

Impact of Infrastructure at Technical Vocational Education Institutions on Human Resource Development on Realization of Sustainable Development Goals in Western Kenya

Sr. Chepkoech Selina, Khatete Ibrahim (Ph.D) and Prof. Wanjala Genevieve (Ph.D)
University of Nairobi, Kenya.

Abstract

Kenya has undertaken Technical, Vocational Education and Training (TVET) as a key driver to Human Resource Development to facilitate her compliance with Sustainable Development Goals (SDGs) in her development visionary plan dubbed Kenya Vision 2030. A number of reforms have been initiated at TVET institutions among them refurbishing and rebranding in ensuring that there is adequate provision of relevant infrastructures to facilitate quality TVET Training. The purpose of this study was to establish the state of infrastructures at TVET institutions and how it has impacted on their capacity to produce quality graduates/manpower in line with Kenya's development aspirations. The study was carried out in 10 public TVET institutions. The study examined various infrastructures in terms of their availability and adequacy. The findings on this two were used in correlating with Trainees academic achievement. Correlation research design was used for the study. Ten principals, 100 heads of departments and 800 Trainees were involved in the study. Questionnaires, interview schedule and observation schedule guide were principle instruments for data collection. The findings of the study established that correlation between infrastructure and academic achievement was very significant at 0.725. However, over 80 percent of the institutions lacked ICT infrastructures; workshops, libraries and modern classrooms. From the findings of the study it is concluded that the state of infrastructures at the TVET institutions are negatively impacting on manpower development, and country's ability to meet her development aspirations in the Kenya Vision 2030 and the Sustainable Development Goal number four. From the study findings it is recommended that the Government should undertake serious development of infrastructures at TVET institutions in order to enhance development of quality graduates to help the country in the attainment of the Sustainable Development Goals.

Keywords: Infrastructure, Quality, Sustainable Development Goals, Human Resource Development

INTRODUCTION

The issue of Sustainable Development Goals emerged out of the World's worry on the rate at which the earth's natural resources are being depleted and the challenges of environmental degradation associated with man's activities in endeavor to meet daily needs. The World Commission on Environment and Development (WCED) (Brundtland Commission) states that 'Sustainable Development is the development that meets the needs of the present without jeopardizing the ability of the future generations to meet their own needs'. Sustainable Development (SD) is normally a triangular interplay of three critical elements; social stability, economic performance and cohesion and environmental stability (ENEP, 2002).

The United Nations Conference on Environment and Development (UNCED) that took place in Rio de Janeiro Brazil in 1992 identified human capacity building as a catalyst for other types of development. The capacity building encompasses the country's efforts in human, Scientific, Technological, Institutional and resource capabilities as a solution to challenges of SD. Based on evidence from East and South Eastern Asian countries that have registered impressive economic growth in a single generation

by encouraging and supporting knowledge-based economies, and skills development that respond to modern and emerging technological advancement. Technical Vocational Education and Training was identified by these Tiger countries as critical in facilitating skill development in line with the demands of SD (World Bank, 1991).

Kenya government as a signatory to International Conventions has committed itself in the attainment of SD goals by undertaking serious measures to revamp her dormant TVET institutions. Much effort is being directed in ensuring that there is adequate provision of infrastructures in all the TVET institutions as a way of promoting quality training of the graduates.

The United Nations Millennium Project Task Force (2005) identified adequate infrastructure as necessary, if not sufficient requirement for enhancing the creation and application of Science, Technology and Innovation. Bowen, Morara and Muriithi (2000) and Nyerere (2009) noted in their studies that most developing countries have impressed TVET and made it a sub-sector of the education system. However, the same countries have given very little attention or budget provisions, a situation that has resulted into poor infrastructure development in the

institutions leading to low-quality education. This scenario is not in line with the demands of the labor market or local livelihoods. In their recommendations they called for adequate budgetary provisions to TVET institutions for the development and provision of necessary infrastructures to promote effective skill development.

The importance of the contribution of infrastructures in learning institutions is underscored. For example availability of the school buildings and other plants enhance good academic performance. In Kenya, investment in skills training for institutions such as Youth Polytechnics (YPs) and Technical Training Institutes is being affected by inadequate funding. The institutions are experiencing lack of or obsolete physical infrastructure (workshops) and poor quality tools, leading to low-quality education that is not in line with the needs of the labor market or local livelihoods. The TVET graduates encounter a number of challenges in the workplace due to lack of the skills demanded by current labour industry. The provision of adequate infrastructures at TVET institutions is a way of fostering effective skill development.

Changilwa ; Akala; and Wambua (2016) while doing a study on Challenges facing the effective implementation of Artisan and Craft Courses in Catholic sponsored community colleges in Nairobi, they established that inadequacy and high cost of infrastructure and equipment hindered effective curriculum implementation in those institutions. Students do not have enough exposure to modern tools and opportunities to practice with the few tools and machines available in their training. The study called for stakeholders to develop strong networks and collaborations with relevant stakeholders and sourcing of adequate funds from variety of organizations in order to provide modern facilities and teaching and learning resources in those community colleges to enhance skill development.

The study was guided by the systems theory. The theory explains the relationship between infrastructure provision and quality of graduates from the institutions. The theory can be used to explain that students who are accessible to adequate infrastructure would generate value in their skills developments. According to this theory; the quality of output (graduates) depends on the quality of inputs used in production process; adequacy and provision of infrastructures.

Lack of workshops hinders institutions' abilities to promote practical teaching; lack of electricity hinders institutions ability to use ICT in teaching and learning as well as use of other machines such as welding to expose students to practical lessons which are critical in skill development.

Statement of the problem

Kenya Education Sector Support Programme (KESSP) called for reforms in education sector in Kenya as a way of enhancing relevance of education and training (RoK 2005). Among the reforms was ensuring provision of adequate infrastructures such as laboratories, workshops and classrooms to ensure that the quality of education is not compromised at all levels including TVET. The ability to use TVET in promotion of SDGs is anchored on provision of not only high quality TVET graduates but also adequate numbers of those graduates for different sectors of the economy. Therefore in order for the TVET graduates to contribute to economic development there should be adequate provision of infrastructure to enhance skill development among them which is the basis on which the study was anchored.

Purpose of the study

This study aimed at assessing the state of infrastructures at public TVET institutions and how it has impacted on skill development among TVET graduates in view of demands of SDGs on the basis of evidence derived from Public TVET institutions in Western Kenya.

The specific objectives of the study were to;

- a. Establish the types of infrastructures at TVET institutions and how they impact on capacity of the institutions to inculcate and develop skills in the graduates in line with demands for Sustainable Development in Kenya.
- b. Determine how the adequacy of infrastructures at TVET institutions impact on manpower development for promotion of sustainable economic development.
- c. Establish correlation between availability and adequacy of infrastructures and academic achievement of the trainers.

Research Questions of the Study

To help in realizing the objectives set, the following research questions guided the study:

- i. What are the types of infrastructure at TVET institutions and how have they impacted on capacity of the institutions to develop skills in view of the demands of skills for sustainable development?
- ii. To what extent does the adequacy of infrastructures at TVET institutions impact on capacity of manpower development for promotion of Sustainable economic development?

Hypothesis for the Study

There is no significant relationship between availability and adequacy of infrastructures at TVET institutions and skill development among the graduates.

Significance of the Study

It is hoped that the findings from the study may be beneficial to several stakeholders. First at policy formation and implementation level, the findings may provide concrete evidence to guide policy makers to come up with policy reforms to enhance the operations at the TVET institutions to increase their capacity to offer relevant skills development required in modern labour market in both quantitative and qualitative terms to meet the country’s development aspiration. Secondly, study recommendations may form a basis which education leaders can use to campaign for more funding to undertake and support trainees’ skills development and lastly, the study findings may contribute to the enrichment of existing knowledge on relationship between provision and adequacy of infrastructures and quality of human labour produced in learning institutions.

Limitations of the Study

At the time of the study some of the factories that offer internship to the TVET trainees in the region were having economic difficulties. One of them had closed operations. This affected feedback from the personnel officers to provide their opinion on the level of skill possession by the trainees. However the researchers carried an in-depth interview with those in the factories that were operational at the time.

Delimitations of the Study

According to EPFT, the quality of education output is influenced by school inputs (quality of teachers, school infrastructures, teaching and learning resources and quality of students admitted) and students’ social environmental factors. However, this study was concerned with intrinsic variables perceived to be relevant for policy-within control of school system only; adequacy and provision of infrastructures.

Methodology

The correlation research design was used in this study. Several researchers Moore, (1983), Cohen and Marion (1983) and Saunders; Lewis and Thornhill (2007) say that correlation research design is suitable for studies where it is not possible for treatment and manipulation or control of independent variables randomly assigned to subjects. This design enabled the researchers to establish the relationship between TVET institutions and other variables which could not be manipulated to achieve the impact of the institutions on human developments and realization of the Kenya Vision 2030. The researchers were able to gather facts on state of infrastructures at TVET institutions in the study. The facts found were used to show how they influence development of quality manpower for realization of Sustainable development goals by the Kenya government.

The study was carried out in ten (10) TVET institutions in Western Kenya. One hundred Heads of Departments, 10 principals and 800 Trainees formed the team of respondents. Data was collected through Questionnaires, interview schedule, observation and document analysis.

Findings of the study

The findings from the study are presented based on the research questions and hypothesis constructed.

Questionnaire Return Rate

A total of 900 questionnaires were distributed to 800 Trainees and 100 Heads of Department (HoDs) out of which 696 Trainees and 90 HoDs responded. The return rate was as summarized in Table 4.1.

Table 1. 1 Questionnaire Return Rate

Respondent Category	No. Dispatched	No. Returned	Percentage
Trainees	800	696	87.00
HoDs	100	90	90.00
Total	900	786	87.33

Table 1.1 shows that the average response return rate of 87 percent was realized from both the Trainees and HoDs. According to Mulusa (1990) the return rate of 50 percent is adequate, 60 percent good and 70 percent very good. The average rate of 87 percent was therefore good enough to make a comprehensive and in-depth analysis of the survey conducted.

Impact of Infrastructures at TVET Institutions’ on Human Resource Development

The first research question was on the impact of infrastructures at TVET on quality of human resources development. The study sought to determine the impact of infrastructure at TVET institutions on human resources development in achievement of economic development in Western Kenya under; Adequacy of infrastructures and Relationship between infrastructures and economic development. To help answer this question various data was collected and reported as in the following sections.

Adequacy of Infrastructure in TVET Institutions

Data to address this objective, data was captured from Trainees, HoDs, and Principals in the institutions. The likert scale values; Strongly Agree (SA); Agree (A); Undecided (UD); Disagree (D) and Strongly Disagree (SD) were used to capture the opinions of the respondents and tabulated as in table 1.2. The Trainees were asked to tick against the given predetermined responses .The seven items on perception scale constituted seven sub variables that signify the requirements of infrastructures for effective Training process.

Table 1.2: Trainees Response on Adequacy of Classes

Respondents' opinion	Frequency
SA	309
A	331
D	20
SD	36
Total	696

Table 1.2 shows that 309 (44.4%) of respondents strongly agreed and 331(47.6%) agreed that classes were adequate. Based on this rating, it is reasonable to conclude that classes at study institutions were adequate for promotion of promotion of Training. However, it was observed in one institution that classes were made of makeshift *mabati* structures without lockable doors and windows, a situation that was likely to compromise the training process particularly during rain seasons. To promote effective training, there is need to put up modern classes to ensure that training process is not disrupted at any time.

It was important for the trainees to rate the facilities. Data is captured in table 1.3

Table 1.3: Trainees Rating of Adequacy of Agricultural Workshops

Respondents' opinion	Frequency
SA	306
A	
D	321
SD	40
Total	29
	696

From Table 1.3, the majority of respondents (over 90 %) agreed that agricultural workshops were adequate to enhance effective training. As if to confirm the above findings, the interview with one of the principals gave the following response;

----as an institution we have a challenge of infrastructures particularly workshops. But I am happy that last year we were given one million shillings by Constituency Development Fund (CDF) that enabled us to put up this agricultural workshop which is benefiting the trainers immensely.

In reference to the above statement, collaboration among various stakeholders is critical in ensuring that adequate teaching and learning is realized. Data on other facilities was as indicated in table 1.4.

Table 1.4: Trainees rating of adequacy of Home Science Rooms

	Frequency
SA	54
A	12
D	315
SD	315
Total	696

Table 1.4 shows that the majority of respondents (over 85%) either disagreed or strongly disagreed that

home science rooms were adequate to enhance effective skill development. Inadequate Home Science rooms are likely to compromise effective skill development among trainees taking courses in this line. Lack of the facilities would also curtail the institutions ability to expose students to practical lessons. Walkiro (2001) observed that a practice session should follow demonstration immediately as a way of enhancing skill development. This is only possible if facilities such as home science rooms are available.

The rating on the ICT facilities was as reported in table 1.5

Table 1.5: Trainees Rating of Adequacy of ICT Workshops

Respondents' opinion	Frequency	Percentage
SA	46	6.6
A	60	8.6
D	291	41.8
SD	299	43.0
Total	696	100.0

From Table 1.5, lack of ICT workshops emerged as the greatest challenge facing TVET institutions. Over eighty percent (80%) of respondent disagreed that those TVET institutions had adequate ICT workshops.

The use of modern ICT facilities enhances TVET's delivery of trainings and assessment of the trainers. It is a critical tool for enhancing access and quality of training at TVET institutions and for promoting life-long learning opportunities. Through ICT, training, teaching and learning, as well as assessment materials, can be provided at a lower cost. It supports learner-centered TVET delivery, improves access to information and knowledge and allows for self- and self-paced learning and assessment. Therefore failure to have adequate ICT infrastructures at TVET institutions is likely to disadvantage Trainees from benefits that accrue from ICT revolution. It is with this background that data on the infrastructures for ICT training was captured and recorded in table 1.6.

Table 1.6: Trainees Rating of Adequacy of Library

Respondents' opinion	Frequency	Percentage
SA	46	6.6
A	70	10.1
D	281	40.4
SD	299	43.0
Total	696	100.0

From Table 1.6, only 116 (16.7%) of the respondents agreed that the libraries were adequate. From these findings, it can be concluded that adequacy of libraries is one of the challenges facing study institutions, a situation that is likely to compromise development of quality skills among Trainees.

The facilities for engineering courses were equally important. Data on this is recorded in table 1.7.

Table 1.7: Trainees Rating of Adequacy of Engineering Workshops

Respondents' opinion	Frequency	Percentage
SA	46	6.6
A	60	8.7
D	374	53.7
SD	216	31.0
Total	696	100.0

From Table 1.7, only 46 (6.6%) and 60 (8.5%) of respondents strongly agreed and agreed respectively that workshops for engineering courses were adequate at the study institutions. From these findings, it can be concluded that there was lack of adequate engineering workshops in the institutions. This poses a great problem towards the production of quality graduates at the study institutions. The trainees are not exposed to practical skills training as expected. These findings agree with research findings of Dasmani (2011) who found that technical institutions in Ghana are faced with inadequate workshops. This compromised the graduates from the institutions who were found by the formal industry in Ghana to be ill prepared for the modern job market. The theoretical technical skills provided by technical training institutions need to be complemented by workplace skills to prepare technical graduates for the work place after training.

Electricity is a major component and input for skill developments. Modern workshop equipment use electricity to run. Data on availability of electricity power in the institutions was captured as in table 1.8.

Table 1.8: Trainees Rating of Adequacy of Supply of Power

Respondents' opinion	Frequency	Percentage
SA	360	51.7
A	260	37.4
D	40	5.7
SD	36	5.2
Total	696	100.0

From Table 1.8, the majority of the respondents (over 85%) agreed that TVET institutions are adequately supplied with power. It can therefore be concluded that TVET institutions under study were well supplied with power. This is a positive step given that availability of power is critical in promotion ICT and use of modern machines to promote learning. Frishch Man (2007), states that lack of electricity hinders institutions ability to use ICT in teaching and learning as well as use of other machines such as welding to expose students to practical lessons which are critical in skill development.

Principals' Response on State of Facilities at TVET Institutions

The study further sought information on the state of training equipment at TVET institutions. The principals were asked to rate the state of facilities at their institutions ranging from obsolete to modern. From the principals' responses, 30 percent of them felt that the training facilities are good, 40 percent rated them as bad, 20 percent said the facilities were obsolete and only 10 percent rated them as modern. Modern facilities meant those facilities in the workshops or those being used for training that are in line with the facilities used in the industries while obsolete facilities referred to the state where the training equipment were absolutely out of tune and operating on old technology famously referred to analog with the facilities/equipment currently used in business Organizations and industries.

Based on this finding, it is observed that lack of modern equipment for training was a major challenge at the TVET institutions. Failure to modernize facilities at TVET institutions is likely to influence negatively on skill development of TVET graduates that would match the demands of the modern labour force. This conclusion resembles that by Nyerere (2009) who found that, underinvestment in skill training, understaffing and obsolete physical infrastructure in the Kenya's YPs led to low-quality of graduates from the institutions that could not perform in the modern labor market.

Relationship between Infrastructure and Human Resources Development in Achievement of Economic Development in Western Kenya

The third objective of the study also sought to determine the relationship between available infrastructure and human resources development in achievement of economic development in Western Kenya. Human resource development was measured based on trainees academic attainment in National exam on grading scale of 1-8 points where the best score was '1' progressing all through to worst score of '8'. To answer this objective, the heads of departments were asked to give their opinion on attributes used to measure the trainers competencies. The respondents were supposed to tick against their level of agreement with a given attribute in the Likert scale. The responses obtained were scored as follows; Strongly Agree (SA) scored as 1, Agree (A) scored as 2, Undecided (UD) as 3, Disagree(D) scored as 4 and Strongly Disagree(SD) scored as 5. The data obtained was used to generate table 1.9 on correlations among all the variables; X₁ on adequacy of classrooms, X₂ on adequacy of Agriculture workshops, X₃ on adequacy of home science rooms, X₄ on availability of ICT laboratory, X₅ Availability of spacious library, X₆ on Availability of engineering workshop, X₇ on

Availability of electricity and X8 on the mean score of the institution.

Table 1.9: Pearson Moment Correlation Coefficient for Infrastructures at TVET Institution and Academic Performance

		X1	X2	X3	X4	X5	X6	X7	X8
Adequacy of classes X1	Pearson Correlation	1							
	Sig. (2-tailed)								
	N								
Adequacy of agricultural workshopsX2	Pearson Correlation	.987**	1						
	Sig. (2-tailed)	.000							
	N	90	90						
Adequacy of home science rooms X3	Pearson Correlation	.534**	.540**	1					
	Sig. (2-tailed)	.000	.000						
	N	90	90	90					
Availability of ICT LabX4	Pearson Correlation	.561**	.570**	.877**	1				
	Sig. (2-tailed)	.000	.000	.000					
	N	90	90	90	90				
Availability of spacious libraryX5	Pearson Correlation	.563**	.570**	.939**	.934**	1			
	Sig.(2-tailed)	.000	.000	.000	.000				
	N	90	90	90	90	90			
Availability of engineering workshop X6	Pearson Correlation	.561**	.568**	.923**	.941**	.986**	1		
	Sig. (2-tailed)	.000	.000	.000	.000	.000			
	N	90	90	90	90	90	90		
Availability of electricity X7	Pearson Correlation	.957**	.532**	.542**	.552**	.550**		1	
	Sig. (2-tailed)	.000	.000	.000	.000	.000			
	N	90	90	90	90	90	90	90	
Mean score X8	Pearson Correlation	.865**	.868**	.749**	.747**	.747**	.743**	.881**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N								

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

The statistics in Table 1.9 shows there is positive correlation between human resource development and; academic performance as measured by the mean score, adequacy of classes, agricultural workshops, home science rooms, ICT laboratories, spacious library, engineering workshops, and electricity. The

coefficient correlation for all the variables were 0.725 in a 2 tailed test at .001 significant levels.

Positive statements by the HoDs on the state of infrastructure at TVET institutions scored above were further used to develop regression equation in Table 1.10

Table 1.10: Regression Analysis of, adequacy of libraries, Home Science Rooms, ICT Laboratories against academic Performance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.660	.107		24.874	.000
	Adequacy of home science rooms	.399	.071	.400	5.589	.000
	Availability of spacious library	-.016	.088	-.018	-.188	.851
	Availability of ICT Lab	.374	.062	.419	6.045	.000

a. Dependent Variable: Mean score

Using the standardized Beta coefficients from Table 1.10, the following regression equation was derived; $Y=2.660+aX1+bX2+cX3$
 Where $a=.400$; $b= -.018$; $c=.419$
 Therefore $Y=2.660+.400X1-.018X2+.419X3$.

From Table 1.10, it can be deduced that when home Science rooms and ICT laboratories are increased by one percent (1%), performance will increase by .400 percent and by .419 percent respectively. Therefore it can also be concluded that availability of home science rooms accounted for 16 percent (16%) of the mean score while ICT laboratories accounted for 17.5

(17.5%) percent of the academic attainments. Availability of libraries had a negligible effect on performance as it was more likely that Trainees could borrow reading materials and read from elsewhere or use modern technology to surf materials from the internet without necessarily visiting libraries.

Based on correlation from Table 1.9 and Regression equation derived from Table 1.10, we failed to reject the hypothesis that; there is no significant difference between the infrastructures at TVET institutions and Human resource development.

CONCLUSION

The study revealed that;

- TVET institutions lacked adequate home science rooms for practical lessons, well equipped ICT workshops and libraries.
- The study further established that there was no significant difference between adequacy of infrastructure in TVET institutions and human resources development in achievement of economic development of Western Kenya.

RECOMMENDATION FOR THE STUDY

From the study findings it is recommended that;

- The government should consider making adequate provision of infrastructures such as workshops, libraries and laboratories at all TVET institutions
- Modern teaching-learning resources should be supplied and adequately equipped in the TVET institutions

REFERENCES

- Bowen, M., Morara, M., &Mureithi, S. (2009). Management of business challenges among small and micro enterprises in Nairobi-Kenya. KCA Journal of Business Management 2(1).
- Changilwa,K.P.;Akala,W.J.&Wambua,J.M.(2016). Challenges Facing effective implementation of Artisan and Craft courses in Catholic sponsored community colleges in Nairobi, Kenya. International Organization and Scientific Research Journal (IOSJ) Vol.6 ver 1(March-April 2016) pg 27-36.
- Cohen, J. & Cohen, J. (2ndedn). (1983).Applied Multiple Correlation Analysis for Behavioral Science New Jersey and London: Lawrence Erlam Associate Publishers.
- Dasmani, A. (2011).Challenges facing technical institute graduates in practical skills acquisition in the Upper East Region of Ghana. Regional Education Directorate, Ghana Education Service.
- Frishmann, B. M (2005).An Economic Theory on Infrastructure and Common Management in Minnesota. Law Review, 899 (917).

Nyerere, J. (2009). Technical, industrial & vocational education and training (TVET) sector mapping in Kenya. Nairobi: Dutch Schokland TVET programme.

Saunders, M; Lewis P.&Thonhill ,A (2007) Research Methods for Business Students. Pearson, New York.

UNEP (2002).Capacity Building for Sustainable Development: An Overview of UNEP Environmental Capacity Development Activities.

World Bank (1991): Vocational and Technical Education and Training. A World Bank Policy Paper, Washington, DC.