process of EIA the concept of public participation (Petts, 2003). EIA should be undertaken for all major development projects in virtually all countries worldwide (Sujit & Vikrant, 2018, p.1). The EIA process consists of various steps namely; screening, scoping, impact analysis, mitigation, impact management and report writing and decision making. Public participation cuts across each of the steps of the EIA process (UNEP, 2002).

The EIA tool is a proactive way to identify and mitigate negative environmental and social consequences of rapid economic development (Zuhair *et al*; 2016). EIA helps those involved in decision-making concerning development projects to make their decisions based on knowledge of the likely adverse impacts on the environment. EIA also gives individuals and communities a voice on issues that may bear directly on their health, welfare and entitlement to a clean and healthy environment (Angwenyi, 2008, p.167). Studies by Adomokai and Sheat (2004) and Wood (2003) reveal that in Bangladesh, public participation practice in government run EIA is much similar to many developing countries in Asia and Africa. The study on selected governmental projects suggest that public participation in EIA is very limited and stakeholders do not seem to have any noticeable influence on the decision making process. The study further indicates that participation took place at late stages where the stakeholder potential to influence decision-making process is extremely limited (Hasan *et al*; 2018). It is also noted that although public participation and involvement are essential parts of the EIA process, it remains a problematic issue in Sub-Saharan Africa and other developing countries (Kakonge, 1996; 1999).

Statement Problem

In Kenya, the Constitution (GoK, 2010) and enabling legislation provide for public participation. Public participation is a mandatory requirement for projects that are subject to the EIA process (GoK, 2017). The EIA is required to be undertaken by the developer or proponent when the lead agency, in consultation with National Environmental Management Authority (NEMA), is of the view that the project may have a significant adverse impact on the environment (Angwenyi, 2008). Depending on the scale and possible effects of the proposed project, an environmental review, an environmental impact evaluation or an environmental impact study may be conducted. Even though for the EIA, the legal framework in Kenya is enabling, the public is still inadequately aware of their role and is unsatisfactorily involved in EIA practice (Okello *et al*; 2009). Similarly, Onyango and Namango (2005) observed that participation in EIA practice

usually remains at the level of consultation and does not often reach higher ranks of citizen empowerment.

The importance of public participation in enriching decision making is recognized by various scholars and the same cannot be overemphasized. However, how to achieve effective participation still remains a challenge. In Kenya, several challenges hinder effective public participation in EIA process. These challenges need to be looked at with a view to encouraging public participation. This study was done between September and October, 2018 with the main objective being to examine key factors influencing public participation in the EIA process for the Nairobi-Thika Superhighway Improvement Project in Nairobi City County with a view to informing policy and practice to enhance effective public participation in the EIA process. Specifically, the study focused on the nature, level and challenges of public involvement in the EIA process for the project.

METHODOLOGY

The study was undertaken on the Nairobi-Thika Superhighway Improvement Project. This was a road project which was a dual carriage highway of about 45 Kilometers. The objective of the project was to improve road transport services along the Nairobi-Thika Corridor by reducing traffic congestion and enhancing mobility within the metropolitan area through better linkages to the immediate and distant suburbs. The expansion and rehabilitation of the said road was meant to alleviate perennial traffic congestion within Nairobi City, and between the City and the Satellite town of Thika. The project proponent or implementer was the Kenya National Highway Authority (KeNHA).

The specific area of the study comprised the households along the said Nairobi-Thika Superhighway which covers areas/centres of Ngara ,Ruaraka, Kasarani,Githurai, Roysambu, Utali and Juja which had a population of 88,885(GoK,2009).A sample size of 120 households from the seven centres along the highway were used. Out of the 120 households, ninety questionnaires were administered and responses obtained from the respondents. However, 30 respondents were not available for the interviews because of tight work schedules and personal commitments. Proportionate sampling method was used to determine the number of households per cluster for the study.

This was followed by simple random sampling to select the individual households for the study. Open and closed ended questionnaires were first pre-tested to ensure they were valid and subsequently administered by research assistants to elicit responses from the respondents. The questionnaires were used to generate quantitative data. Both primary and secondary data were gathered. Secondary data comprised of desktop review of published materials. The purpose was to guarantee reliability of collected data and thereby improve the validity of the data.

Quantitative data was analysed using descriptive statistics in order to determine frequencies and percentages. Descriptive statistics comprising of frequencies, percentages and graphs were used to present the results. The gathered data was cleaned, verified and coded before entered into Statistical Package for Social Sciences (SPSS) software where descriptive techniques were used for data analysis.

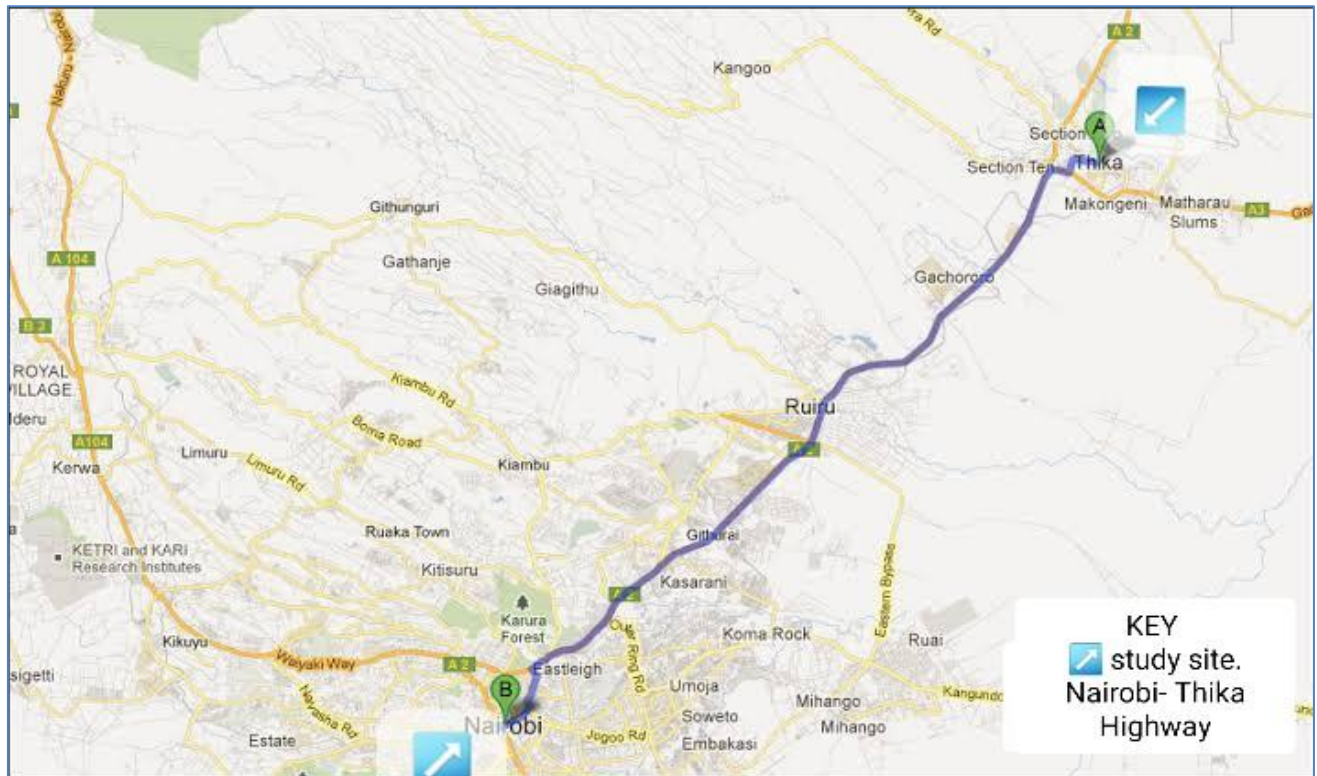


Figure 1:A Map Showing the Key Centres on the Nairobi-Thika Highway

Source: Google 2018

RESULTS AND DISCUSSIONS

Several factors were found to influence the level of public participation during the EIA process for the Nairobi-Thika Superhighway improvement project. The main ones were gender, awareness of the process and channels of communication used to pass the message to the public.

Gender distribution

The gender factor plays a critical role not only in public participation but in environmental matters. Out of the 90 respondents interviewed, 76.6% of respondents who participated in the EIA were male while 23.1% were female. The demographic data on gender participation indicates that the male respondents who participated in the EIA process were high as compared to women. The reason attributed to this difference is that men were more willing to participate in the study as opposed to the female. The low participation of women in the EIA is attributed to social norms and low level of education. The finding confirms other studies with similar findings related to women participation in projects. Conducted by Syremon et al,(2016) and Sujit and Vikran,(2018).

According to Syremon, *et al*, (2016) women participation in EIA is hindered by social norms which recognize men as household heads and community representatives, stereotypes, education levels, knowledge on the project and communication barriers. The situation is further confirmed by (Sujit and Vikran, 2018) on inclusion of gender in Environmental impact assessment study conducted in twelve countries including Kenya observe that despite the multiple roles women assume at the household level and society at large, their representation and participation in decision making processes remain abysmal. This can be attributed to strong patriarchal patterns and numerous gender-based assumptions in society.

Awareness and Participation in the Public Engagement in the EIA process

Public awareness about a project is important in enabling the public engagement. From the study out of the 90 respondents interviewed, all were aware of the Nairobi-Thika Superhighway improvement project having received information about the project However, despite the level of awareness of the project only 39.5% of the respondents participated in the actual EIA public deliberations. This indicates that awareness alone does not translate to public participation and more needs to be done to encourage public participation.

Channels of Communication used to Notify Respondents on Public Participation

It is a requirement of the law that members of the public are notified of the project and their input is required during the EIA process. From the study 92.1% of the respondents indicated that the newspaper was the medium through which they became aware of the public consultation while 7.9% of the respondents indicated that they became aware of the notification for public participation by word of mouth. From the study, limited channels were used which were newspaper and word of mouth which is limiting in notifying the public about meetings. The finding is consistent with the study by Okello, (2008) who found that information on public participation remains inaccessible to many people and observed that there is need to improve access to information.

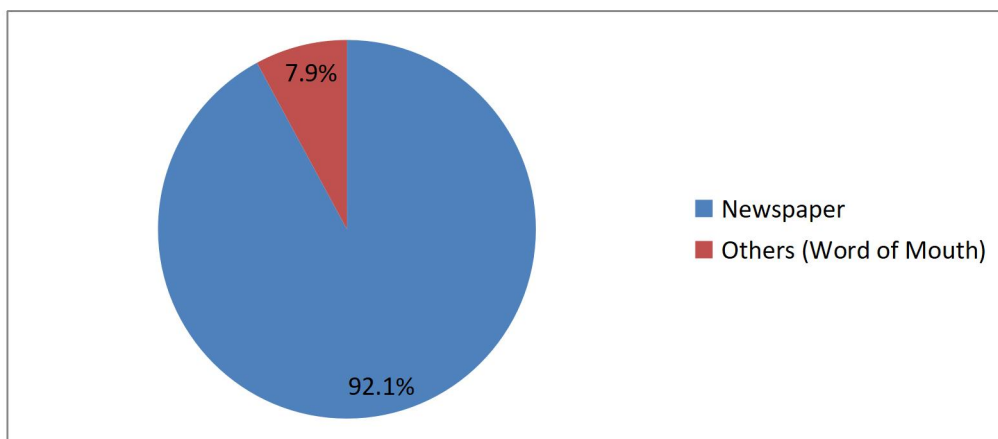


Figure 2: Channels of Communication used to notify the respondents of the public consultations for the project (Source: Author, 2018)

Reasons for non-attendance during public consultation

There was low attendance for the EIA public engagement in this project. The respondents interviewed cited various reasons for non-attendance during the public participation in the EIA process. All respondents cited lack of time, 83.3% of respondents indicated that they lacked information about the project, 88.9% of the respondents cited lack of trust in the system, whereas 75% and 78% of respondents indicated lack of transparency and conflicts of interest groups respectively. Other barriers cited to have hindered public participation in the project include, reliance on one channel of communication, the choice of venue of the meeting and poor engagement of stakeholders by NEMA and project proponents and the nature of EIA reports and documents.

The findings on low attendance in public participation in EIA process is consistent with previous studies conducted which revealed inadequate awareness by the public of their roles and rights during the EIA. Okello,(2009) in studies on public participation in EIA in Kenya found that although the EIA legal framework was enabling, the public were still inadequately aware of their role and were unsatisfactorily invited in EIA practice. Similarly, studies by,(Kameri-Mbote,2001,Okello, Marara *et al*, 2011 and Mwenda *et al*,2012) confirms low level of participation in EIA process in Kenya which is attributed to various obstacles.

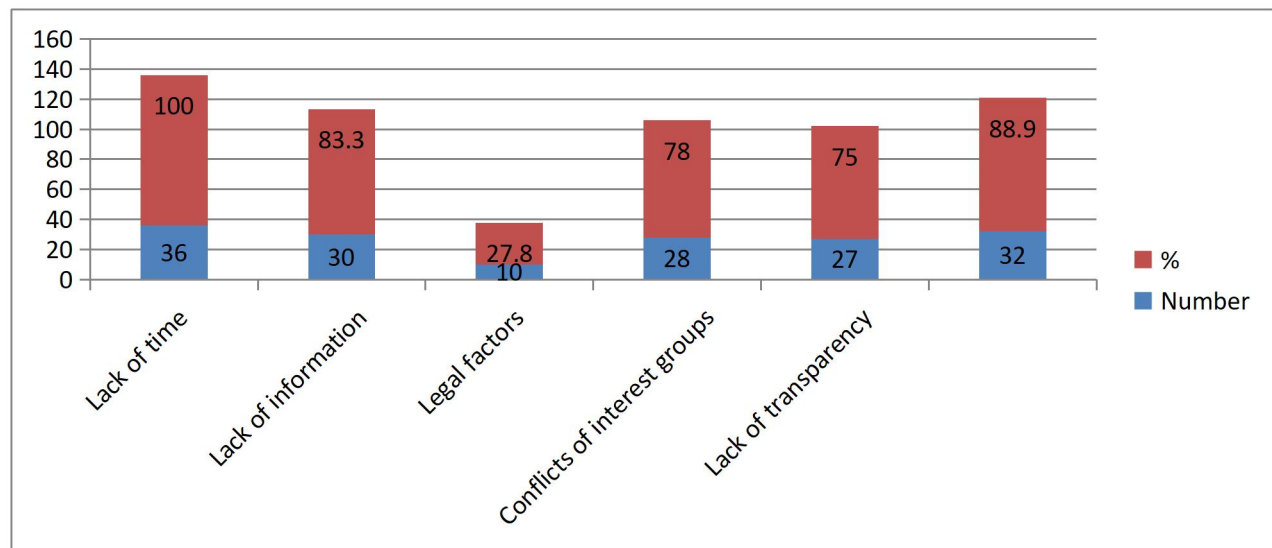


Figure 3: Reasons for Non-Attendance Public Consultation Meetings (Source: Author,2018)

CONCLUSION AND RECOMMENDATIONS

The study concludes that low knowledge on the need to participate in EIA process led to low actual public participation by individuals during the EIA process for the Nairobi-Thika Superhighway improvement project. The study recommends the following measures to improve the level of public participation during the EIA process.

Enhancement of public education and awareness

There is need to enhance public education and awareness on the importance of public participation in development projects particularly in EIA process. The National government, Ministry of Environment and Forestry, the County governments and environmental lead agency - NEMA should coordinate and develop civic education programs aimed at educating the public on their right and roles regarding public participation in development projects. A thorough understanding of public participation by the public is crucial for effective engagement in EIA process.

Improvement on the channels of communication

There is need to embrace more channels of communication to notify the public apart from the newspapers. It is proposed that channels of communication such vernacular radio stations, posters, websites and social media should be used to give people more opportunities to access information and create awareness. These channels can be used also to notify the public about the participation venues, dates of meetings and explanation of the EIA Reports and documents.

Enhancing Trust and Transparency in the Participation Process

The level of transparency should be increased. The project planners and implementers need to observe transparency in the EIA process for increased public trust, acceptability and support.

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Design Courses and the ‘New Normal’: ePortfolios as a Pedagogic Innovation in Advancing University Education

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Abstract

Portfolios are crucial for practitioners in the creative industry. Practitioners in the field of art and design use portfolios as a means to show their skills to prospective clients or audiences. Portfolios may either be created in the form of physical artifacts or digital versions depending on the artist/designer’s specialised area and preferred medium. Portfolios cannot be taken out of art and design disciplines. A portfolio is the evidence of the designer’s work and skills. In most design schools every course requires the creation of a portfolio, which sometimes becomes challenging to manage for design educators and even students at the end of the term. The study aimed at exploring the use of emerging technologies in higher education institutions (HEIs) – specifically in a University of Technology (UoT) – as part of design education to facilitate the creation of ePortfolios. Participants were level 300 Advertising and Media (AD&M) option students who take a core course in photography. Flipped classroom, pedagogical approach and design methods were used to introduce students to the course. In a sandpit session, they were introduced to Google sites and Edmodo to create their ePortfolios and conversations between students and educators respectively. Results showed that Google sites had an affordance that facilitated the creation of ePortfolios and Edmodo was a useful tool for collaboration, communication, discussion and appraisal of students’ work in a virtual classroom. It is anticipated that ePortfolios will be beneficial for future virtual exhibitions, reflective learning, sharing, assessment, collaborations, monitoring and evaluation that can make learners work. Suggestions are that other HEIs could reflect on the ePortfolios pedagogies and integrate it as part of learning activities in the era of the COVID-19 global pandemic – which arguably, is the ‘new normal’.

Keywords: *Afrika; Conventional Framework (CF); Bloom’s Digital Taxonomy (BDT); COVID-19; Design Education; ePortfolio; Emerging Technologies; Flipped Classroom; Inclusive Education; Higher Education Institution (HEIs); Resilience*

INTRODUCTION

Communication Design practices continue to evolve due to the emergence of technology. The advent of technology necessitated a call for action in design schools to improve instructional approaches that can accommodate trends of the 21st century practitioners and learners. In the 21st century, communication design students in higher education institutions are exposed to one or more types of emerging technologies and social media tools. These are made up of online media tools for peer-to-peer communication and learning. Some of the commonest social media tools include *Facebook, WhatsApp, Viber, Instagram* and the likes (Rahimi *et al.*, 2015:235-237).

These social media tools provide students and educators with a wide range of opportunities to engage in conversations in real time for collaboration and communication.

However, the use of these tools to facilitate teaching and learning in the process of conversation with emerging technology have not been fully explored in most educational settings within the research context. Educators usually focus on teaching technology as opposed to teaching with technology. For instance, in design departments within the study context, most art and design educators usually focus on teaching students how to use technology to complete their design projects. Occasionally learners are encouraged to use social media for communication among peers and submission of exercises. The focus has not been on how we can teach with emerging technologies (e.g. Web 2.0 or social media) to support teaching and learning. This gap in design education provides an opportunity to explore pedagogical approaches that can accommodate emerging technologies in design programmes to facilitate active teaching and learning. In specialised disciplines within the Communication Design domain, such as graphic design, and photography, designing software enables designers to come up with the needed artifact to satisfy or meet the needs of an identified audience. As such students are familiar with using technology for their studio-based exercises. Therefore, it is feasible to transform the learning environment using emerging technologies, which is adaptable by students to promote affective learning.

This paper is based on a pilot study where we explored the process of teaching with technology within the Communication Design programme in a UoT in Afrika³. The design experimentation was undertaken with students in the *Advertising and Media* (AD&M) option of the Communication Design programme, but focusing on the photography course. Communication Design courses are most often practice oriented. The output of the design exercises in the programme is usually submitted as creative portfolios, which complement written essays that form part of the learners' collective assessment process. The concept of teaching with technology was piloted with the photography course. Participants were tasked to create their ePortfolios as part of student reflective learning and assessment.

Due to the integration of digital technology in the design courses, there is a need to explore how to digitise portfolios and integrate it into the broader Communication Design programme. The enquiry sought to answer the following questions. *What are the emerging technologies that can aid communication design students to create ePortfolios? What are the relevant technologies that can assist educators to create virtual classroom environments to facilitate teaching and learning? What are the pedagogical approaches and technology that can enable design students achieve High Order Thinking Skills?* In this case, we describe the processes involved in the study, design activity in creating ePortfolios and reflections on teaching with emerging technologies. Advantages of ePortfolios as opposed to paper-based portfolios and other case examples are discussed. Findings of the study are discussed reflecting upon Diana Laurillard *Conversational Framework* (CF) and Bloom's *Digital Taxonomy* (BDT), which acknowledge that teaching occurs as a conversation. Focusing on High Order Thinking skills (HOTs) of BDT, technology served as an enabler in the process of teaching and learning in the research case.

Background

³ Afrika: an epistemological stance seeking to co-create an authentic narrative of the continent from its own unique context, perspective and aspirations.

Emerging technologies in design education

In design schools where the focus is on creative arts, courses such as photography, typography, illustrations, sound design, and graphic design are usually offered in these institutions, which require the creation of a portfolio for assessment (Powell, 2013:86). The emergence of technology has offered designers with limitless possibilities on realising some of the creative ideas they have conceptualised and bringing them into reality in design schools (Rowley *et al.*, 2014:39). However, technology in this case is an enabler to augment design pedagogical approaches in making it easy to ideate and easily design solutions to emerging problems.

The introduction to social media in education has moved teaching and learning solely from directive learning (teacher centred-pedagogy) to learner-centred (andragogy) and self-directed/motivated learning (heutagogy) (Cochrane & Antonczak, 2014:359-360). Technology has increased collaboration and communication in academic circles and among professionals in the industry due to the emergence of Web 2.0 for social media activities (Cochrane & Antonczak, 2014:359-360). The popularity of Web 2.0 tools and the services have provided students with “just in time” and “at your fingertips” learning opportunities that can support a wide range of teaching and learning activities (Rahimi *et al.*, 2015:235).

Communication Design (graphic design) and other related design disciplines have transformed incrementally due to the emergence of technologies. Communication Design discipline has migrated from paper-based designing, through desktop computer based courses, into engagement with the rise of mobile computing and design formats that foster interactivity (Cochrane *et al.*, 2014:34). In the educational setting, programmes such as *Adobe Creative Suite*, *Indesign*, *Flash*, *Maya*, *Cinema 4D*, *Edius Pro* and so on, have affordances that enable designers to bring their imaginary concepts into reality. These professional tools and the familiarity with ICTs give designers the ability to work with social media and other cloud based tools for learning. These tools can also help designers create their portfolios. The effectiveness of working with technology will be possible, provided the learning environment is designed to accommodate student learning through active participation using available technologies (Cochrane *et al.*, 2014:36).

Emerging technologies offer a wide range of tools that can support pedagogical approaches to promote active teaching and learning. Some of the pedagogies include flipped classroom, blended learning, rhizomatic learning, and so on. Although these benefits are enormous, in some UoTs in developing world context, these technologies have not been fully explored in design disciplines for course outcomes such as ePortfolios. The goal of this study is to explore ePortfolios as a pedagogic innovation where students will use their artifacts as documentary evidence of their learning as a way of promoting active teaching and learning (Rowley & Bennett, 2016:1-2). In view of the many benefits of ePortfolios in design education, the study was purposed to *firstly identify relevant emerging technologies that can enable design students create ePortfolios. Secondly, to identify relevant technologies that can assist educators create virtual classroom environments for communication, collaboration and appraise student ePortfolios. Thirdly, to explore available pedagogical approaches and technology that can enable design students achieve High Order Thinking Skills (HOTs).*

Portfolio Design

Portfolios are a collection of students', teachers' or people's work that demonstrates one's skills or performance over time and serves as an evidence of their learning or skills (Ng *et al.* 2013:355-356). Portfolios present more detailed information than a standard resume (Shaidullina *et al.*, 2015:375). Portfolios have been kept by artists for hundreds of years but today it has become part of modern education since the 1980s (Davis, 2015:1). Portfolios are not only applied in design courses but students in other disciplines such as engineering, architecture, nursing and many more, to encourage reflective learning (Green *et al.*, 2014:4-5). Portfolios may be organised in two major ways that may either adopt a positivist, and / or a constructivist approach (Davis, 2015:1-2).

The process may either be combined to achieve learning outcomes as desired by educators in a particular course and to understand media literacies (Perk & Galantino, 2013:39). It is necessary for educators to determine what type of portfolio it is that one is building. Educators need to decide whether the portfolios for *showcasing* or a *process* portfolio that ought to consider how students will store their portfolios during and after the course (Bryant & Chittum, 2013:189-190). Portfolios may be designed to meet particular audiences for employment or for educational purposes. However, when considering portfolios for educational purposes it may be developed using the *positivist* or the *constructivist* approach.

Portfolio for learning (positivist approach)

It is usually done over a short-term period. It is typically assessed summative at the end of the term; that is typically a showcase portfolio. In this process students will submit their portfolios at the end of the term for assessment (Davis, 2015:1-2).

Portfolios as learning (constructivist approach)

In this case, it is usually a process portfolio. In this format, the use of portfolios as learning, typically has an extended time frame and can be done overtime (*ibid*). It aims for formative assessment and students will reflect on their learning which gives them ownership of the process. It mirrors the construction of student learning overtime in their studies (O'Toole, 2013:6; Davis, 2015:1-2).

Traditional Portfolios versus ePortfolios

Portfolios come in two major formats, the traditional (paper or sample of physical artifact) and the electronic (digital versions of artifacts) formats also known as ePortfolios (Newhouse, 2014:475-476). The paper portfolios could be perceived as two-dimensional and the e-versions will be 3-dimensional (Fox *et al.*, 2009:7). In some situations the two formats could be combined. In such situations, the electronic versions are stored on a DVD or on a pen drive and presented together as one piece of work which is applicable, especially in the field of designing (Lorenzo & Ittelson, 2005:1-5).

Components of a Traditional Portfolio

These may be made up of only tangible physical evidence of the creator's works, such as artworks in print media formats, hardcopy paper CVs, publications, pictures and any other

related works which might be presented in a file or in a physical artist portfolio (Fox *et al.*, 2009:3). Traditional portfolios include the reflections and learning activities of the creator, both at school and co-curricular activities. In design schools these portfolios help educators and learners assess outcomes of their learning. These portfolios are later extended to the industry after school, as a tool to showcase the artist's work for employment.

Components of Electronic Portfolio (ePortfolios)

This version is an electronic portfolio which is mainly in digital formats and might be presented usually in the form of a website format (Buente *et al.*, 2015:170). A typical ePortfolio will be an electronic evidence of the owner that will be made up of blogs, text, images, audio recordings (podcasts), video recordings (vodcasts), multimedia, links to other websites (webcasts) in the form of hyperlinks and other digital forms (Green *et al.*, 2014:4-5). ePortfolios have now become a movement that is being explored in many universities in other parts of the world to promote active teaching and learning (Eynon *et al.*, 2014:95-96).

Advantages of ePortfolios

ePortfolios have several benefits for educators, students and the general public. Studies on ePortfolio implementation in academic circles such as the creative arts have proven to be successful in enhancing students' learning (Rowley *et al.*, 2014:36-37). ePortfolios have been used successfully as an alternative tool to collect, reflect and select student learning in diverse academic disciplines and co-curricular activities on campuses (Kehoe & Goudzwaard, 2015:343). ePortfolios potentially can expand student learning in various forms of media, enhance media literacies and encourage reliable intellectual work (O'Keeffe & Donnelly, 2013: 2-3). It allows students to link different parts of their learning, both in class (formal) and other co-curricular activities (informal). ePortfolios enable active learning rather than passive learning since students continuously engage with their learning (Bryant & Chittum, 2013:189).

Also, ePortfolios provide a system for schools to assess and organise student learning (Buyarski & Landis, 2014:49). ePortfolios make it possible to connect with other students and educators in other universities (Latta & Vaughan, 2015:16-17). Students and educators alike are able to share pedagogical and learning styles in their various fields of discipline and it has been proven to enhance assessment and feedback (O'Keeffe & Donnelly, 2013:2). In a word, the use of ePortfolios is not about technology only but rather a set of principles about pedagogy where the technology serves as an enabler to these set of principles (Barrett, 2009:para 6).

Cases of ePortfolio integration

Cases: University of Hawai'i at Mānoa Francis

The University of Hawai'i at Mānoa Francis integrated ePortfolios into their communication BA curriculum for assessment. ePortfolios were integrated into their curriculum incrementally starting from 2010 and assessment was done in 2013. They noted that integrating ePortfolios in capstone courses can facilitate relational connections with their major courses. ePortfolios can provide more consistent learning experiences that integrate real life work and experiences in the classroom (Buente *et al.*, 2015:169-176).

Case 2: Efolio Minnesota

In Minnesota, ePortfolios have been extended to the public domain. The idea was practicalised through local, federal government and higher education. It was dubbed eFolio Minnesota which was a statewide ePortfolio system. The system provided every resident of the community an opportunity for a free storage capacity (3Mb) of a lifetime ePortfolio (<http://www.efoliominnesota.com/>). eFolio Minnesota was being used by educators, students and workers (Lorenzo & Ittelson, 2005:7).

Case 3: University of Cape Town- eMarketing Course

In a case study conducted at the University of Cape Town, South Africa, postgraduate students in an eMarketing course used ePortfolios as a way of marketing themselves as a *brand* in the course. Students indicated that it was a useful tool to share with potential employees and create an online presence and spaces for interactions. The authors in this case, noted that ePortfolios have multiple aspects that learners need to be aware of. ePortfolios goes beyond online space, personal brand and assessment regime in the eMarketing course. ePortfolios can foster relationships and as such it not only serves as a means to deploy technology, it also makes pedagogy and students visible (Pallit & Houslay, 2014:4-13).

Additionally, in a report by *New Media Consortium* (NMC) 2015, ePortfolios were introduced in some schools among first year students in Ireland. Researchers from this study reported that the integration of ePortfolios in schools improved student learning (Johnson *et al.*, 2015:7). It is evident from these case examples that ePortfolios have great potential and could be integrated in different educational settings. ePortfolios can promote reflective learning that can meet career goals among students and practitioners across many disciplines.

Research Gap in a Design Programme

Students and lecturers in art and design schools often use portfolios as the main source of reflecting on students' performance at the end of the term. At the end of each design cycle in a typical studio based course, students produce portfolios for evaluation and for their professional practice (Buente *et al.*, 2015, 172-173). A typical portfolio of a communication design student is a collection of their works that may range from print media to electronic media (Newhouse, 2014:476-477). These works are created by students that are often exhibited at mid-term and end-of-term and it forms part of their continuous assessment. Sometimes creating these artifacts are expensive for students to manage since printing is costly and not very sustainable (Ng *et al.*, 2013:360).

After exhibiting some of these works, it becomes problematic for students and lecturers to store them within the university environment for future studies. At the moment there is no instant digital feedback session, avenue for digital exhibition, or virtual storage system in place within most of these practical oriented courses in the selected UoT. Thus, in this investigation, we explored teaching with emerging technologies that could facilitate development and conversations around ePortfolios as a reflective (active) teaching and learning activity.

Educational context- ePortfolios in an Advertising and media course

The context of this research is situated within the Communication Design programme in the selected UoT. The Communication programme in the selected UoT has three major options: AD&M, Film and Video, Animation and Visual Communication. The study is being piloted, at this stage. Hence, we focused on AD&M students with a focus on the course, photography. In our observation as educators in our contexts, it is evident that designers cannot do without portfolios. Students and educators create portfolios which might be physical artifacts or digital formats which are usually stored on pen drives, hard drives, CD/ DVDs, to show to potential audiences or for assessment. Presentation of these portfolios has been in more traditional formats as opposed to electronic portfolios. Physical (paper-based) portfolios have been quite cumbersome for educators and students alike to manage hence the need for this investigation. Although the study is in its early stages, it is perceived as an opportunity to integrate ePortfolios into Communication Design programmes in future.

METHODOLOGY

The methodological approach for the inquiry was based on qualitative research procedures that draw on Action Design Research (ADR) methods. Design Research (DR) process involves research through the design process (Glanville, 2015:13-16). ADR methods are a combination of DR and AR procedures ($DR + AD = ADR$). Since the study was conducted based on our real context as design educators and practitioners, we adopted some aspects of Action Design Research approach (ADR) for the study because ADR is problem driven and generates knowledge through an iterative design process (Reuver *et al.*, 2015:1-2). Our practice as design educators informed the data collection process in an iterative manner, as applied in design research to test the concept of integrating technology in a real educational context (Kennedy *et al.*, 2017). However, concepts in the CF were integrated as part of the teaching process using design methods to meet HOTS as part of learning outcomes in AD&M courses. A summary of the teaching process is illustrated in an emerging conceptual framework as Figure 1. Figure 1 is a combination of selected concepts in the CF, BDT and the Double Diamond (DD) design process situated in the ADR approach.

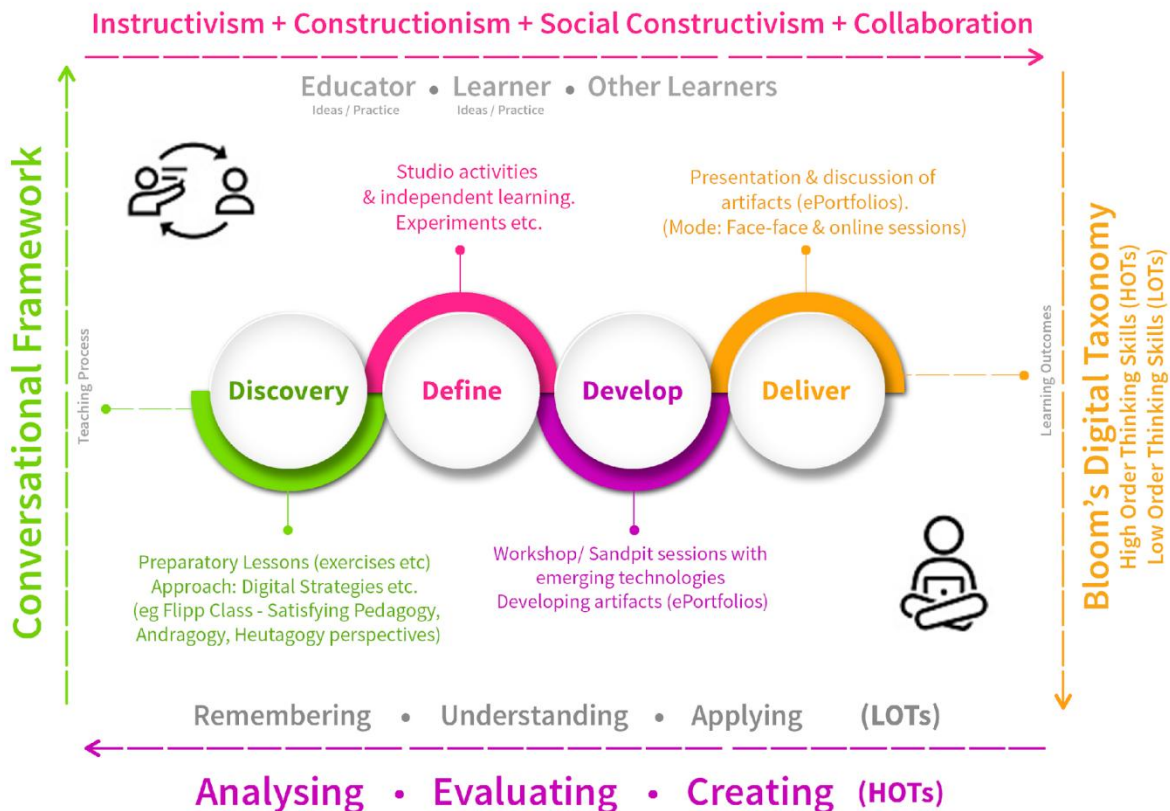


Figure 1: Framing ePortfolio integration in the design process (source: 1st author's construct)

Participants and ePortfolio activities

Design students were purposively selected to participate in this inquiry in order to meet the stipulated milestones of the research (Wahyuni, 2012:73; Creswell, 2014:239). The participants were mainly from level 300 of the AD&M option. Since the study is being piloted at this stage it was not extended to cover all students in the Communication Design programme due the large class sizes. AD&M design classes have the smallest number of design students, which was manageable for the research case. Most of the design students are familiar with designing with technology using software such as *Adobe Creative Suite*, *Dreamweaver*, *Flash*, and other related design software due to the nature of the design programme. They all own laptops, mobile devices and are familiar with social media tools. Hence the *Bring Your Own Device* (BYOD) concept was used and students brought their own devices to the course. Their familiarity with these tools made it easier for them to create ePortfolios as part of their reflective learning process.

Design ethics

The inquiry was conducted with design ethos that informed the research process. It was conducted in a collaborative process with participants and lecturers (facilitator) both in face-to-face and virtual classroom environments. Participants signed consent forms and they were not forced to participate in the study, as it was actually part of their AD&M course activities for the term and therefore they willingly participated. Participants were assured that information will be

managed with confidentiality and reporting of data will be done with anonymity except in cases where they gave permission for their names to be used (Collins, 2010:86-87). However, participants' works have been shown in this paper, because they all gave permission for their works to be used as such.

Design Action with Emerging Technologies

Designers normally use some form of technology to design and develop their artifacts. In the photography course the goal for the term was for the students to develop an ePortfolio as part of their assessment for the term. This process required the use of technologies that students were familiar with but, in a different way. On the design action, the study began by briefing students on the outline for the term and highlighting the essence of developing an ePortfolio for assessment, learning and professional practice. Expected outcomes for the term were made known to students that included creating virtual exhibitions as part of their assessment for the term. The flipped classroom pedagogical approach was applied to the photography course (see Figure 1 & 2). Students were then given the necessary learning materials in order to personalise their learning and meet the set objectives for the term (Abeysekera & Dawson, 2015:1-3).



Figure 2: Participants at work in a face-to-face/ sandpit sessions

Integrating emerging technologies in AD & M Course

Integrating technologies into a course requires that educators select appropriate technologies that have the affordances to meet the specific outcomes in the AD&M course. *Google sites* and *Edmodo* were selected for the exercise, since it had the affordances that could facilitate the development of ePortfolios. Workshops were organised in the form of “*Sandpit sessions*” for *technology integration*. Sandpit sessions are considered as playful learning environments that foster creativity. It can be organised either in the classroom or outside the classroom (Jarrett *et al.*, 2010:221-222). In this context, *Edmodo* (Figure 2a) was suitable to create a virtual classroom space for collaboration and communication. *Google sites* were deemed suitable for participants to create ePortfolios (see Figure 2b). These tools provided students with new spaces to showcase themselves and their artworks in new ways (Brown, 2015:335). Participants using these tools for creative works could develop higher metacognitive abilities through creating ePortfolios in the selected design course.



Figure 3a & b: Logos of selected emerging technology tools (source: Google images)

RESULTS AND DISCUSSION

Results

Creating ePortfolios with design students generated interesting feedback. Data obtained were both visual and textual. These were based on responses obtained from students, on the exercises in *Edmodo* and during face-to-face sessions that were valuable sources of data. Information obtained was categorised based on the emerging themes from participants. Reflections were based on learning experiences as participants were observed while they work on their ePortfolios. The findings evolved through the process of organising, and analysing participants’ feedback; appraisal of ePortfolios and finally making sense and comparisons out of the entire process. Students’ ePortfolios served as the basis for reflections and appraisal of their works. The data was grouped through the process of higher order concepts to a more abstract level in order to find interrelated themes in their ePortfolio design (Collins, 2010:150). Findings from the process showed that the students understood the concept of ePortfolios and perceived it as creative artifacts. As beginners, they created authentic ePortfolios that had basic aesthetic appeal expected in a creative piece of artifact. Participants enjoyed using the selected technologies to facilitate their learning in a more reflective process. Samples of the ePortfolios created by AD&M students are presented as Figures 4 and 5. Additional ePortfolios from other members in the class have been documented in the form of hyperlinks accessible online by simply double clicking the links to sample ePortfolios of ADM students such as the ones provided below:

Class page – link to design student ePortfolios:

- <https://sites.google.com/view/isaacopoku/home>

- <https://sites.google.com/view/danielkofiaboagye/home>
- <https://sites.google.com/view/davidedusah/home>

Group page – link to Edmodo virtual classroom:

- <https://www.edmodo.com/home#/>

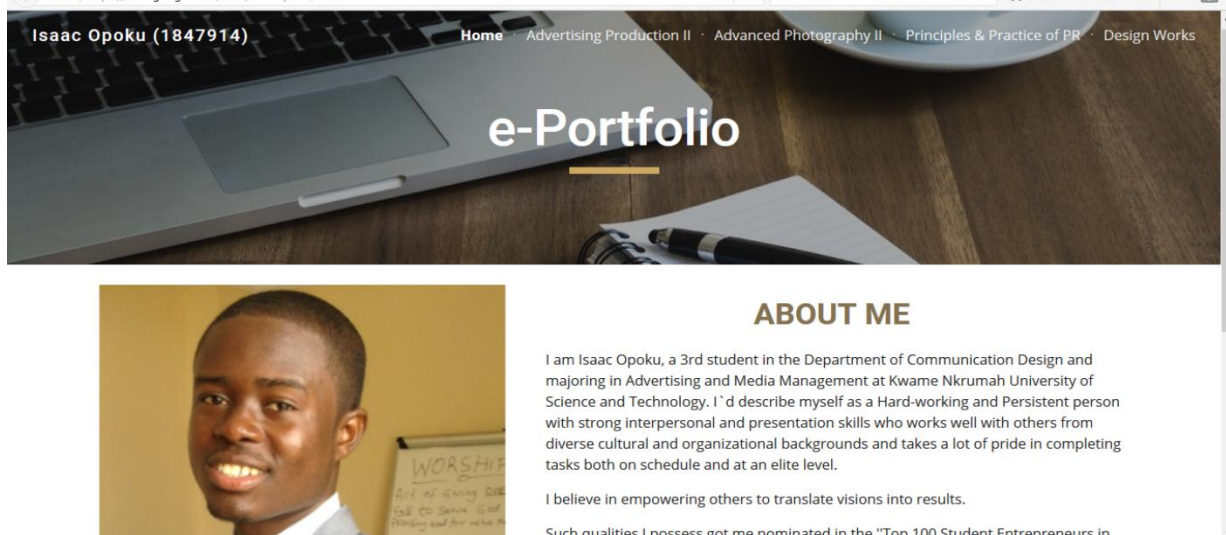


Figure 4: Sample A - ePortfolio of AD&M student

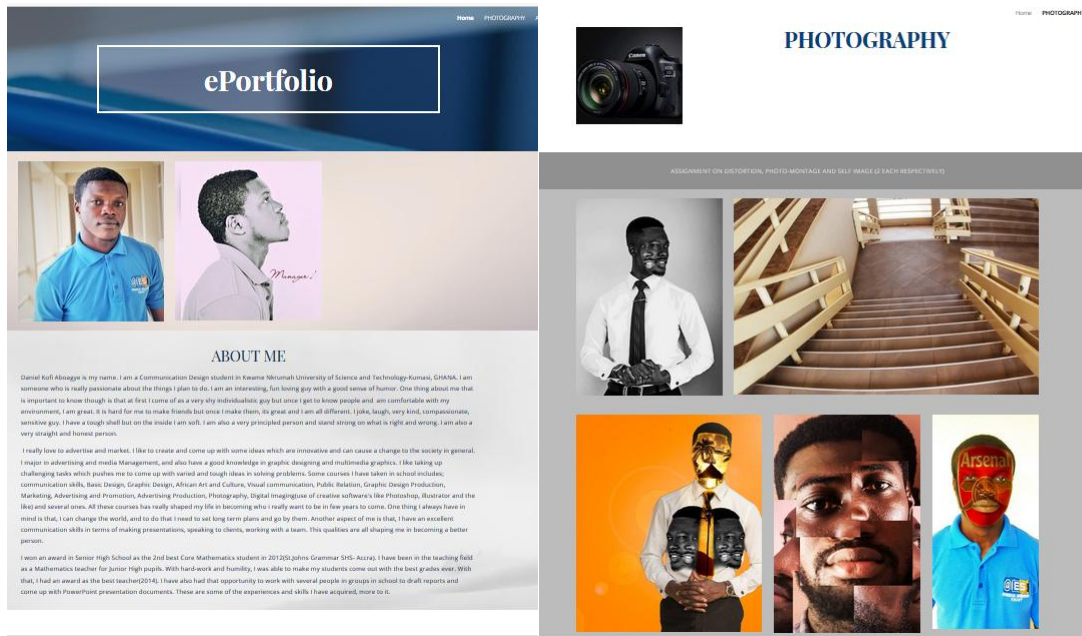


Figure 5: Sample B -ePortfolio of AD&M student

Participants' Reflections their ePortfolios

Students showed enthusiasm in the use of these emerging technologies as observed during the sandpit sessions. They indicated that it was a very smart way of creating their ePortfolios and storing their works in virtual environments for collaborations and communications. Some indicated that they had lost a lot of work in the past due to the absence of a system to compile their works and store in the clouds. Also, participants indicated that they were very excited that they could actually create paperless portfolios in a more organised way. They acknowledged that using *Google* sites was quite easy. A few of the comments obtained from the participants are presented as extracts in subsequent lines:

“Using Google sites today is really cool, it seems to be a smart tool and If I had known how to use this in my early years in school, I would have saved most of my works in the clouds by creating my ePortfolio” – Designer A.

“Using an ePortfolio as a means of documenting our works is very good. Because we are in an era where almost everything is done online; job application, interviews and many other things too. Integrating ePortfolio as part of our learning, gives us the chance to upload our works online for people to view and make comments concerning our works. We pick up these pieces of ideas and make sure to incorporate them in our next work. We tend to see other peoples work as well and derive some inspiration from them. ePortfolios are a good way to reflect on our learning and practice as designers. We are able to get online exposure without suffering to look for someone to aid you. When you have an ePortfolio online, not only those who are familiar with your works will comment, unknown experts or people with good and appreciable knowledge of what we do can also pass comments which will help you enhance your knowledge for professional practice” – Designer B.

“ePortfolios [are] fun! It is exciting to know I have a personal website that I can manage. With ePortfolios, I have control to design and manage the content of my website, and also it is an easier means to share my work” – Designer C.

“Wow, wow, wow, this is one of the best education initiatives so far, students can interact anytime, anywhere and on any day. At least we do not have to carry loads of assignments to class whereas it can simply be compiled as ePortfolios and presented on this virtual classroom platform. As an advertiser, a platform like this is best for

idea sharing both internationally and locally. God bless the creator ☺ I'm excited already to be part of this experience” – Designer D.

The extracts presented above based on participants' opinion is a good indication that ePortfolios has a potential in design courses. ePortfolios can be integrated into the communication design programme to promote active teaching and learning.

Discussion

Teaching in general and in design transpires through the process of conversation to co-construct knowledge in various forms for different purposes. Conversation for the purpose of teaching/learning occurred between the design educator, AD&M learners and other design students (Figure 6). Here in a conversation, ideas were exchanged from educators, learners that were later extended to other learners. Based on these concepts, the AD&M courses were taught in the process of conversation through an iterative design process to integrate ePortfolios. Integrating ePortfolios as part of the AD&M course was entirely a new concept and as such was done incrementally.

Learners were introduced to the ideas and theories around ePortfolios using flipped classroom pedagogies. They were then provided with learning materials such as videos (vodcast) and PowerPoint presentations to argument their learning process that formed the basis of creating their ePortfolios. Since teaching and learning happens as a conversation, two frameworks that aligned to the concepts of the investigation were selected. These are the Diana Laurillard CF and BDT. They were adopted as an adjustable lens to discuss the outcome of the study. CF is focused on the process of teaching between teachers, learners and other learners (peers). The framework as Laurillard describes it has four main basic components: *i) students concepts and ii) students specific actions; iii) teachers concepts; and iv) teachers constructed learning environment* (Schneider & Mgaved, 2007:1). On the other hand, BDT highlights the cognitive abilities of the learners. BDT is classified into two major parts: Low Order Thinking skills (LOTs) that involves *remembering, understanding and applying*; and High Order Thinking Skills (HOTs), which involves *analysing, evaluating and creating* (Tarling & Ng’ambi, 2016:559-560).

However, in this research case the inquiry revolved around HOTs. Thus, participants were expected to come up with ePortfolios as an outcome of their learning out of the teaching process of conversation. In reflecting upon the investigation using the CF, participants were given information in the form of theories and ideas (*teachers’ ideas*). Participating design students then processed these theories/ideas (*learners ideas*) to understand what ideas have been put forward by their lecturer. Learners processed these concepts/ ideas as obtained from their lecturer. Next, the lecturer sends feedback to learners in the process of conversation, which occurs in an iterative manner between lecturer, learner and other learners (Figure 6).

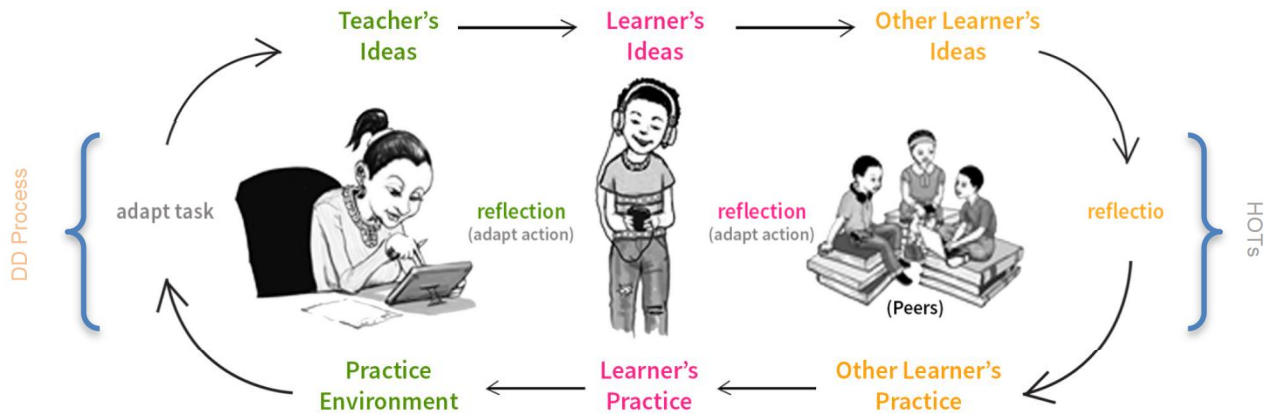


Figure 6: Metaphor of the CF (source: 1st author's construct)

(Metaphor framework was informed by Diana Laurillard CF, BDT& DD)

After students had come up with tangible results in the form of ePortfolios, feedback was then given to the lecturer that formed part of the teacher's constructed environment (*Learners/ other learners practice*). The students' works were reflected upon by the lecturer, providing constant feedback to participants that informed the next process of instruction (See Figure 1& 6). Students extended these ideas on ePortfolios to their peers both in class and outside the classroom that encouraged rhizomatic learning through social media (Cochrane *et al.*, 2014:39). Rhizomatic learning is the process where independent and peer-to-peer learning occurs through active experimentation with technology (Mackness & Bell, 2015:31).

Emerging technologies such as Edmodo were used for active communication and collaboration with lecturers, learners and other peers in the virtual AD&M classroom environment. On the other hand, *Google* site was a useful tool in creating ePortfolios that served as a tangible product for their learning process. Propositions are that HOTS of the BDT have been met to an appreciable level through the creation of ePortfolios. The results of the study have proven that ePortfolios can add value to design courses. ePortfolios can be integrated as a viable tool that can promote reflective teaching and learning in UoT offering Art and Design programmes in Afrika.

Lessons Learned from ePortfolio Integration

The introduction of ePortfolio concepts using technology was adaptable because the 'Bring Your Own Device' (BYOD) strategy was employed. BYOD encouraged students to easily participate since they had their own devices that adds flexibility and context to their learning (Cochrane *et al.*, 2014:39). Also, participants were familiar with their devices, social media, which facilitated the introduction of *Google* sites that are easily adaptable to ePortfolios design and *Edmodo* for communication and collaboration. Finally there were challenges with accessing constant connectivity and electricity. However, this challenge was overcome at a point since most students already charged their mobile devices and had some data for connectivity. However, for an effective teaching and learning to take place using emerging technologies, there should be

constant power supply and interconnectivity for educators and students in the context of the study.

CONCLUSION

Design as a discipline will continue to require the use of portfolios as an outcome of the design process. The integration of ePortfolios in communication design courses can potentially provide learning experiences with technology since outcomes for course assessment are usually designed artifacts. Creating ePortfolios with design principles will add aesthetic value to the designers' creative abilities and can help them gain employment. The study focused on level 300 AD&M students in the Communication Design programme. It is proposed that future research is required to integrate the ePortfolio concept as part of the annual students' industrial attachment programme as learning and for assessment. Future research could focus on virtual supervision of industrial attachment programmes and other learning activities using tools such as *Zoom, Microsoft Teams, Skype, Adobe Connect, Google Hangout, Google Meet, Facebook* and other emerging technologies with the relevant affordances for the exercise. Also, further research needs to be conducted into how ePortfolios can inform assessment; how active learning and teaching can be achieved using ePortfolios; what emerging technologies will be suitable to transform learning spaces in design education for communication and collaboration; *How technologies such as Quick Response (QR) codes could be explored to integrate paper based artifacts into ePortfolios; and what best practices are available using QR codes in ePortfolio design?*

In summation, it is proposed that the selected UoT could explore the concept of ePortfolios as part of the pedagogical approach to encourage reflective learning in all courses. The use of these approaches can potentially bring visibility to the university. It can also create networks with students and educators in other universities. Future projections are that ePortfolios can be further extended to include students, lecturers and administrative staff in the selected UoT for both storage, learning and communicative purposes. A holistic, integrated approach is required to digitise artifacts in order to operate a sustainable ePortfolios system at all levels in higher education institutions. The efficacy of such ePortfolio systems is arguably prescient given the highly disruptive nature of the COVID-19 global pandemic and its implications on the future of design pedagogy in Afrika and beyond.

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Covid-19 Pandemic and Implementation of World Bank Supported Education Initiatives in East Africa

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Abstract

In early 2020, COVID-19 was confirmed as a global pandemic by World Health Organization. Countries rushed to introduce lockdown and quarantine measures so as to minimize infections and deaths. Secondary schools were equally closed; affecting about 1.5 billion secondary school students globally. East African countries similarly followed this trajectory. This was done in the midst of the ongoing implementation of various World Bank initiatives- aimed at keeping and retaining vulnerable students in secondary schools; providing pathways to girls' secondary school education – especially those who had dropped out due to early pregnancy and marriage. Cursory studies had earlier indicated that school closure, necessitated by COVID-19, greatly affected the implementation of this initiative in East African countries of Tanzania, Kenya and Uganda. This study- based on literature review, examined how World Bank initiatives in these countries was impacted by COVID-19 pandemic. The synthesis of the findings showed that the closure of schools in these countries, together with other socio-economic disruption brought about by COVID-19 had a devastating effect on the World Bank initiatives. It was also reviewed that the pandemic has had a knock-on effect on the girl child; Girls were exposed more to some of the social cultural challenges they had escaped from such as Female Genital Mutilation and Early Marriages. Either too, policy makers were worried that this devastation clawed back on the gains that the region had made in as far as improving retention and completion rates in secondary education is concerned. On the basis of these revelations, this study recommends that World Bank group should carry out a needs assessment to better understand how the initiatives carried out in secondary schools were disrupted and thereafter come up with socially accepted strategies of implementing its initiative in these countries.

Key words: *COVID-19 Pandemic, Implementation, World Bank, Education Initiatives*

INTRODUCTION

According to scholarly evidence, COVID-19 pandemic started in the Chinese city of Wuhan, Hubei province. The first credible reports indicating the number of the affected people was revealed in December, 2019 (WHO, 2020a). From that time- henceforth, this pandemic has been spreading all over the world at an alarming rate- leading to a global closure of various social and economic sectors. Either too, educational institutions were closed in order to arrest this situation. Statistics show that more than one hundred and ninety (190) countries worldwide closed school and colleges (UNESCO, 2020a). This move did not leave out institutions of learning in Africa, and East Africa in particular, which equally suffered from this pandemic.

Scholarly writings show the divesting nature of COVID-19 pandemic to the education sectors. For example, the study done by “*A save the children [survey](#)” indicates that 8 out of 10 students in 37 surveyed countries showed that they have learned very little or not at all since the closure of schools to the time when they were re-opened. Furthermore, it was reported that almost three quarters of the world's students were unable to access distance teaching (Witter, 2021 &*

Jaramillo, 2020). Moreover, girls were reported to have been greatly impacted by this closure. This is because women and girls are always vulnerable to any unfolding in any unpredictable social underpinnings.

Furthermore, empirical literature shows that the educational impact that girls faced, during and after COVID-19 school closures is greater -as compared to the boys. Particularly, girls from marginalized families across the globe were and are still greatly affected (Jaramillo, 2020). This was reported as drawback to the many achievements attained in equity and equality measures of school enrolments and attainments. For example, prior to the COVID-19 pandemic, the global rate of enrolment for girls in basic education had greatly increased. This increase reduced the gender gap in access to education. However, COVID-19 pandemic- which resulted into the closure of schools, backtracked these achievements and thus has put all progress at risk (Witter, 2021). Equally, other pandemics like Ebola have the same effect on educational practices and process. For example, in 2014 to 2015, over 10,000 schools closed in Guinea, Sierra Leone, and Liberia during Ebola outbreak. During this crisis, girls were severely impacted. For example, girls in Guinea had a completion rate of basic education of 0.9% while that for boys was 2.7%; and in Sierra Leone, girls' completion rate was 1.8% against 4.0% for boys (Witter, 2021).

Malala Fund's report revealed that the closure of schools because of COVID-19 pandemic had long effects for girls. It was estimated that more than 20 million secondary school-aged girls could drop out after the pandemic has passed. Malala Fund's report uses insight from the Ebola epidemic of 2014-2015 in understanding the short and long-term effects of COVID-19 for girls. Following the Ebola epidemic and school closures in Sierra Leone, Guinea and Liberia, enrolment rates for girls dropped because of household responsibilities, child labour and teenage pregnancy (Malala, 2020).

In East Africa, the closure of institutions of learning such as schools is said to have interrupted educational initiatives supported by various donors- including the World Bank. For example, World Bank had initiated several intervention measures to enhance learners' achievement in secondary schools in East African countries of Tanzania, Kenya and Uganda before the onset of COVID-19. When COVID-19 was declared as a pandemic by World Health Organization, most countries in the region rushed to declare lockdown and quarantines so as to minimise infections and deaths. Secondary schools were quickly closed (WHO, 2020a). These schools were in the process of implementing various World Bank initiatives on such as Secondary Schools' Improvement Project whose aim was to retain vulnerable students in secondary schools; provide path way to secondary school education for girls who had dropped out from school due to early pregnancy and other social cultural issues. However, due to disruption brought about by COVID-19, cursory studies indicated that vulnerable learners, especially girls, in secondary level of education were directly affected; Lack of school attendance exposed them to some social cultural challenges they had escaped from such as Female Genital Mutilation and Early Marriages. This paper reviews how COVID-19 Pandemic affected the implementation of World Bank supported education initiatives in East Africa countries (WHO, 2020a). The review is based on three countries, Tanzania, Kenya, and Uganda. Based on the analysis, conclusion and recommendation for policy and practice are given.

FINDINGS FROM AVAILABLE LITERATURE

COVID-19 Pandemic and World Bank' Educational Initiatives for Girls in East African countries

The available literature shows the impact of COVID-19 on social-economic activities in Tanzania, Kenya, and Uganda. Most particularly, the educational process and practices was greatly affected; Students and learners in the region were /are being impacted by school closures and the experience of COVID-19. Particularly, girls and other vulnerable people are facing heightened challenges and disruptions in accessing quality education and opportunities for a hopeful future. Lack of access to internet, technology, and stable electricity are just some of the challenges that this group of learners are facing in the region.

According to the 2020 Global Education Monitoring Report, responses to the COVID-19 crisis have not paid enough attention to inclusion of all learners, with only 40% of low-income countries supporting learners at risk of exclusion, including those with disabilities. The United Nations International Children's Emergency Fund (UNICEF), estimates that 20 percent of girls enrolled in secondary school in the region are at significant risk of dropping out for good, while the World Report on Education estimated that half of all secondary school girls will not return when classrooms reopen to full operation.

In Tanzania, the first COVID-19 infection was reported on 16th March, 2020, and on 17th March, 2020 the government announced the closure of all schools and colleges for unknown time (WHO, 2020b). This closure, though done in good faith, is reported to have impacted many educational activities- including the World Bank' Secondary Education Quality Improvement Program (SEQUIP). Most particularly, this programme was aimed at making secondary education for girls to be better, safer, and more accessible. The SEQUIP introduced three measures: (i) encouraging awareness to the community on the risks for girls, (ii) reducing the risks of gender based violence on the way to school and (iii) supporting girl students who become pregnant to be recognized and have right to Alternative Education Pathways (AEPs) - for them to obtain ordinary secondary school certificate and continue with advanced secondary education (The World Bank, 2019). Statistics show that out of the 60,000 secondary school students who drop out 5,500 leave due to pregnancy. The WB programme advocates for pregnant girls to be readmitted in the educational cycle after giving birth if they wish through Alternative Education Pathways. The AEP provided alternative education to the girls who drop out ordinary secondary school to accomplish the secondary education cycle (United Nations, 2020).

However, the plan has been impacted by the COVID-19 pandemic. During this period, school girls were subjected to social-cultural practices like female genital mutilation and child marriage and early pregnancy which have a greater impact on school attendance and enrolment (Milišić, 2020). School closures also made girls in the region at risk of getting married and early pregnant which reduced their likelihood of continuing with their education by the time schools were reopened (UNESCO, 2020b). Moreover, girls with disabilities faced barriers due to the absence of supportive equipments that would allow them to follow online sessions; online learning for students with disabilities required some accessibility features, such as audio narration, sign language video to the deaf students, and simplified text. As argued by Jaramillo, (2020), students from poor families are at an advantageous side when it comes to using new innovations

in the teaching and learning process. This scenario was also evident in other East African countries.

In Kenya, learning institutions including secondary schools were abruptly closed on March 15, 2020 (Njenga, 2020). The closure of schools interrupted the implementation of secondary education improvement project supported by the World Bank. The project started in 2018 and it is expected to end in 2023. This project aimed at reducing the challenge of shortage of teachers and improving retention. These distractions have an effect on the service planned to learners, teachers, learning institutions and other educational stakeholders (MoE, 2020). Through this initiative the Government of Kenya has provided remote teaching support using the internet and television and has encouraged academic institutions to adapt teaching material to create a more accessible online learning environment (Ngwacho, 2020). This plan targets both vulnerable students and teachers and aims to capitalize on existing radio infrastructure to enhance the possibility of community-based learning (Global Partnership, 2020).

According to scholarly writings in the country, the COVID-19 pandemic in Kenya has disrupted learning for more than 18 million learners- a situation which is said to be affecting and/or threatening the achievement of sustainable development goal No.4 on access to quality, equitable and inclusive education. Moreover, the school closures are also reported to be obstructing Kenya's Vision 2030 National Development Goals which is aimed at achieving quality education for all (Ngwacho, 2020). Additionally, the school closure also affected students from low income families, especially girls and other vulnerable students. Students had to stay a whole day at home, some of the girls claimed were harassed by their parents and guardians. Also they missed distance learning lessons because they were given household chores and childcare responsibilities. Odhiambo, (2020) asserts that school closures harmed girls across the world; Girls faced barriers to accomplish their studies, because schools protected girls from being abused.

Educational strategies used in Kenya during school closure, was also applied in Sierra Leone during the Ebola epidemic. The government announced the use of distance learning during school closure, but these side-lined students in rural areas who did not have access to radio/television and other ICT facilities like internet (Jaramillo, 2020). This group was/is at greater risk of social exclusion compared to boys (Odhiambo, 2020). The closure of schools exposed them to the risk of sexual violence, female genital mutilation, pregnancies and early marriages, and extra restrictions from social expectations such as household responsibilities (UNESCO, 2020b & Jelimo, 2020).

In Uganda, the government announced closure of 51,000 schools from March 20, 2020 to mitigate the spread of COVID-19 (Tumwesige, 2020). The closure affected 15 million students in different levels of education including secondary schools. The WB has been supporting \$ 150 million for Ugandan Secondary Education Expansion Project (USEEP) which aimed at constructing 116 lower secondary day schools and additional classrooms in 61 secondary schools (Kulubya, 2020). The USEEP also aimed at equipping safe and conducive learning environments which is supportive to personal growth and increases retention for both girls and boys. It also includes special measures to reduce the occurrence of early pregnancies to girls and to assist young mothers to re-join lower secondary education (Kulubya, 2020). Schools protect girls from domestic violence, sexual abuse and exploitative work (Tumwesige, 2020).

CONCLUSION AND RECOMMENDATIONS

Conclusion

The distress of the COVID-19 pandemic on education has been unparalleled. It has pushed the attainment of international education goals and largely affected those aimed at aiding girl's education. From the findings, this paper concludes that, the COVID-19 pandemic had a lot of impact on implementing the WB supported educational initiatives in East African countries. The distance approach which was offered did not engage them fully as it could be done on face-to-face teaching. This approach caused girls to engage and to be forced to early marriages, child pregnancies and to be responsible for household activities which caused them to abandon studies all together. The pandemic had a devastating effect on the practice and process of education as it clawed back on the gains that region had made such as improving retention and completion rates, all aimed at addressing equity and equality measures. It is now the responsibility of governments and the cooperating partners such as the World Bank cooperate in setting up new principles of ensuring that all students especially girls, who have dropped out schooling during the COVID-19 school closure re-gain their future education dreams. Educational officials and stakeholders should also continue finding tangible ways of meeting this goal-taking into consideration the "new norm" created by the COVID-19 pandemic.

Recommendations

The study recommended that there is a need for the World Bank to evaluate their initiatives and to find out how COVID-19 affected their programs. The evaluation report will help in finding possible strategies of implementing the educational interventions in East African countries during school re-open. Since it is evidenced that girls are the most affected by school closure, there is an opportunity to set up a learning structure that could create a room for girls to accomplish their studies. Moreover, through societal dialogue, the World Bank should apply functionalism theory of education strategy in making sure that the introduced initiatives for secondary school girls are implemented and attained their educational goals as planned. This will make girls to become a functioning part of the society.

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Mixed Farming and its Impact on Food Insecurity and Dietary Quality in the Context of Varying Aridity in Rural Areas of Kenya

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Abstract

Sustainability in agricultural production is key in ensuring food and nutrition security. Mixed farming has been touted as one of the farming systems for enhancing this sustainability. However, there is limited evidence on the effects of mixed farming on different indicators of food insecurity under different biophysical environments. This study investigates the impact of mixed farming on food insecurity and dietary quality in areas with varying degrees of aridity using nationally representative data from 10,817 households extracted from the Kenya Integrated Household Budget Survey 2015/2016. The study uses Food Insecurity Experience Scale (FIES) framework and household dietary diversity score (HDDS) to assess food insecurity and dietary quality, respectively. We applied matching techniques to estimate impacts. Our results show that food insecurity prevails, with mild food insecurity being the most prevalent, followed by moderate and severe levels. Food insecurity differs across the aridity gradient, increasing from the Non-ASAL to the Arid counties. Mixed farming reduced severe food insecurity in all areas, but impact of mixed farming on moderate and mild food insecurity varied with degree of aridity: in the Non-ASAL and Arid areas, all levels of food insecurity reduced for mixed farming adopters, while in Marginally semiarid areas, moderate and severe food insecurity reduced. In Largely semiarid areas, mixed farming reduced only severe food insecurity. The study further found that mixed farming increased overall HDDS, implying improvement in dietary quality, with the largest impact being in the drier areas. Our findings suggest that policymakers should support agro-pastoralists to scale up mixed crop-livestock farming as a strategy to sustainably improve food security and dietary quality.

Key Words: *Mixed farming, Food Insecurity, Dietary quality, FIES, Aridity, Matching techniques.*

INTRODUCTION

There is increasing food insecurity globally that can be attributed to among others, stagnant agricultural productivity, climate change risk, the rising population, and degraded soil quality (Fraval et al., 2019; Bjornlund et al., 2020; Giller, 2020). Recent projections showed that the number of hungry people would hit 840 million by 2030, and the number of undernourished individuals 132 million by 2020 (FAO et al., 2020). This impedes achievement of the United Nations Sustainable Development Goal 2 (SDG 2) that proposes to end hunger and improve nutrition by 2030, as well as the African Union's Agenda 2063 (72(e)) that aims to eliminate hunger and food insecurity (African Union Commission, 2015; UN General Assembly, 2015).

Sustainable agriculture is essential for reducing hunger and malnutrition since about 70% of households depend on agriculture as their main source of livelihood. A high proportion of food in Africa is produced by smallholder farmers, yet they are the most susceptible to food insecurity, malnutrition and poverty (Fanzo, 2018). In fact, much of the discussion in SDG 2 focuses on Africa, which has the highest prevalence of undernourishment among all regions (19.1%), and twice the world average of 8.9% (FAO et al., 2020). Smallholder farmers provide a critical pathway for agricultural orientated interventions to improve food and nutrition security (Fanzo, 2018; Fraval et al., 2019).

Due to rainfall variability that makes farming unpredictable, and degrading natural resources like soils, smallholder farmers adopt farming systems that minimize risk (Bjornlund et al., 2020) under varying biophysical conditions. The type of farming system is dictated by the amount, timing and rainfall distribution and other agro-ecological conditions. This drives the preference for specialized systems (either crop or livestock systems), agro-pastoral systems based on aridity status and mixed crop-livestock systems in higher rainfall zones. However, due to climate change risk, farmers have adopted diversified agricultural systems as a risk minimizing strategy, to build resilient systems and to improve food security (Thornton & Herrero, 2014; Ngigi et al., 2020).

Mixed farming is one of the systems that can enhance both productivity and sustainability of food and agricultural production (Sneessens et al., 2016). Literature cites numerous benefits of mixed farming as compared to specialized crop or livestock enterprises. For instance, crop residues are used as animal feeds; animal manure could be used to fertilize soils and provide nutrients to crops; water and family labor are used more efficiently; and farm risks are spread over multiple crop and livestock enterprises (Wright et al., 2012; Thornton & Herrero, 2014). These and other benefits confer sustainability and resilience to farming systems especially in the advent of climate change. A study by de Moraes et al. (2014) showed that mixed systems not only led to environmental gains and ecological intensification but also increased yield and income of farmers, as compared to specialized or non-integrated livestock farming in Brazil. Similarly, Bell et al., (2014) showed that crop-livestock integration systems improve farm risk management, increase both crop and livestock productivity and reduce the cost of inputs such as inorganic fertilizers and animal feeds in Australia. Despite the documented advantages of mixed systems, largely crop or livestock farming systems are still widely practised (Ryschawy et al., 2012; Wright et al., 2012; Shahbaz et al., 2017).

Mixed farming is promoted as a key strategy in climate-smart agriculture (FAO, 2013) and is increasingly attracting the attention of researchers. Several studies have assessed the linkages between mixed farming systems and food and nutrition security but the findings are largely mixed. For instance, the study by Parvathi et al (2018) in Lao PDR found that while overall farm production diversity increased dietary quality through dietary diversification, mixed crop-livestock farming resulted in reduced diversity of household diets. Further, Musemwa et al., (2018) investigated the implications of farming and non-farming activities on food consumption and dietary quality in the Eastern Cape Province of South Africa, and found that while household dietary diversity (HDDS) of farmers practising mixed farming was significantly higher than that of non-farmers, it did not differ significantly with that of farm households specializing in crop or livestock farming systems. More recently, Mee et al., (2020) reported from their study in

Myanmar's Yamethin District that households practising mixed farming recorded moderate food availability and low food utilization compared to those practising monoculture, which had low food availability and moderate food utilization. There was no difference in food access, with both farming systems reporting high food access.

We complement these studies by investigating the impact of mixed farming on food insecurity and dietary quality in the context of different biophysical environments with varying degrees of aridity using nationally representative data from rural areas of Kenya, where farming is the dominant source of livelihood. Aridity is a key constraint agricultural production (Bannayan et al., 2010; Murray, 2016; Goparaju & Ahmad, 2019), especially where agriculture is largely rain-fed. About 70% of Kenyans live in rural areas where they primarily engage in farming as the main economic activity. Kenya's pursuit of food and nutrition security especially in rural areas is challenged by the biophysical environment under which agricultural production is practised. Over 80% of the country's land area is classified as Arid and Semi-Arid Lands (ASALs), with significant crop and livestock farming activities (ASAL-APRP, 2016). However, low levels of agricultural productivity and high levels of poverty, food insecurity and malnutrition abound in these areas (FAO, 2020). Kenya has embraced climate smart agriculture that promotes mixed farming, but there are no rigorous studies investigating whether and how impacts of mixed farming could be influenced by the biophysical environment. Hence, it remains largely unknown if impacts of this farming system would be beneficial across all environments. The purpose of this study therefore, is to assess impacts of mixed farming on food security and dietary quality among rural households in different biophysical environments characterized by varying degrees of aridity. The study hypothesizes that environmental differences influence food security and dietary quality impacts of mixed farming.

METHODOLOGY

Analytical Framework

The study adopts an impact evaluation framework that compares food security and dietary quality outcomes for mixed farming practitioners (adopters) against those of non-practitioners (non-adopters). Under this framework, mixed farming practice is considered to be a *treatment* (T). Consequently, adopters of mixed farming are considered to be treated and therefore referred to as the *treated group* ($T = 1$) while non-adopters are untreated and hence the *control group* ($T = 0$). Impact of mixed farming can be thought of as the difference in the average value of the outcome variable between the treated and control groups (*average treatment effect, ATE*), computed as $ATE = E[Y_i|T_i = 1] - E[Y_i|T_i = 0]$, where $E[Y_i|T_i = 1]$ is the average value of outcome variable for the treated group and $E[Y_i|T_i = 0]$ is the average value of outcome variable for the control group. However, deriving the treatment effect directly in this manner is erroneous because assignment of households into mixed farming adopters and non-adopters was not random, but dependent on socioeconomic factors (Wu et al., 2010). Hence, the treatment effect computed would be under- or over-estimated due to *selection bias* (Angrist & Pischke, 2009).

To correct for potential selection bias, we used a non-parametric method known as propensity score matching (PSM) (Rosenbaum & Rubin, 1983). PSM enabled us to construct a group of households that did not practise mixed farming (control or counterfactual group) which is comparable to households that practised mixed farming (treatment or treated group). PSM was implemented by first computing a propensity score, equivalent to the probability that a household

practised mixed farming, using a Logit model. Next, we used nearest neighbor matching algorithm (5 neighbors with a caliper of 0.2) to construct the treatment and control groups within the region of common support (Caliendo & Kopeinig, 2008). To assess the quality of matching, we tested for balancing of covariates using Stata's *pstest* command. Finally, impact of mixed farming was computed as the average treatment effect on the treated (*ATT*), by taking the difference in outcome variables (food insecurity variables described in 2.4.2 and dietary quality variable, HDDS, described in 2.4.3) between adopters and nonadopters of mixed farming in the matched sample. Separate PSM models were implemented for the non-ASAL, Marginally Semiarid, Largely Semiarid and Arid regions.

Study Area

Kenya's land mass is approximately 569,140 square kilometres (FAO, 2015). Of this area, ASALs occupy more than 80% and are residence to about 36% of the country's population, according to the country's Ministry of Devolution and the ASALs (2021). The country is administratively divided into 47 Counties, of which 18 are classified as non-ASALs and 29 as ASALs but with different degrees of aridity (see Figure 1)⁴. Among the ASAL Counties, 8 are arid (85-100% aridity), 8 are marginally semiarid (10-29% aridity) and 13 largely semiarid (30-84% aridity). Agriculture is the mainstay of the country, with different crop and livestock species being raised in each of the biophysical environments according to their adaptability.

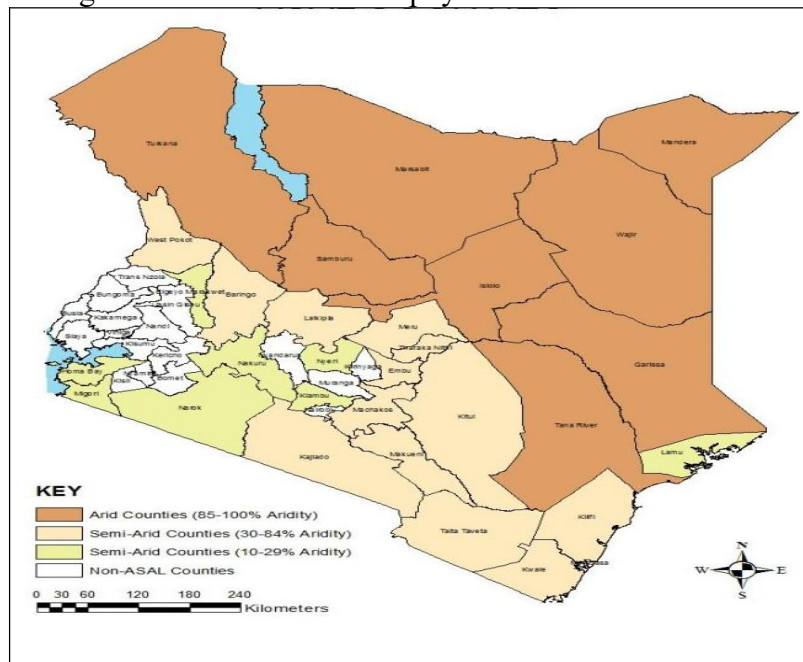


Figure 1: Map of Kenya showing degree of aridity by Counties

⁴ From figure 1, the **arid counties** are Garissa, Isiolo, Mandera, Marsabit, Samburu, Tana River, Turkana and Wajir; the **Largely Semiarid Counties** include Baringo, Embu, Kajiado, Kilifi, Kitui, Kwale, Laikipia, Machakos, Makueni, Meru, Taita Taveta, Tharaka Nithi and West Pokot, while the **Marginally semiarid Counties** are Elgeyo Marakwet, Homa Bay, Kiambu, Lamu, Migori, Nakuru, Narok and Nyeri. The **Non-ASAL Counties** comprise of Bomet, Bungoma, Busia, Kakamega, Kericho, Kirinyaga, Kisii, Kisumu, Mombasa, Murang'a, Nairobi, Nyamira, Nyandarua, Nandi, Siaya, Transzoia, Uasin Gishu and Vihiga.

Data

This paper uses data from the Kenya Integrated Household Budget Survey 2015/2016, collected by the Kenya National Bureau of Statistics (Kenya National Bureau of Statistics, 2018). A stratified two-stage cluster sampling was used to select households for the survey from the all the 47 Kenyan counties. Data was collected from rural and urban strata in each county except Nairobi and Mombasa which are entirely urban counties. A total of 2,388 clusters were selected in the first stage of sampling, from which 10 households per cluster were selected in the second stage, making a final sample size of 21,773 households. Data was collected at both household and individual level (where applicable), on variables such as household demographic characteristics, housing conditions, education levels, household income and credit, ownership and use of information and communication technologies, farming activities and food and non-food consumption expenditure, among others. This study considered 10,817 rural households with adults aged 20 years or older, that had been used to analyze overnutrition among Kenyan adults (Muange & Ngigi, 2021). Distribution of the sampled households by ASALs category is shown in Table 1.

Table 1: Distribution of sampled households

Aridity Category	No. of households	% of households
Arid (85%-100% aridity)	1,599	14.8
Semiarid (30-84% aridity) – largely semiarid	3,207	29.6
Semiarid (10-29% aridity) – marginally semiarid	1,744	16.1
Non-ASAL	4,267	39.4
Total	10,817	100.0

Measurement of key variables

Mixed farming

Mixed farming, the practice of managing different kinds of crops and/or livestock by the same farmers, exists in different forms as highlighted by (FAO, 2001). In this study, households were asked to state if they practised crop or livestock farming during the 12 months preceding the survey and if so, the main crops grown and type and number of livestock kept. A household that had cultivated at least one crop and raised at least one livestock type was considered to have practised mixed farming.

Food insecurity

Food security is achieved when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life” (FAO, 2009). Food security is multidimensional, with one vital dimension being steady economic access to sufficient and quality food. Our study focused on this dimension and measured it using Food Insecurity Experience Scale (FIES) approach developed by the Food and Agriculture Organization of the United Nations (Ballard et al., 2013; FAO, 2017; Nord et al., 2016). FIES data is collected either from individual or household levels for a recall period of 30 days or 12 months and the approach is increasingly being applied in SSA (Wambogo et al., 2018). Following the FIES approach, we measured the severity of food insecurity based on economic access using eight questions with binary responses (Yes/ No) to capture self-reported experience of food insecurity and the perceived severity of food insecurity experienced over a 12 months period, as shown in Table 2.

Table 2: Food Insecurity Experience Scale questions and severity of food insecurity measured

S/No	Question	Label	Severity of food insecurity
1.	In the last 12 months, did you worry that your household would not have enough food?	WORRIED	Mild
2.	In the last 12 months were you or any household member not able to eat the kinds of food you preferred because of lack of money?	HEALTHY	
3.	In the last 12 months, did you or any household member eat fewer kinds of food due to lack of money or other resources?	FEWFOODS	
4.	In the last 12 months, did you or any household member miss a meal because of lack of money or other resources to obtain food?	SKIPPED	Moderate
5.	In the last 12 months, did you or any other household member eat less than you thought you should because of lack of money or other resources?	ATELESS	
6.	In the last 12 months, did your household run out of food because of lack of money or other resources?	RUNOUT	
7.	In the last 12 months, were you or any other household member hungry but did not eat because of lack of money or other resources?	HUNGRY	Severe
8.	In the last 12 months, did you or any household member go without food for a whole day because of lack of money or other resources?	WHOLEDAY	

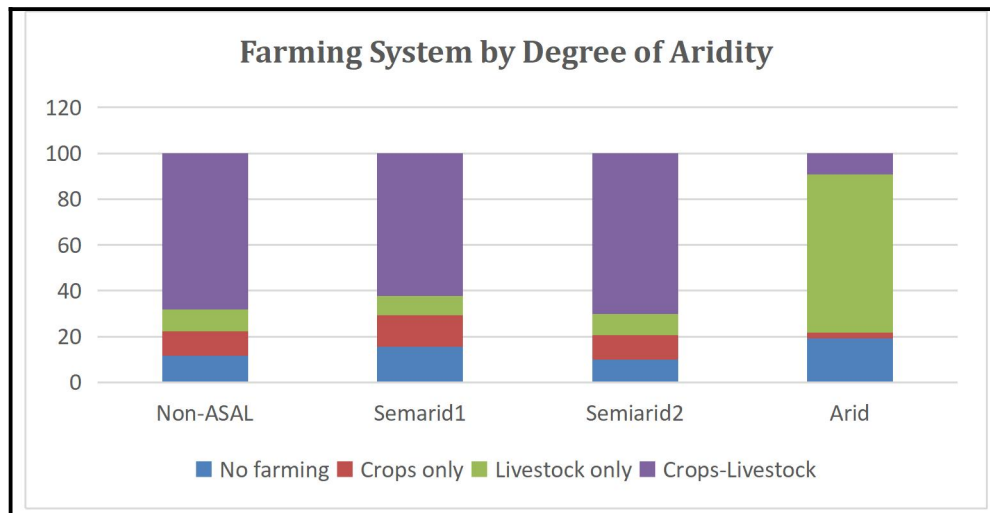
Dietary quality

We measured dietary quality using a household dietary diversity score (HDDS). Dietary diversity is a qualitative measure of access to a variety of foods, a good indicator of nutrient adequacy and extent to which households follow recommend nutritional practices, and a possible remedy to malnutrition (Torheim et al., 2004; FAO et al., 2019). HDDS was computed as a count of food groups consumed by the household during a 7-day recall period preceding the survey. We used the 12 groups of foods recommended by FAO and others to calculate the HDDS (Kennedy et al., 2011). The 12 groups are: cereals; white tubers and roots; vegetables; fruits; meat; eggs; fish and other seafood; legumes, nuts and seeds; milk and milk products; oils and fats; sweets; and spices, condiments, and beverages.

Characteristics of the sample

From the 10,817 rural households in our sample, 59.9% practised mixed farming. Further analysis revealed that mixed farming was practised by 9.9% of households in the *Arid* areas 70.8% of households in the *Largely Semiarid* areas, 62.8% of households in the *Marginally Semiarid* areas and 69.3% of the *Non-ASAL* households (Figure 2). The data shows that *Arid* areas of Kenya are least diversified in terms of crop-livestock mixed farming despite being highly risky for agricultural production. This could be explained by lack of adequate rainfall to

sustain crop production in these areas. Surprisingly, the *non-ASAL* areas, despite having most conducive physical environment for farming, have high levels of mixed farming just like the *Largely Semiarid* areas that have unreliable rainfall.



Note: Semiarid1 = Marginally Semiarid; Semiarid2 = Largely Semiarid

Figure 2: Farming System by Level of Aridity

Our data also reveals that overall, HDDS averaged at 8.74 out of 12 food groups, representing 72.83%. HDDS was highest in the *Marginally Semiarid* (9.23), followed by *Non-ASAL* (9.17), *Largely Semiarid* (8.90) and *Arid* areas (6.74). As shown in Table 3, HDDS differed across the degree of aridity and significantly between households practising and those not practising mixed farming, at 1% significant levels. This indicates that across the aridity gradient, mixed farming households consumed higher quality diets than those specializing in crop or livestock production.

Table 3: HDDS by mixed farming and degree of aridity

Variable	Mixed farming	Arid	Largely semiarid	Marginally Semiarid	Non_ASAL	All
HDDS						
	Yes	7.86	9.10	9.39	9.35	9.24
	No	6.23	8.42	8.98	8.75	8.01
	Difference	1.23***	0.68***	0.41***	0.60***	1.23***

Other characteristics of the sample (Table 4) show that a large proportion of the households had formal education, with just 25.8% having no formal education. About 70.4% of the respondents were married and 39.5% households were female-headed. Most household heads (96.8%) were religious, subscribing to different religions and denominations. The proportion of households owning mobile phone, television set, computer, and internet connection was 73.9%, 12.8%, 2.1% and 13.6% respectively. Distance from homestead to main road averaged at 57.1 km. Besides, the per capita annual non-food expenditure was KES 34,788 and mean number of rooms in main house (capturing wealth status of the households) was 2.3. As can be seen in Table 4, adopters and non-adopters of mixed farming differed significantly in all but two socioeconomic variables, implying lack of random assignment into adopters and non-adopters of the farming system.

Table 4: Description and characteristics of the sample

Variable	Description	Adopters of mixed farming	Non-adopters of mixed farming	Sample
Education	Level of formal education completed			
None	No formal education (%)	16.48	39.72***	25.79
Primary	Primary school including pre-primary (%)	55.92	37.99***	48.74
Post primary	Secondary school and post primary school vocational training (%)	25.07	23.78***	18.79
College	Post-secondary certificate/diploma (%)	6.12	9.15***	5.22
University	Undergraduate/postgraduate degree (%)	1.78	4.71***	1.45
Married	Household head is married (%)	74.22	64.64***	70.38
Female	Household is female-headed (%)	36.93	43.07***	39.39
Mobile	Household owns mobile phone (%)	78.86	66.51***	73.91
TV	Household owns a television set (%)	15.39	9.04***	12.84
Computer	Household owns a computer (%)	2.02	2.17	2.08
Internet	Household has internet connection of any type (%)	15.45	10.77***	13.58
Religion				
None	Household head has no religious belief (%)	3.01	3.39	3.16
Catholic	Household head subscribes to Catholic faith (%)	23.90	22.12**	23.19
Protestant	Household head belongs to a protestant church (%)	55.66	39.79***	49.30
Other_christ	Household head belongs to another Christian denomination (%)	12.76	9.04***	11.27
Muslim	Household head subscribes to Islamic religion (%)	3.47	23.41***	11.46
Other	Household head subscribes to other religions (%)	1.20	2.24***	1.62
Age	Age of household head (years)	49.52	44.42***	16.08
Hhsize	Household size (number of members)	4.84	4.14***	2.52
Distance	Distance from homestead to main road (km)	14.54	68.68***	57.07
Expenditure	Per capita annual non-food expenditure (KSh)	35,478	33,756	34,788
Rooms	Number of habitable rooms in main house	2.65	1.78***	1.26

, * Figure differs significantly from that of adopters at 5% and 1% level of significance, respectively

RESULTS AND DISCUSSION

Descriptive statistics of food insecurity variables

We begin the presentation of study results by describing the severity of food insecurity as captured by the FIES questions (Table 5). The results show that overall, mild food insecurity was experienced by 65% to 72% of households, while moderate and severe food insecurity were experienced by 50%-61% and 28%-44% of households, respectively, depending on the question used to capture food insecurity experience. This implies that mild level of food insecurity was the most prevalent, followed by moderate and severe levels, respectively. Food insecurity experiences differed across the aridity gradient, increasing from the non-ASAL counties to the arid counties. Chi-square tests on all the FIES questions showed significant differences across regions, implying food insecurity experiences differed along the aridity gradient. In the largely semiarid and arid counties, food insecurity of mild, moderate and severe forms was experienced by more than 50% of the sampled households. These results show that there is still a long way to go in achieving zero hunger and food insecurity in Kenya, more so in the drier regions.

Table 5: Descriptive statistics of food insecurity experience by aridity

Variable	All	Non ASAL	Marginally Semi-arid	Largely Semi-arid	Arid
WORRIED	65.1	61.16	63.30	65.61	76.55
HEALTHY	71.9	69.08	72.08	73.06	77.22
FEWFOODS	68.5	65.07	66.34	70.57	76.11
SKIPPED	52.5	46.87	40.25	57.93	70.00
ATELESS	61.0	57.71	57.05	62.08	71.86
RANOUT	50.1	45.57	41.57	52.47	66.77
HUNGRY	44.1	39.08	35.89	46.54	61.85
WHLDAY	27.6	17.77	19.32	31.93	54.22

Impacts of mixed farming on food insecurity and dietary quality

Mixed farming impacts were estimated using the propensity score matching approach described in Section 2.1 above. Our analysis confirmed that adoption of mixed farming was indeed not random, but significantly influenced by the covariates described in Table 4, among others. As we show in Table 6, the pseudo-R-squared for the unmatched samples ranged from 0.14 to 0.25 in all models, implying that the variables explained well the probability of that a household practised mixed farming. After matching, the pseudo-R-squared fell to between 0.01 and 0.02, implying poor explanation of the probability of practising mixed farming, by the covariates. In addition, the mean bias reduced by between 72.8% and 90.6%, while the median bias also reduced by between 50.5% and 90.2%, implying that matching resulted in significant balancing of the observed covariates between the adopters and non-adopters of mixed farming. For brevity, we omit the results of the models used to compute propensity scores, and of the tests used to check the balancing of individual covariates before and after matching.

Table 6: PSM diagnostics – checking the quality of matching

	All	Arid	Largely	Marginally	Non-ASAL
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					semiarid		semiarid			
	UM	M	UM	M	UM	M	UM	M	UM	M
Pseudo R ²	0.25	0.01	0.18	0.01	0.25	0.02	0.18	0.02	0.14	0.01
LR chi2	3690.30	94.27	174.87	2.99	972.01	113.57	421.96	56.78	742.63	82.01
Reduction in Mean Bias (%)	90.63		87.35		72.84		68.48		68.52	
Reduction in Median Bias (%)	90.21		87.00		50.52		65.85		62.96	

Note: UM – Unmatched (Before matching); M – Matched (After matching)

Results of PSM, showing impact of mixed farming on food insecurity and dietary quality, are presented in in Table 7. The results show at the national level (model 1), mixed farming reduced food insecurity experience at the mild, moderate and severe levels. The greatest reduction was in the severe level (7.5-8.4 percentage points) followed by moderate (4.4-6.6 percentage points) and mild (3.0-4.1 percentage points) levels. Disaggregated results show that mixed farming had significant negative impact on mild food insecurity experience mostly in the Non-ASAL areas. Further, mixed farming reduced moderate food insecurity experience significantly in the Arid, Marginally semiarid and Non-ASAL areas, but not in the Largely semiarid areas, with larger impacts estimated in the Arid and Marginally semiarid areas than in the Non-ASAL areas. Furthermore, mixed farming reduced food insecurity experience at severe levels in all areas across the aridity gradient. Reduction in the proportion of households experiencing hunger ranged from 6.6 percentage points in the Largely semiarid areas to 10.4 percentage points in the Non-ASAL areas, while the decline in the proportion of households going without food for the whole day ranged from 5.5 percentage points in the Arid areas to 10.7 percentage points in the Largely semiarid areas.

These results imply that while adoption of mixed farming by households would reduce severe food insecurity experience in all areas regardless of degree of aridity, impact on moderate and mild food insecurity depends on degree of aridity. The results show that while in the Non-ASAL and Arid areas, mixed farming reduces all levels of food insecurity experience, it only reduces moderate and severe food insecurity experience in Marginally semiarid areas, and severe food insecurity experience in the Largely semiarid areas.

Further results show that, mixed farming increased overall HDDS by 0.374, implying an improvement in dietary quality. Disaggregated analysis reveals that the largest impact was in the Arid areas (0.485), followed by the largely semi-arid areas (0.443), Non-ASALs (0.372) and Marginally semiarid areas (0.248). The results imply that the impact of mixed farming on dietary quality was largest in the drier regions of the country.

Table 7: PSM results – Impact of mixed farming on food insecurity and dietary quality

Variable	All (1)	Arid (2)	Largely semiarid (3)	Marginally semiarid (4)	Non-ASALs (5)
WORRIED	-3.24**	-7.77*	-4.34	-4.59	-3.43
HEALTHY	-3.00**	-4.33	-3.30	-2.94	-1.94
FEWFOODS	-4.12***	-5.99	-4.80	-4.99	-4.33**
SKIPPED	-6.62***	-9.94**	-4.38	-10.64***	-6.86***
ATELESS	-4.43***	-9.04**	-2.51	-7.31**	-3.40
RANOUT	-4.40***	-5.61	-4.41	-7.42**	-5.32**
HUNGRY	-7.46**	-8.79*	-6.61**	-9.89**	-10.41***
WHLDAY	-8.35***	-5.48	-10.72***	-9.89***	-8.73***
HDDS	0.374***	0.485**	0.443***	0.248*	0.372***

*, **, *** ATT is significant at 10%, 5% and 1% level, respectively

Discussion

This paper investigated the impact of mixed farming on food insecurity and dietary quality in the context of different biophysical environments with varying degrees of aridity. The paper provides novel findings that mixed farming reduced severity of food insecurity as measured by FIES and improved HDDS hence dietary quality. Mild food insecurity was found to be the most prevalent, followed by moderate and severe levels. The severity of food insecurity increased with the degree of aridity and was highest for the Largely semiarid and Arid areas. Mutea et al. (2019) similarly showed that in Kenya the type of agro-ecological zone significantly influences household food security. However, their study indicated that households in Non-ASAL areas (humid agro-ecological zone) were less food secure than those in semi-humid and semi-arid zones.

Further, the findings show that mixed farming reduced severe food insecurity in all areas. However, impact of mixed farming on moderate and mild food insecurity depends on degree of aridity. Evidence illustrates that production systems of farms in both developed and developing countries influence food security status, with mixed findings. Mixed farming could support the multidimensionality of food security through various pathways. Mixed farming improves food availability through self-supply of food commodities for household members. For instance, small livestock like goat and chicken could help a household overcome a poor crop harvest. Mixed farming supports household income through the sale of agricultural products, that improve economic access to adequate food. Lastly, mixed farming support farm sustainability that is critical under a changing climate that supports land productivity and income, hence supporting stability in the supply of food products. (Poczta-Wajda et al., 2020) suggest that farms specialized in permanent crops and dairy production were more exposed to food insecurity than crop farms in Poland. The authors argued that mixed farming improves farm sustainability that improves farm incomes which in turn positively impacted food security. A recent study in Myanmar's Yamethin District by (Mee et al., 2020) indicated that mixed farming improved food availability through self-supply and increase food utilization by household member as compared to those practising monoculture.

Lastly, mixed farming increased overall HDDS, implying an improvement in dietary quality. The largest impact was in the drier areas (Arid and largely semiarid areas), followed by Non-ASALs and Marginally semiarid areas. Musemwa et al. (2018) had similar findings that farmers practising mixed farming had a higher HDDS than households specializing in either crop or livestock production systems in the Eastern Cape Province of South Africa. Contrary findings were reported in Lao PDR where mixed crop-livestock farming resulted in reduced diversity of household diets (Parvathi et al 2018).

CONCLUSIONS AND POLICY IMPLICATIONS

Food insecurity is globally rising and this that can be attributed to stagnant agricultural productivity, climate change, the rising population, and degraded soil. This impedes achievement of the United Nations Sustainable Development Goal 2 (SDG 2) as well as the African Union's Agenda 2063 (72(e)) that aim to eliminate hunger and food insecurity and improve nutrition. Sustainable agriculture could reduce hunger and malnutrition. Farmers, especially smallholders, adopt farming systems that minimize risk under varying biophysical conditions. Mixed farming is one of the systems with many benefits that can enhance both productivity and sustainability of food and agricultural production, by optimizing resource use. However, studies assessing the association between mixed farming and food and nutrition security produce mixed results, with positive, neutral or negative findings.

This study investigated the impact of mixed farming on food insecurity and dietary quality in the context of different biophysical environments with varying degrees of aridity. The study used nationally representative data comprising of 10,817 households, from rural areas of Kenya. The country promotes mixed farming as a climate-smart agriculture strategy, but rigorous studies investigating how impacts of mixed farming could be influenced by the biophysical environment, are rare. The study adopted an impact evaluation framework that compared food security and dietary quality outcomes for mixed farming adopters against non-adopters. We used propensity score method (nearest neighbor matching, with 5 neighbors and a caliper of 0.2) to remove potential selection bias, and construct treatment and control groups. Food insecurity was measured using the food insecurity experience scale (FIES) approach, while dietary quality was measured using household dietary diversity score (HDDS).

Results show that Kenya still has a long way to go in ending hunger and food insecurity. Food insecurity prevails, with mild food insecurity being the most prevalent, followed by moderate and severe levels. Food insecurity experiences differ across the aridity gradient, increasing from the Non-ASAL counties to the Arid counties. Mixed farming reduced severe food insecurity in all areas. Impact of mixed farming on moderate and mild food insecurity depends on degree of aridity: in the Non-ASAL and Arid areas, all levels of food insecurity reduced for mixed farming adopters, while in Marginally semiarid areas, moderate and severe food insecurity experience reduced. In Largely semiarid areas, mixed farming reduced severe food insecurity. The study further found that mixed farming increased overall HDDS, implying improvement in dietary quality. Largest impact was in the drier areas (Arid and largely semiarid areas), followed by Non-ASALs and Marginally semiarid areas.

Our findings suggest that policymakers should support agro pastoralists to fully adopt mixed crop-livestock farming as a way of improving food security status and dietary quality. Mixed

farming can be promoted through awareness creation on different varieties and types of crops and different kind of livestock species suitable for different aridity levels that farmers can adopt to improve food security, livelihoods and build resilient farming systems under changing climate. Besides, the development of agricultural markets in rural areas will support farmers to access to input and output markets essential for sustainable mixed farming systems.

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Availability of data and material

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Green Human Resource Management Practices and Environment Sustainability: From Empirical Evidence

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Abstract

Green human resource management, if well designed and implemented, is undeniably one of the avenues that is envisaged to contribute towards the actualization of the Sustainable Development Goals (SDGs). This paper set out to interrogate the extant literature on Green Human Resource Management (GHRM) Practices and its nexus to environmental sustainability. One of the emerging issue within business communities is the campaign of going green (GG). GHRM is a drive which helps to create green workforce that can understand and appreciate green culture in businesses and institutions. It is paramount to note that human resource and their systems are the basic foundation of any business. It is a fact that human resource function in an organization is responsible for planning and executing those eco-friendly policies to create a green environment. The study was mainly a desktop, where a review and synthesis of the existing empirical literature, was undertaken. The main source of the data and information for purposes of this paper were largely relevant reports, journals and books. Past writings, indicate that there is a growing need for the integration of environmental management into Human Resource Management (HRM) practice. This article pursues an integrated view of the literature in Green HRM. It examines and interrogates the current empirical literature in the area of green human resource management with a view to pointing out and synthesizing the gray areas and suggesting way forward towards enriching knowledge and practice in the area of green human resource management. Finally, the paper suggests some key HR initiatives towards creating and nurturing GHRM practices and behavior for environmental sustainability. This article draws together the extant literature in this area in suggesting managerial implications and research direction in GHRM. Hence, the papers demystifies the debate and discussion on GHRM and suggests new fronts that requires research focus.

Keywords: *Going Green, Environment, Sustainability, Eco-friendly, GHRM*

INTRODUCTION

Human Resource Management

According to Tiwari & Saxena (2012), human resource management practices refer to organizational activities directed at managing the pool of human resources and ensuring that the resources are employed towards the fulfillment of organizational goals. Effective HRM practices have the potential to create organizations that are more intelligent and flexible than their competitors through the use of policies and practices that focus on hiring, developing talented staff and synergizing their contribution within the resource bundle of the organization (Saeed, Afsar, Hafeez, Khan, Tahir & Afridi, 2019).

Human resource management practices are central to the improvement of the quality of services offered by organizations. Human resource management practices are important pillars in building and maintaining trust in employees for they shape the employment relationship between the employee and the employer (Tang, Chen, Jiang, Paille & Jia, 2018). They are aimed at improving the overall performance of employees within the organization, ultimately resulting in increased organizational performance.

Human resource management practices have changed dramatically during the last two decades owing to globalization, privatization or deregulation, competition and technological advancements. The highly turbulent environment has forced organizations to adopt new workplace practices that lead to sustained levels of high performance (Ray & Ray, 2011). As firms enter into a more dynamic world of international business, and as the globalization of world markets continues at a fast pace, human resource management issues appear to be gaining momentum (Namusonge, Gathungu, & Iravo, 2015).

When employees are managed effectively through consistent practices, they are able to act flexibly in pursuit of the organization excellence. Douglas, Tom and Stuart (2012) observe that worldwide, human resources have to be managed effectively if they are to generate value from other resources. In Nigeria, Oaya, Ogbu and Remilekun (2017) observe that recruitment and selection strategy in the manufacturing companies have an influence on organizational efficiency hence performance. Kianto, Sáenz & Aramburu (2017) argue that in the contemporary business world, human resource represents the most important resource and each organization strives to achieve a competitive advantage and improve organizational performance.

Green Human Resource Management

In Green HRM, different human resources practices such as recruitment and selection, training, compensation and rewards, and performance appraisals are adapted to ensure their employees understand and promote green behavior (Douglas, Tom & Stuart, 2012). Green HRM aims to design, implement, improve, and maintain a green vision within every employee of the organization (Douglas, Tom & Stuart, 2012). It is the use of HRM policies to promote the sustainable use of resources within organizations and, more generally promotes the causes of environment sustainability (Ren; Tang; & Jackson, 2017). GHRM is directly responsible in creating green workforce that understands, appreciates, and practices green initiative and maintains its green objectives all throughout the HRM process of recruiting, hiring, training, compensating, developing, and advancing the firms human capital. It refers to the policies, practices, and systems that make employees of the organization green for the benefit of the individual, society, natural environment, and the business. Chemjor (2020) explains that green human resource management refers to using human resources management practices to reinforce environmental sustainable practices and increase employee's commitment on the issues of environmental sustainability and it embraces considering concerns and values of environmental management in applying human resources initiatives generating greater efficiencies and better environmental performance. Similarly Mampra (2013) defines green human resource management as the use of human resource management policies to encourage the sustainable use of resources within business enterprises and promote the cause of environmentalism, which further boosts up employee morale and satisfaction). This then affects the employee attitude towards the implementation of sustainable environment.

Green practices in human resource can take a wide range of forms, from communications methods, employee selection, employee training and reward among others (Behrend, Baker & Thompson, 2009). For example, green recruiting and hiring practices can be seen through hiring and recruiting more of a workforce that is aware of and personally more committed to green matters than the typical job candidate; green training and development practice through instilling awareness and values along the green theme by way of targeted training and development on everyday practices, specialized area of employee activity, efficiency in the use of company equipment, proper waste disposal, and recycling methods; and, green reward practice where employees are rewarded for their alignment with green company practices, and often times, the rewards themselves are additionally of some eco-friendly nature (Behrend, Baker & Thompson, 2009). Today players are looking for and embarking on more ways to sustain and be conscious of environmental issues affecting people, the community and the society at large. Green human resource management is one of these ways. Currently, the discussion on green human resource management not only includes awareness toward environmental affairs, but also stands for the social as well as economic well-being of both the organization and the employees within a broader prospect. Green human resource management if well designed and implemented is undeniably one of the avenues that is envisaged to contribute towards the actualization of the Sustainable Development Goals (SDGs).

Statement of the problem

Human resource management is an important field of studies today. It is a recognized practice of high value for any business. Human resource management is explained as the efficient and effective utilization of employees in order to achieve organization's goals (Ren; Tang; & Jackson, 2017). It is about managing the people side of the business, putting in place and actualizing policies, procedures, rules, and systems that influence the behavior and productivity of employees of the organization (Opatha, 2009). In the human resource management there is a growing research attention and literature on green human resource management. However, Renwick, Redman and Maguire (2013); Jackson, Renwick, Jabbour and Camen (2011) note that the literature on green human resource management is not only diverse and piecemeal but also it does not have strong analytical and theoretical framework to underpin the valuable knowledge obtained by the scholars through a systematic research works in this field. Greening organizational operations and activities has become a talk of the day so much so that every organization could like to put in practice to ensure sustainability. Past writings indicate that there is a growing need for the integration of environmental management into Human Resource Management (HRM) research practice. This article pursues an integrated view of the literature in Green HRM. This article draws from the extant literature in this area in proposing a new process model and research agenda in Green HRM. Hence, this paper presents and interrogates the current GHRM literature and proposes way forward towards enriching knowledge and practice in the area of green human resource management for environmental sustainability.

METHODOLOGY

This paper employed an H-Classics methodology. This is regarded as an objective approach to categorizing classic papers that takes in account the magnitude and history of citations in a given

field of knowledge, providing useful information for developing lines of research (Katarzyna Piwowar-Sulej, 2021). Therefore, H-Classic approach as utilized offers an objective method to identify core knowledge in green human resource management and environmental sustainability. This paper pursued a desktop research approach. Relevant empirical literature is reviewed and synthesized. Textbooks and journal articles were the main sources of the data and information for purposes of this paper.

RESULTS AND DISCUSSION

Green job analysis and design

Crosbie and Knight (1995), Revill, (2000) advocate for including environmental, social, personal, and technical requirements of the organizations in job descriptions and person (job) specifications. This assertion was supported by Beard and Rees, (2000) and Griffiths and Petrick (2001) who observed that teamwork and cross-functional teams can be used as job design techniques to successfully manage the environmental issues of the company. Renwick et al, 2013 noted that a number of environmental protection related tasks, duties and responsibilities should be incorporated in each job and put into effect. Opatha (2013) on his part suggests for the inclusion of environmental dimension as a duty in job description and inclusion of green competencies as a special component in job specification.

Green recruitment and environmental sustainability

Wehrmeyer (1996) notes that general job descriptions can be used to specify a number of environmental aspects. For example, based on evidence from UK, environmental reporting roles and health and safety tasks, which staff are exposed to, harmful substances/potential emissions, and matching personal attributes to needed environmental competencies, buying-in specialist competencies via new hires or investing in training and induction for new recruits is seen to be needed to ensure employees understand and approach their corporate environmental culture in a serious way. Based on survey data in UK, Wehrmeyer (1996, Oates (1996) further argues that environmental issues have an impact on recruitment. According to them, survey data shows that high-achieving graduates judge the environmental performance and reputation of a company as a criterion for decision-making when applying for jobs. As reported by Clarke (2006), a survey by the British Carbon Trust shows over 75% of 1,018 employees considering working for a firm see it as important that a firm should have an active policy to reduce carbon emissions. A study by The U.K. Chartered Institute of Personnel and Development shows that 49% of their respondents take environmental credentials into account when deciding whether to take a job or not, with firms like Boots viewing the 'green job candidate' as influencing thinking in this area (Brockett, 2006). Jabbar and Abid (2015) in their study of green Human resource practices and its impact on environmental performance noted that employees recruited on the basis of their environmental cognizance achieve higher grades of satisfaction when they are more involved in decisions and day to day operations.

Green Performance Appraisal and environmental sustainability

There has been debate as to how to measure green performance through performance appraisals. Firms like Amoco in the United States (U.S.) has installed corporate-wide environmental performance standards (which cover on-site use, waste management, environmental audits, and

the reduction of waste) to measure environmental performance standards, and developing green information systems and audits (to gain useful data on managerial environmental performance), Union Carbide Corporation an American chemical corporation, use green audit programme that contains field audits which are seen as important, as they can give employees a mechanism by which they can raise any recurring problems, and gain information and feedback on past and future environmental performance of their firm (Milliman and Clair, 1996). Milliman and Clair argue that there is need for managers to be held accountable, so that they familiarize themselves with compliance issues. However, several of the existing PA systems in use in the U.S. seem limited to plant and division managers and executives only. TUSDAC (2005) proposes that one way in which PM systems can be successfully initiated in an organization is to develop performance indicators for each risk area in environmental awareness and education.

Green training and development and environmental sustainability

There is debate and discussion on the who and how in terms of embracing employee training and development for purposes of environmental sustainability. Organizations are training teams of front-line employees to produce a waste analysis of their work areas. Such employees are seen as ideal staff to spot and reduce waste as they are closest to it, but they must be knowledgeable on how to collect the relevant data. Examples of best company practice in training and development in EM in the U.S. comes from Allied Signal Inc., who include a Total Waste Minimization (TWM) component into their training, whilst Nordstrom use education initiatives in general waste minimization (May and Flannery, 1995: 30, 34-35). Training seems to be one area where the role of HRM in environmental management has been recognized for some time (as job rotation provides a useful way to train Green executives or future Board members in EM, and is seen as a crucial part of successful environmental programmes (Wehrmeyer, 1996). North and Daig (1996) reports that in Adam Opel AG in Germany, environmental issues are integrated within the training programmes given with all new projects and processes, in the U.K. at General Electric Company (GEC), all of their companies are required to work out their own environmental targets individually. At GEC, such training incorporates the aspects of environmental legislation, the environmental management system (EMS) (for environmental managers) and issues like waste management, transport and air emissions, a discussion of treating waste and ground water, communications, awareness-raising and risk management.

According to Wehrmeyer and Vickerstaff (1996), A number of steps may be used to establish an environmental training system, such as: a) an audit of existing training system resources and activities, forming a corporate environmental committee (with HR representatives, environmental professionals and other executives on it), b) a job analysis producing a job description, and environmental awareness as part of induction training (as done at the Body Shop in the U.K.) and c) use a performance management system to monitor and review performance on productivity, quality, wastage and accidents. According to Jabbour (2011), green training refers to a system of activities that motivate employees to learn environmental protection skills and pay attention to environmental issues, which are key in achieving environmental goals. Lasrado & Zakaria (2019) not that green training must be given together with educational programs for all company members, not only those who are related to the environment department

Jabbar H. M, Abid M. (2015), in their study of green Human resource practices and its impact on environmental performance, proposes that organizations who want to increase their employee performance should put emphasis on training as it motivates them to achieve higher performance levels. Simms (2007) advocates for initiatives to encourage and empower staff to act in more environmentally friendly ways at work and home. A study by Chemjor (2020) recommends that there is need for training and development to build capacity for those institutions that have embraced green human resource management practices and provide support to various green network movements and other groups as the leading vehicles for green human resource management and sustainability in our entities.

Employee relations and environmental sustainability

Employee relations through employee involvement and participation has been seen as one of the ways of nurturing an eco-friendly workforce. Reed (2002) reports that since 1975, 3M has encouraged employees to propose changes to generate revenue and reduce pollution through their Pollution Prevention Pays (3P) programme. So far, 3M claim their 3P initiative has produced more than 2,500 pollution solutions, halving their waste release, and saving them nearly \$300million. Indeed, later estimates for 3M are that their 3P programme has seen employees propose more than 4,750 projects worldwide, preventing 1.7 billion pounds of pollution, and saving them \$850 million in pollution control and raw material costs. According to May and Flannery (1995), American Airlines claim their flight attendants recycle over 616,000 pounds of aluminium cans, earning at least \$40,000 to them in one year. Newman and Johnson (2000) reports that other employee involvement team projects in the U.S. have also been seen to produce environmental improvements for Chrysler at the Jeep plant in Toledo, AT&T in Ohio, and the Wheeling-Pittsburgh Steel plant.

Fernandez, Junquera and Ordiz (2003), argue that Eco-initiatives occur from creative ideas from all employees, and that mechanisms need to be made to involve employees in it giving employees independence to generate creative solutions to solve problems. Ramus and Steger (2000) examined the relationships of environmental policy and direct supervisory support behaviours in promoting employee-led environmental initiatives in a survey of 353 mid and low-level workers in 10 European (and one U.S. and one Canadian) leading-edge firms committed to environmental protection. Their results reveal that factors associated with organizational and supervisory encouragement are important in employee environmental creativity. A HSBC initiative in the U.K. found benefits in carbon saving being seen to come from employee initiatives (Simms, 2007). Phillips (2007) notes that Argos (UK) are aiming to engage their staff through increased environmental awareness, including initiatives in recycling and waste segregation.

Green grievance & discipline and environmental sustainability

Wehrmeyer (1996) argues that disciplinary procedures should be attached to environmental rules and duties where non-compliance occurs. Brockett (2006) supports this position by noting that environmentally unfriendly behaviour may constitute a breach of contract and therefore possible grounds for disciplinary measures to be undertaken. This is expected to act as a deterrent to behaviors and conduct which are eco-unfriendly.

Green compensation and reward practices and environmental sustainability

It is argued that organizations could benefit from establishing a reward system for waste reduction practices that teams develop. May and Flannery (1995) cites various examples in this line such as DuPont in the US which has an Environmental Respect Awards program that recognizes employee environmental achievements, and both Nordstrom and 3M which offer rewards for suggestions that individual staff make to help the environment and increase firm profitability. However, Fernandez, Junquera and Ordiz (2003) note that assessing results that employees produce in environmental activities is a difficult task and argue that it is important to consider linking of contingent remuneration for senior managers and the higher performance produced in environmental management, and the successful use of public recognition systems that include financial compensation for employees.

Milliman and Clair (1996) roots for recognition-based rewards. This suggestion is supported by Govindarajulu and Daily (2004) who further suggests these could take forms of paid vacations, time off, favoured parking, and gift certificates all aimed at encouraging employees on environmental performance.

Green employee exit interview practices and environmental sustainability

An exit interview has been described as a discussion between the departing employee and the employer, which can vary in structure and formality, and is designed to get information about their employment experience and motivations for leaving (Evans 2006; Rudman, 2002; Stone, 2005). It is meant to find out what exactly the departing employee think and feel about the organization (Evans 2006). According to Wehrmeyer (1996) such discussion should contain environmental dimensions. Marcus and Fremeth (2009) noted that data collected from departing employees about firms' environmental behavior have been constructively used to improve firms' environmental performance. Behrend, Baker and Thompson (2009) report that departing employees are more factual in reporting environmental activities of a firm and therefore HRM teams are more likely to obtain quality data on environmental management conduct of employees which they can use to improve firm's environmental performance.

Green Human Resource Management Practices and Environmental Sustainability

Samant & Sangle (2016) view sustainability as a competitive strategy which represents the philosophy as well as the strategy of an organization. As a company's performance, including the achievement of its sustainability-oriented goals depends first of all on its employees, more and more attention is being directed toward new human resource management concepts such as sustainable HRM, green HRM, socially responsible HRM, triple bottom line HRM, and common good HRM. Ren, Tang, & Jackson (2018); Saeed et al., (2019) argue that the concept of green HRM can also be described as sustainable human resources management which is defined as "the adoption of HRM strategies and practices that enable the achievement of financial, social, and ecological goals, with an impact inside and outside of the organization and over a long-term time horizon while controlling unintended side effects and negative feedback" (Ehnert, Parsa, Roper, Wagner, & Muller-Camen, 2016).

Thomson and Leviski (2011) in their study on the economically advanced countries of Europe noted that the spread of green human resource practice gained momentum during 2005-2010, mainly in countries like Germany, Austria, France and Spain and linked this development to the growing adoption of sustainable management practices in these countries. Robert and Timber

(2013) studying service organizations in Middle East and North Africa (MENA) region noted that firms achieved effective decision making, better precision in operational implementations and reduction of manpower cost responsible as a result of the growing popularity of green human resource management practices.

Kanapala P. M.K, Battu N (2018) carried out a study on the role of Green Human Resource Management Practices on Employee Performance in the Health Care Industry and noted that green HRM practices (recruitment, performance management and appraisal, training and development, employee relations and pay and rewards) had the moderate effect on employee performance.

In their study of Green HR practices and its impact on environmental performance, Jabbar and Abid (2015) concluded that GHRM enables organizations to reduce their costs and invest their resources for the betterment of the environment. Organizations that recruit employees with the objective to enhance environmental outcomes have gained customer satisfaction and eventually increased their performance. Companies that are able to align practices and human resource dimensions with the objectives of environmental management can be successful in the organization journey towards environmental sustainability.

A study by Andjarwati, Audah, Khouri and Rebilas (2019) on the impact of green human resource management with a focus on training and development and Eco- Friendly policies enterprise sustainability. Using data collected from the employees who are associated with the mining sector of Indonesia, the findings revealed that green training and development are not important predictor of environmental sustainability.

A study by Owino & Kwasira (2016) investigated the influence of selected Green Human Resource Management Practices on environmental sustainability at Menengai Oil Refinery Limited Nakuru, Kenya. The practices focused on were green employee sourcing, green occupational health, green employee training and green performance management. Findings from this study indicated that embracement of these practices influenced environmental sustainability. The study further found out that the firm was able to improve its environmental sustainability practices when it offered training and development programs on green aspects of the organization and environmental consciousness and implemented green occupational health and safety programs. A similar study carried out by Langat and Kwasira (2016) at Kenyatta University, Kenya found out that employees' application for employment at the University was not based on green issues hence their little understanding of the concept. It further showed that many employees were aware of Environmental sustainability and National Environmental Management Authority policies and regulations as opposed to Green Human Resource Management and sustainable organizational practices. Findings from the study at Kenyatta University further indicated that green/environmental performance indicators were not adequately included in performance management and appraisals systems and thus recommended the need for training and capacity building among the employees of the university and inculcating the culture of green and sustainable ecological practices as well as developing pro-environment managers and leaders to ensure sustainability in the workplace. Whiegar (2012) observes that almost all Supermarkets in Nairobi, Kenya have adopted various green logistics such as use of lead free fuels, recycling of materials, complying with the National Environmental

Management Authority (NEMA) regulations, and use of environmental friendly packaging materials in serving customers through the embracement of green human resource management practices.

A study by Chemjor (2020) recommends that there is need for training and development to build capacity for those institutions that have embraced green human resource management practices and provide support various green network movements and other groups as the leading vehicles for green human resource management and sustainability in our entities. Mohammad Abdullah Al Mamun (2019) examined the extent of awareness of Green Human Resource Management among different levels of HR Managers from various organizations in Bangladesh. Using a combination of quantitative and qualitative research methods the study found out that Green HRM knowledge depends on various factors and noted that organizations should employ requisite Green HRM practices to achieve excellent organizational performance through proactive organizational and national human resource development initiatives.

In their study, Saputro A. and Nawangsari L. C. (2021) analyzed the effect of green human resource management on employee performance through organization citizenship behavior for environment at PT Andalan Bakti Niaga, Indonesia and noted that green training, green compensation and rewards have a positive and significant effect on organization citizenship behavior for environment, green performance appraisal has no significant effect on organization citizenship behavior for environment, green recruitment, green training, green compensation and rewards have a significant effect on employee performance through organization citizenship behavior for environment and green human resource management has a significant effect on organization citizenship behavior for environment.

Kuria M. W, Mose T, (2019) studied the effect of green human resource management practices on organizational effectiveness of universities in Kenya and reported that during recruitment and selection, the management should seek to employ and recruit staff and personnel that are conversant and ready to apply their skills and expertise to better the ecological surrounding. Further, through this study, it was noted that staff so recruited should also be coached and trained on their specific matters and issues that relate to the environment and motivation to realize eco-friendly work environment.

CONCLUSIONS AND RECOMMENDATIONS

This paper has reviewed the relevant literature on Green Human Resource Management (GHRM) and its implications on Environmental Sustainability (ES). From evidence reviewed, indeed green human resource management practices and initiatives are critical for the realization of environmental sustainability at individual, corporate, community and society levels. However, it is evident that there is limited literature and therefore evidence on the practice of GHRM and its implications on environmental sustainability across the diverse sectors in the developing economies.

Based on the review and discussion of the extant literature in GHRM, going green in HRM should be the slogan and anthem for individuals, corporate and the community as one of the avenues towards achievement of environmental sustainability and contributing to the realization

of Sustainable Development Goals (SDGs). Employers and human resource practitioners are encouraged to incorporate aspects that impress upon eco-friendly and behavior in the hiring and recruitment, staff training and development, staff deployment, employee performance appraisal, employee relations through involvement, employee reward system and employee exit process. This is envisaged to contribute to improved organizational environmental performance. Top leadership of organizations are also encouraged to develop and support policies and strategies that create an enabling working environment for the people and organization exhibiting a “green” behavior with keen interest on waste management and recycling and safeguarding and enhancing worker health and well-being.

We suggest that more research efforts and support should be directed to documenting evidence on GHRM practices with a focus on the level of adoption and implications on not only environmental sustainability but also organizational or institutional performance within the developing economies and across sectors and sub-sectors. Therefore academicians and researchers are called upon to step into gaps and contribute to the growing literature and knowledge in the area of GHRM.

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