

Evaluation for Implementation of Training Programmes at the Technology Development Centre, Athi River, Kenya

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Abstract

This paper reports the findings of a section of a broad study carried out to assess the capacity for the implementation of selected training programmes at the Technology Development Centre (TDC), a TIVET institution based in Athi River Town in the outskirts of Nairobi. The section of the study reported in this paper evaluated first, the training needs of the lecturers in the institution, and secondly, the status of its teaching and learning resources and facilities. The study established that lecturers have a variety of training needs and that, although the institution has an commendable array of teaching and learning resources facilities which are put to good use, some areas such as library services are inadequate. The paper concludes that inadequate teaching staff skills among lecturers and teaching facilities are affecting the delivery of training in the institution. Overall, implementation of the training programmes at TDC, though with challenges, is in the right direction. It recommends that the institution adopts a comprehensive staff development plan at all levels of technical training, including pedagogical skills for lecturers and that it establishes a research and production unit so as to improve links with industry.

Introduction

Every country's education system seeks to propel the interests, needs and aspirations of the society. Othieno, Kiiru and Kerre (1990) have argued that the formulation and realization of national development objectives and aspirations can only be achieved through giving emphasis to the acquisition of knowledge and skills through training of the work force. One of the Kenya's national goals of education is "to promote the social, economic, technological and industrial needs for national development" (Mwaka, Kafwa, Musamas & Wambua, 2013, p. 150), which is facilitated through production of trained manpower. This goal is well pursued through the Technical, Industrial, and Vocational Education and Training (TIVET) sector of education and training (Mwaka et al., 2013 Sifuna & Otiende, 1992).

For the last two decades or so, the Government of Kenya (GoK) has continued to give support to awareness of technical education, giving more emphasis on technical education. This is evident in Government policy documents, which emphasize expansion of technical training institutes, and committing to give support to informal training



through developing stronger linkages between informal sector artisans, and both public and private sector institutes (GoK, 1997).

The Policy Framework for Education, Training and Research (Sessional No.1 of 2005), recommended increase in accessibility to an increased number of Kenyan youth by increasing the facilities, while taking care of the quality of education. The Kenya Education Sector Support Programmes 2005_ 2010, aimed at establishing mechanisms and appropriate incentives in the development of TVET for increased access. According to policy makers (GOK, 2017), the government has in recent years, turned its focus to the provision of technical skills to reduce unemployment among the youth. Unemployment will be reduced if practical training is promoted by improving employability of youth after most of the hustling population attained different technical skills.

Statement of the Evaluation Purpose

Studies have indicated that the main problem facing the TVET system in Kenya, has been low enrolment for the Industrial Training Programmes (ITPs), and therefore underutilization of the facilities and resources in the Industrial Training Centres. Low enrolments have created a lot of idle capacity throughout the years in these centres. Yet, in Kenya, youth polytechnics increased from 585 in 2011 to 647 in 2012 (Economic Survey, 2013), and still low in relation to increased demand for education in the entire country” (Kitui, 2015, p. 4).

The observed low enrolment rates in Industrial Training Centres led to the current study, which sets out to find out whether the low enrolment rates could have been caused by observed low performance, due to low entry academic levels of trainees, and therefore poor outputs in terms of number of qualified graduates. If this were so, employers, sponsors and other stakeholders, would be reluctant to sponsor trainees to the institutions, leading to low levels of resource utilization. Or was it due to shortage of lecturers, or of skilled ones? Or could the cause have been due to shortage of physical facilities and equipment, or equipment that was outdated, and therefore not in tandem with the modern technology in industry? This forms the purpose of this evaluation.

Evaluation Questions

The purpose of this evaluation therefore, was to investigate that would improve implementation capacity for objectives of the training programmes. The evaluation study was guided by the following eight evaluation questions:

- i. What are the training needs of the lecturers at the Technology Development Centre, Athi River
- ii. What is the status of teaching and learning resources and facilities of Technology Development Centre, Athi River in relation to implementation of training programme?

Evaluation Model

This study was guided by the Stufflebeam’s Context, Input, Process and Product (CIPP) Model for evaluation, a comprehensive framework for undertaking both formative and summative evaluations of programmes. The CIPP Model focuses on programme improvement, instead of proving something about the programme (Alkin (1969). It puts emphasis on the fact that programme evaluation should be used both proactively and retroactively to sustain improvement of a programme, and at the same time make judgement of its value;

As pointed out by Rossi, Freeman and Lipsey (1999), the purpose of



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implementation is to verify what the programme is and whether it is delivered as intended to the targeted recipients. These may be the programme managers, or any other stakeholders, when completed, or underway. Implementation evaluation will provide information about programme performance. It does not “attempt to assess the effects of the programme” (p. 197).

One of the greatest strengths of the CIPP model as applied in this study is that it gives focus to the evaluation, thus avoiding collection of huge amounts of information only to discard it due to irrelevance. It focuses on the clients’ information needs for managers to make decisions based on evaluator’s enquiries. Because of this emphasis on information for decision makers, CIPP Model is a preferred choice by most managers and boards (Worthen, Sanders & Fitzpatrick, 1997). Some of the decisions in need of the evaluator’s information include “monitoring and adjusting operations; and deciding to continue or terminate an effort”(Shinkfield & Stufflebeam, 2007, p. 198).

Another strength of CIPP Model is that it encourages programme personnel to use evaluation continuously, and systematically to plan and implement programmes, thus meeting beneficiaries’ needs continuously. Hence, decisions are made throughout the life of a programme ; the programme personnel are accountable to the progress of the programme decisions and actions continuously, and the full range of personnel involved in the implementation process are involved in the application of the Model.

The CIPP model addresses all phases of an educational programme: Planning, implementation and a summative or final perspective assessment of desired outcomes (Frye & Hemmer, 2012). CIPP evaluations are important for the provision of sound information, needed by service providers in regularly assessing and improving services to beneficiaries, and all levels of stakeholders; those who are targeted as the end users of the findings.

The CIPP Model has one very important tenet: “The most important purpose of evaluation is not to prove, but to improve.... Evaluations serve an advisory improvement function through assisting organizations to free resources and time for worthy efforts” (Stufflebeam & Shinkfield 2007 p.331).

Other advantages of this approach include its loyalty to the Professional Standards for Evaluations; its applications involving the full range of stakeholders; and also the way it presents the framework of information, thus making the programme personnel accountable to the decisions they make and actions they take (Stufflebeam & Shinkfield, 2007).

Review of Related Literature

Description of Technology Development Centre(TDC)

This evaluation was carried out on the training programmes of Technology Development Centre (TDC), Athi River, one of the five (5) Industrial Training Centres (ITCs) in Kenya, under National Industrial and Training Authority (NITA). The Athi River TDC, is located along Namanga Road in Athi River, Nairobi (Kenya). It was started in 1994, initially as a Vocational Training Centre, sponsored by the Korean Government, but was later converted to its current status in order to address industry changes associated with training. Currently, the Centre is offering training in all NITA programmes as per the regulations stipulated by the National Industrial Training Board (NITB), formerly National Industrial Training Council (NITC). Thus, TDC objectives are derived from NITA objectives.

The general objective of this evaluation was to find out whether TDC has sufficient capacity to implement the revised programmes, and therefore increase accessibility, raising enrolment levels. This capacity will be in terms of new technology



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and modern teaching and learning facilities, and equipment, and even highly trained technical teaching staff, who are able to handle the new technology as is demanded in industry.

The National Industrial Training Authority (NITA) has been established to replace former Directorate of Industrial Training (DIT) in the Ministry of Labour, under an Act of Parliament (Cap 237, as amended in 2011). According to this Act, the objectives of this Authority are: Industrial training; regulating trainers; developing industrial training curricula; integrating labour market information into skills development; harmonizing curricula and certificates of competence; assessing industrial training, testing occupational skills and awarding certificates, including Government Trade Test certificates; and accrediting institutions engaged in skills training for industry.

The National Industrial Training Scheme, as is being run under the National Industrial Training Act (as amended 2011), has the aims of establishing training standards for all the industrial training programmes. The scheme also aims at developing, regulating and promoting systematic industrial training programmes by creating opportunities for persons to acquire industrial skills, thus meeting present and future needs for industrial training graduates. It also aims at developing demand driven industrial training programmes, which are flexible, gender sensitive, and which provide for horizontal and vertical mobility in career development (GoK, 2011).

The general aims of the Industrial training programmes run at TDC include: Creating a link between the education and training sector world of work; facilitating trainees to access industry through the industrial training scheme, as part of their training phase in curriculum; preparing students for further training; passing on practical skills to students, who have initially acquired academic and theoretical knowledge; and providing attitudes and competencies, necessary in lower entry levels.

Technical training at both post primary and post-secondary levels, aims at providing training opportunities for school leavers to be self-supporting; develop practical skills and attitudes which will lead to income generating activities through self – employment. The training provides practical education and training skills which are responsive to both productive and service sector's needs. They also provide the technical knowledge and vocational skills necessary to enhance the pace of development.

The Technician Training Programme has the following general objectives to achieve: Develop skills which are responsive and relevant to the country's human resource requirement at the middle level; prepare the trainees to enter the world of work with confidence; and impart adequate skills which enable the graduate trainee to operate either as a craftsman, or perform middle supervisory functions. The diploma programme is designed to provide the middle cadre manpower in self or wage employment. The courses under this programme aim at providing the trainee with the necessary knowledge, skills and attitudes, to deal with the problems arising in the workshops (GoK, 1992).

Empirical Studies Related to Implementation of Technical Training Programmes

A number of studies have been done on technical training programmes. Mutungi (2005) studied the trainers' practical skills in automotive courses in technical training institutions in Nairobi, Kenya. The study sought to find out the extent of awareness and competencies in new technologies. The analysis of the findings revealed that automotive trainers lacked practical skills, creativity and innovation. There was consensus from the study that a positive correlation between the trainers' practical skills and trainees' performance in national examinations existed. Wanjohi, Kagema, and Kimiti (2016) undertook a study of TIVET in Nyeri County, Kenya, whose purpose was to assess the effectiveness of graduates of technical training institutions by establishing TIVET



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trainees' attitudes towards technical training in TIVET. The research was based on Context, Input, Process and Product Theory and adopted a Descriptive study design. The target population included workers in companies and trainees attached in industry. The study employed the questionnaire as the primary data collection instrument. Data analysis procedures employed were both quantitative and qualitative procedures. Although majority of the students involved in the study had negative perceptions of TIVET, the sample was also too small to be generalized to the whole country.

Ooko (2011) investigated factors hindering enrolment of artisans into technical and vocational institutions, using Survey method. The factors to be investigated included learners, trainers, institutional, and Government factors. Ngumbao (2012), while investigating factors that influence access to TIVET institutions in Mombasa County, used the Descriptive Survey research design with a limited sample, that cannot be generalized to the whole Kenyan population. A similar study by Kigwilu (2014) examined the determinants of effective implementation of Artisan and Craft courses in Catholic sponsored community colleges in Nairobi region of Kenya.

Another Kenyan study (Kitui, 2015) sought to establish the extent to which, among other factors, adequacy of physical facilities and human resources influenced access to Technical and Vocational Education and Training (TVET) institutions in Bungoma East sub-county. Using Descriptive survey research design, data was collected through questionnaires filled by finalist youth trainees, YP managers and one sub-county youth officer, and even parents as respondents. The current study is a Case study using MMR methodologies, in order to increase validity and reliability of the data collected, through a variety, and large quantities of data. The study sample includes all students and all lecturers at TDC, an industrial training institution, a larger sample. A Mixed Methods Research design, as used in the current study, would be more authoritative in such studies. The researcher in the current study made use of students and lecturers, who are the users, and therefore may be more enlightened on the contents of the institutions. MMR design was used rather than some of the above methodologies, which tend to be subjective. The sample also needs to be large enough to produce sufficient data necessary for rigorous statistical inferences.

Kigwilu, Akala and Wambua (2016) investigated the challenges to effective implementation of Artisan and Craft courses in Catholic sponsored community colleges in Nairobi region. Adopting MMR design, and students, teachers and directors as sampled participants for the study, questionnaires and Interview Guides were used to collect both quantitative and qualitative data. Actually, this study has been replicated at TDC, an industrial training institution, but involving survey on the Heads of Departments and interviews on the Top Management of the institution.

The study by Luyali, Olel, and Othuon (2015) recommended the following, in order to improve enrolments in youth polytechnics: Courses be mounted after study of community's needs; equip youth polytechnics; and adapt curriculum to needs of community. On a similar study, Kitui (2015) also recommended improvement of infrastructure and provision of adequate and qualified teachers, in order to enhance enrolment rates in youth polytechnics. In order to provide TDC with enough teachers, and equip it with relevant teaching facilities and resources, the current situation had to be evaluated, hence the current study.

Kibet Yegon (2016) advanced a discussion on the Technical and Vocational Education and Training (TVET) in Kenya, based on the state of TVET in Kenya. This discussion paper was expected to raise debate on best possible strategies on how TVET system can be used to promote economic development and youth empowerment, in particular, and achievement of Kenya Vision 2030, in general.

Using Desk Top Research method to undertake analysis of policy documents



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from the government and strategic documents from TVET institutions, the information raised discussion on the best ways to improve TVET in Kenya and to propose a model that is used to implementation effective TVET. Various ways needed to be put in place to improve TVET, and suggestions were put forward on areas that should be addressed to improve efficiency, quality, equity and relevance. In the current study, the evaluator sought opinions and suggestions on how to improve on the challenges facing the current TIVET system using survey and interview methods.

From this literature review it is evident that several evaluation studies have been undertaken on curriculum implementation issues. Though some were replicated in Kenya, the issues investigated were not all specific to the curriculum implementation in TIVET institutions, and specifically for the special case of the TDC, Athi River. There is an existing gap in knowledge about the training needs of the lecturers in the institution, and secondly, the status of its teaching and learning resources and facilities at the TDC, Athi River and which is addressed in the current study.

Evaluation Design and Research Methodology

Evaluation Design

The evaluation adopted a Mixed Methods Research (MMR) design, as advanced by Creswell (2009), and Creswell and Clark(2007). The purpose of this design is to obtain different, but complimentary data on the same topic to best understand the research problem, with the intent of bringing “together the different strengths and non overlapping weaknesses of quantitative methods (large sample size, trends, generalizations) with those of qualitative methods (small sample, details, indepth)” (Creswell & Clark, 2007, p. 62; 2011, p. 77).

Specifically, the Embedded Design in the light of a MMR Case study (Creswell & CLark, 2011) was adopted, using pluralistic approaches in the collection and analysis of numerical data, using questionnaires and checklists. At the same time, interviews and observations were conducted (Creswell & Clark, 2007, 2011). The collection and analysis of the second data(qualitative) was undertaken concurrently with the data collection and analysis procedures for the larger(quantitative) design.

Target population, Sample and Sampling Procedures

The targeted population of this evaluation included all the year 2014 students (333), and 300 past students from three years (2011 to 2013); these past students were those who were admitted and graduated within the three years, for the purpose of comparing entry and exit performances. All current Heads of Departments (HODs) (8) and all lecturers of the Diploma and Certificate classes (40), were targeted. The Top Management of TDC (5), which included the Centre Manager, was also interviewed. These are the policy makers, who gave information on the policy direction concerning TIVET curriculum development, and programme implementation, in general. As indicated in Table 2, quota sampling was used to select participants in the study.



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Table 1: Sampling Matrix

Respondents	Proposed	Sampling Procedure	Actual Sample	Percentage Sample
Year 2014	333	Quota sampling	333	100
Past students	300	Quota sampling	300	100
Lecturers	40	Quota sampling	40	100
HODs	8	Quota sampling	8	100
Top Management	5	Quota sampling	5	100

Response Rates

Three hundred and thirty three (333) questionnaires were administered to the students. Two hundred and eighty eight participants responded to the questionnaires, while 45 did not (Table 2). All the 35 lecturers and seven Heads of Departments returned their questionnaires fully completed. Out of 288 students who responded, about three quarters (71.9%) were males, while about a quarter (26%), were females. About 2.1% did not indicate their sex (Table 2). Since there was no deliberate sampling in favour of any gender, it is evident that the response rate of the students in the Centre is in favour of the male gender, almost at the ratio 3:1. This seems to suggest that the responses favoured male students. However; the number of female lecturers is almost at par with those of male lecturers (ratio 1:1.2). There are some attempts to acquire staff gender equality at the institution.

Table 2: Response Rates of Study Participants (Year 2014)

Category	Male		Female		Non- responses		Total Responses	
	f	%	f	%	f	%	f	%
Students	207	71.9	75	26.0	6	2.1	288	86.5
Lecturers	19	54.3	16	45.7	0	0.0	35	87.5
HODs	6	85.7	1	14.3	0	0.0	7	87.5
Top Management	3	60.0	1	20.0	1	20.0	4	80.0

Source: Research Finding

Description of Evaluation Instruments

The instruments used in this study included semi-structured Questionnaires for students, lecturers and Heads of Departments, an Interview Schedule, used by the researcher on the Top Management, and an Observation Checklist together with a Document Analysis Guide, for the researcher to collect information on learning resources, and student performance records, respectively.

Description of Data Analysis Procedures

In the current evaluation, being a Case study using MMR design, there was detailed research involving both qualitative and quantitative data, and therefore both quantitative and qualitative data analysis techniques were used. Data on students and lecturers obtained through the questionnaires were analyzed quantitatively using both descriptive statistics, and statistical inferences. Qualitative data were analyzed by coding themes or categories of responses.

Presentation and Discussion of the Findings

(a). *Training Needs of the Lecturers*

The first Research Question was to assess the training needs of the lecturers at the Technology Development Centre, Athi River. This was attained using three methods: Manpower method, Educational Level and experiences, and Performance Appraisal. The first method involves staff skill gaps, the second involves monitoring and evaluation of staff development and career growth, while the third determines any observed staff performance discrepancy due to lack of training.

Staff Training Needs Assessment Using the Manpower Method

Staffing levels for each course in each Department at TDC, was sought using Document Analysis. Access of trainee to an instructor is an important determinant of quality of graduates. Thus, it is important to determine student-teacher ratio in implementation of training programmes. When courses are placed in their respective and relevant Departments, Table 3 shows the result.

Table 3: Distribution of Lecturers among the Departments

Department	Gender				Total	
	Male		Female			
	F	%	F	%	f	%
Automotive Engineering	4	11.4	2	5.7	6	17.1
Business	3	8.6	3	8.6	6	17.1
Electrical Engineering	2	5.7	2	5.7	4	11.4
Fashion Design	0	0.0	3	8.6	3	8.6
Garment	0	0.0	4	11.4	4	11.4
KTTI	2	5.7	0	0.0	2	5.7
Mechanical Engineering	6	17.1	0	0.0	6	17.1
Science and Liberal studies	2	5.7	2	5.7	4	11.4
Total	19	54.3	16	45.7	35	100.0

Table 3 indicates that the Departments with the highest staffing levels are Mechanical Engineering, Business Management and Automotive Engineering, each with six lecturers. The lowest staffing level, two lecturers, is for Weaving Department. However, officially, Weaving, Garment Making and Fashion Design form the Textile Department with a total of nine lecturers. It is evident that each course is taught by at least two teachers. It should, however be noted, that these figures represent the main courses the lecturers teach. They may be teaching other courses across Departments. For example, a physics subject lecturer may teach across the departments of Electrical Engineering, Mechanical Engineering, Civil Engineering, Automotive Engineering, and even Electronics Department. For that purpose, some skills are shared among the departments, leading to insufficient coverage of subject content and lack of skill specialization.

Based on the question: What is your opinion about the staff levels in the Centre? each of the Top Management team members gave their opinions on adequacy of staffing levels, and the quality of the current staff also. The Principal said that there was “inadequate numbers of lecturers, to the extent that part-time lecturers have had to be hired to fill the gap for various subject content areas. Areas affected were Internet/ Structural Programming, Microcontrollers/Automation Control, Instrumentation, and welding” (Interview, Principal, February 2015). The Deputy Principal also thought that



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there was inadequate staff; most of the lecturers being hired to fill the gaps.

Finally, the Centre Manager also indicated that “staffing levels were inadequate. We hire part time lecturers to fill in the gaps. The subjects most affected are Electrical Engineering, Electronic Engineering, Instrumentation and Mechatronics” (Interview, Centre Manager, February 2015).

The four respondents were unanimous that the staffing levels across the departments were inadequate. The most affected courses were those of Mechanical Engineering/Mechatronics, Electrical Engineering/Electronics, Automotive and Information and Communication Technology (ICT)/Internet, some needing specialist lecturers to be hired, even from industry. Private lecturers are expensive to hire and be available when you need them.

The minimum recommended staff\student ratio is 1:15; the maximum is 1:20 (Interview, Principal, February 2015). The opinions given above by the Top Team varied from Department to Department. This is due to shortage of experts in specialized areas of technology. At the same time, the enrolment of students at Diploma level introduced another artificial “staff shortage” because of the requirement of higher qualifications on the part of the lecturers, qualifications which are not available.

Going by current enrolment levels, student-teacher ratios are very low. However, with number of lessons given per each course in the classrooms, the Heads have been able to determine that there are staff gaps (Interview, Registrar, February 2015). A close study of the data presented indicates low staffing levels, especially on specialized subject areas. A lecturer taking a Diploma class should have a maximum teaching load of 18 hours per week, while a Certificate class lecturer needs a teaching load of 22 hours per week.

Identification of Staff Skill Gaps Using their Educational Levels and Experiences

Educational level of the teaching staff has a bearing on the performance of students, both in the way they act as models for students, and also in the capacity to handle and deliver the content. It is observed that majority(42.9%) of the lecturers have the educational qualifications of at least a Master’s degree, followed by 22.9% of them who are first degree graduates in technical subjects. The rest (34.2%) have either a non-technical degree, are untrained graduates, or hold a diploma and/or higher diploma, in technical training. It is assumed inappropriate for untrained or diploma graduates to train other diploma students.

The educational level of a lecturer can be a good motivator for students’ performance, since he\she can be emulated by his/her students. A good lecturer will improve the performance of students. On the other hand, an excellent achievement will attract stakeholders to enroll in an institution (Simiyu, 2009b; Centre for Public Education. For the same matter, it is important that the lecturers receive higher qualifications, if they have to handle Diploma classes effectively. That observation may lead to a conclusion that there is an occupational or group training need for the teaching staff of TDC. No wonder, Mutungi (2005) and Bulemi (2009), in separate studies, identified a training need amongst the technical teaching staff. Low quality of technical teaching staff has also been identified through some Kenyan studies (Government of Kenya, 2003; Mutungi, 2005; Bulemi, 2009). Employees acquire higher qualification mostly for their career growth, besides their performance.

According to lecturers’ responses, the highest qualifications indicated were found to be useful, by slightly more than half (54.3%) of the lecturers, followed by 45.7% who found the qualifications “very useful” to their career growth. This is in line with the responses on relevance to duties, as what is relevant to performance will be useful to



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career growth. Again, none of the lecturers found the qualifications “not useful”. With none of the lecturers finding the qualifications “not useful”, the next question: “If not useful, what course(s) do you need to improve your practice?” was not responded to, as that would lead to a contradiction. These observations lead to a confirmation that self-assessment of training needs using this method would identify ‘wants’, instead of ‘needs’. This is in line with the “need for achievement”, where individuals always strive to achieve the next goal after achieving the previous goal. Best results are obtained through the supervisor of the worker, or an independent analyst, or assessor. Hence, the use of an evaluator in this study.

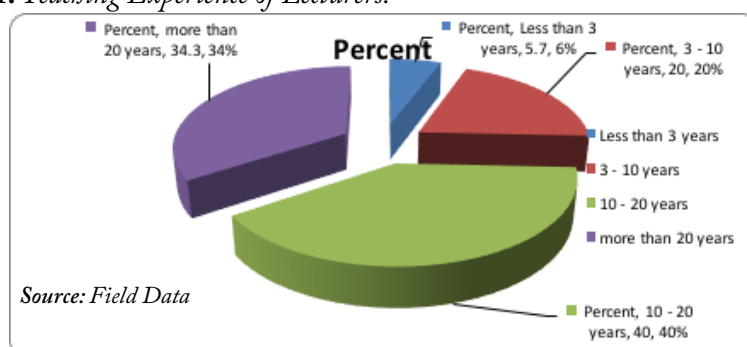
There are seven Heads of Departments. Out of these, three have Higher Diploma; three have Bachelor’s Degree, while only one has a Master’s Degree. Five of the Heads of Departments have ten years of experience in technical teaching, while one has 14 years’ experience and another has 20 years’ experience. Recent recruitments seem not to have been undertaken, and therefore succession management is likely to be an issue in the near future; an indication of future training needs identified in this study.

While compiling a joint KenyaILO report on a handbook for managing vocational training systems, Glasskov (2000) identified that most VET administrators have inadequate organization and management skills; there is lack of institutional capacity and infrastructure; and VET administrators lack skills to determine priorities adequately, to apply strategic management concepts to national education and training systems. Thus, he concluded that VET administrators need professional management skills, as well as a technical understanding of their field “Senior Administrators should possess a general management qualification which reflects their ability to organize a national VET system; identify national education and training needs; establish strategic priorities and targets; participate in the government budgeting process; and develop internal management policies...”(Glasskov, 2000, p. 3).

Based on this, the management staffs of TDC have a training need in organizational and management skills. These include the Heads of Departments, the Principal, the Academic Registrars, and Curriculum Development Coordinators. This type of training is also a training need to the Senior Management officials of NITA.

The study also sought to find out the teaching experiences of the staff. Figure 1 presents the relevant findings. Out of a staff establishment of 35, about 40% (14) of them had a teaching experience in technical subjects of 11-20 years while twelve (34.3%) of them had a similar experience of more than twenty years. The rest, about a quarter (25.7%) had less than 10 years’ experience in teaching technical subjects. With about three quarters (74%), having such a high experience, is a positive to the institution, as teaching experience means sharpening of skills in teaching; it on the job training? Better skills lead to creativity and innovation in the delivery of content. This partly contributes to in-service training of staff.

Figure 1: Teaching Experience of Lecturers.



Occupational Training Needs Analysis of Lecturers for Improved Performance

Table 4 indicates the training needs of the lecturers, determined by indicating the forms of training or topics, they felt were “of great need” (with score of two) and/or “of some need” (with score of one), and “No Need” (with no score), for the improvement of their performance. A rank order is indicated against each topic to show which topics should be given priority, in case a training programme is planned, for improved performance. In Table 4, topics that have been given priority as “of great need” and “of some need” have their gross scores ranging from 70 (e.g., applying innovative results to your own practice), to 50 (e.g. Providing feedback to colleagues).



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Table 4
Lecturers’ Responses on Occupational Training Needs Required (n=35)

Occupation Training Needs Required	Great Need fw (%)	Some Need fw (%)	No Need fw (%)
Establishing a relationship with students and/ or staff	54(77.1)	8(22.9)	0(0.0)
Doing paper work and/or routine data inputting e.g. lesson preparation	50(71.4)	10(28.6)	0(0.0)
Assessing practical projects	54(77.1)	8(22.9)	0(0.0)
Appraising your own performance	60(85.7)	5(14.3)	0(0.0)
Applying innovative results to your own practice	70(100.0)	0(0.0)	0(0.0)
Identifying viable practical projects	64(91.4)	3(8.6)	0(0.0)
Technical skills	64(91.4)	3(8.6)	0(0.0)
Introducing new ideas at work	64(91.4)	3(8.6)	0(0.0)
Providing feedback to colleagues	34(48.6)	15(42.9)	0(8.6)
Statistically analyzing your own research data	46(65.7)	12(34.3)	0(0.0)
Planning and organizing an individual student’s homework/assignment	60(85.7)	5(14.3)	0(8.6)
Evaluating students’ psychological and social needs	60(42.9)	5(57.1)	0(0.0)
Organizing your own time effectively	58(82.9)	6(17.1)	0(0.0)
Using technical equipment, including computers	46(65.7)	10(28.6)	0(5.7)
Making do with limited resources	50(71.4)	10(28.6)	0(0.0)
Assessing student learning needs	50(71.4)	10(28.6)	0(0.0)
Collecting and collating relevant research information	56(80.0)	7 (20.0)	0(0.0)
Designing a research study	50(71.4)	10(28.6)	0(0.0)
Working as a member of a team	58(82.9)	6(17.1)	0(0.0)
Accessing research resources (e.g. Time, money, information, equipment)	64(91.4)	3(8.6)	0(0.0)
Undertaking administrative activities	54(77.1)	8(22.9)	0(0.0)
Coping with change in the education service	64(91.4)	3(8.6)	0(0.0)
Coaching and Counseling	42(60.0)	14(40.0)	0(0.0)
Health and safety in work places	64(91.4)	3(8.6)	0(0.0)
How to motivate students	58(82.9)	6(17.1)	0(0.0)
Handling complaints and grievances	50(71.4)	10(28.6)	0(0.0)

Source: (n=35). NB: fw means weighted frequencies (a product of frequency and the provided weighting). Adapted from “Evaluating Training Programmes. The Four levels by Kirkpatrick and Kirkpatrick, 2009.



The maximum possible weighted score would be 70 (35 x 2) per item if all participants identified an item “of great need”; the minimum would be 35 (35 x 1), if all participants identified an item to be “of some need”. Of course, the absolute minimum would be zero, if all participants identified an item to be “of no need”. Thus, if the median score per item (62.5) is identified as the “pass mark,” all items or topics with a gross score of 63 and above will be identified as a training need for the staff.

With the above case in mind, the topics that are priority in training include: Identifying viable practical projects; appraising own performance; applying innovative results to own practice; teacher students’ technical skills, and introducing new ideas at work. Others are: Coping with change in the education sector; planning and organizing individual students’ homework/assignment; organizing own time effectively; working as a member of a team; accessing research resources; health and safety in work places; and collecting and collating relevant research information. Most of these topics have to do with delivery of technical subjects’ content, and handling of students in a technical learning environment. This confirms a presence of training needs for the teaching staff.

(b). Role of Physical Resources and Facilities in Supporting Implementation of Training Programmes at TDC

The second research question stated: Does Technology Development Centre have sufficient capacity for training programme implementation, in terms of teaching and learning resources and facilities? The second research question sought to find out how physical resources support implementation of the training programmes at TDC. Such resources and facilities include laboratories, workshops, equipment/machines and teaching-learning support materials, like books, and schemes of work.

Students’, Lecturers’ and Top Management’s Responses on Supply of Teaching/Learning Resources and Facilities

The common learning resources needing consideration for implementation of training programmes include books, equipment and machines (Ogula, 1998). These will also be associated with availability of facilities like classrooms, libraries, laboratories and also workshops. The students in this study were required to give their opinions on the adequacy of the teaching /learning resources at TDC. About 22% of the student respondents indicated that textbooks were “very adequate”, while 13.5%, 40.6% and 4.2% indicated that Reference books, equipment/machines and Library resources were respectively “very adequate”. Only 18.8% of the respondents stated that equipment/machines were “inadequate,” while 36.5% and 37.5% of the respondents, respectively indicated that Textbooks and Reference books were “inadequate”

Access to teaching and learning facilities is a factor to be considered in the implementation of industrial training programmes. Students were asked to give their assessment of the availability of the facilities at TDC. It is observed that the students who identified that the supply of equipment and machines was “excellent” were highest for Electrical Engineering workshop (47.9%), ICT laboratory (43.8%), Mechanical Engineering workshop (42.7%), Automotive Engineering workshop (38.5%), and Textile Technology workshop (30.5%). The highest response for “poor” supply was for Business laboratory (9.4 %) physics laboratory at 6.3%. Overall, it is expected that access to learning resources, which will include materials, equipment and/or machines should enhance understanding of content taught. Therefore, effective learning thus improves performance.

The results are: The ICT laboratory, Textile Technology workshop, Automotive Engineering workshop and Electrical Engineering workshop had the highest response



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rates of 77.1% each, for “excellent” equipping of the facilities, with 22.9% of the lecturers not responding to the item, then 100% of those who responded to the item rated “excellent” for each of these facilities.

Responses were also sought from lecturers on how the facilities for training are furnished at TDC. The rest of the facilities, namely Physics laboratory, Mechanical Engineering workshop and Business laboratory attracted 42.9%, 42.9% and 34.3% response rate for ‘excellent’ respectively, then 34.3% and 20.0% “good” response rate for Mechanical Engineering workshop and Business laboratory, respectively, and finally, 43.3% and 37.1% response rate for ‘fair’ assessment of equipping Physics laboratory and Business laboratory, respectively.

The above results show high-to-fair satisfaction of the lecturers, on the situation of the facilities. This increases morale, as the lecturers deliver content to students, and therefore make full use of their training skills. Access to teaching-learning resources and equipment is important to any training. Determination of student-equipment ratio is therefore important, in evaluation of training programmes. Hence, Heads of Department were requested to indicate the status of supply of teaching-learning facilities.

While majority of the Departments may require facilities like workshops, and of course furnished classrooms, others may not require such specialized facilities for use with videos and internet, for example. With each Head focusing on resources specific to her Department only, in terms of lack or adequacy, the findings will therefore appear staggering. Six (85.6%) of the Heads of Departments indicated that furniture and Internet were ‘Adequate’ with five (71.4%) indicating that Machines, workshops and Workshop Equipment, were ‘Adequate’. None indicated laboratory equipment, library and study rooms as ‘Not adequate’. In fact, five (71.4%) said furnished classrooms, laboratory equipment and textbooks were ‘Not adequate’.

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Access to teaching resources by students assists in effective teaching of delivered content. Teaching and learning resources include student textbooks, teacher’s reference books and equipment/machines in laboratories and workshops, Lecturers’ responses were also sought on how they assess the adequacy of the teaching resources they use. While over 37% of the lecturers report that there is adequate supply of equipment and machines, all (100%) of the lecturers report that there is “inadequate” supply of Textbooks and Reference books. The responses from lecturers on supply of books, textbooks, and library/reference material, are of importance for this study. This is due to the fact that it is the lecturers who have better experience on institutional requirements, in terms of teaching resources. The findings using other data collection instruments have supported this stand.

Heads were also required to give their opinions on the relevance of teaching aids used. Heads’ opinions in this study were necessary because they are the ones who determine the needs of the departments, and set the required standards of the resources. Eventually, they are the ones who make the orders for purchase or supply. All the



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Heads of Department (100%) indicated that training equipment, Internet, Information Technology, furnished classrooms, and other training machines, were very relevant for the training departments. Five of the seven Heads said that workshops were also relevant for training. Interestingly, none of the Heads indicated any of the given aids and facilities, as “fairly relevant” or “irrelevant”; they were either “very relevant” or “relevant”.

According to regulations and guidelines given by the Ministry of Education on skill development, each workshop/laboratory must have a maximum of twenty students with at least two students sharing a machine or piece of equipment in each of the sessions in the laboratories and workshops (Interview, Registrar, February 2015). In the case of TDC, each of the laboratory or workshop is equipped to the limit, and with excess in the stores, with the exception of the Physics laboratory, Business laboratory and Mechanical Engineering workshop.

The Top Management team of TDC was asked to comment about facilities and resources for teaching and learning. The Deputy Principal talked of adequacy of resources and facilities, shortage of solar technology, inadequacy of classrooms and unavailability of text books and reference books. The Registrar indicated that there were adequate equipment and machines, which were in good state and modern, while there was no library. The Centre Manager said that, generally there were adequate facilities and resources for teaching.

The observations obtained from the comments by the Top Management team of TDC showed that there were adequate or even excess workshop and laboratory equipment, such as, completely new and modern vehicles for teaching automotive technology. What was lacking and actually a big problem to the institution, according to them, was an equipped library, and also furnished classrooms. These supplement the findings from other participants, obtained by using a variety of instruments. Being the policy makers, the Top Management have a clear vision of the requirements of the institution for successful implementation of the curriculum.

Findings on Availability of Teaching/Learning Resources and Facilities using the Observation Method

In addition to the findings and observations of students, lecturers and Heads of Departments, the researcher used the Observation Method to find out about the availability or non-availability of the teaching-learning resources and facilities at TDC. As is the case with qualitative data collection, the role of the evaluator in data analysis took place at the same time as data collection. Thus, as physical observations were being recorded, any comments and interpretations were also recorded

Besides the evaluator confirming the quantity of equipment, he was able to note that the equipment was available and serviceable. Classes are sometimes defined by the optimal equipment per room or lecturer. It could be concluded that given the amount of equipment available in the institution, the lecturer-equipment ratio is quite low. Hence, the need to enhance staffing levels.

Twoli (as cited in Mbugua, 2010) defines training institutional resources as those that teachers use to assist learning, increase interest, as well as enhance students' participation in learning activities. These include textbooks and science equipment. Textbooks, teachers' guides and other institutional materials, can also be referred to as “curriculum package”. If these are readily available in an institution, then implementation of curricula is made possible. Simiyu (2009a) found out that, institutions with sufficient teaching-learning resources and equipment attracted student admissions and manifested improved performance.

From the findings, it is evident that currently the access of students to equipment



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and workshop facilities is high. This is necessary in technical training, and performance in practical subjects. However, this contrasts with the findings from similar studies conducted in Kenyan technical institutions, where there were inadequate facilities and equipment (Ngatia, 2008; Bulemi, 2009). Ngatia (2008) sought to find the extent to which TIVET education is effective in Nairobi and Central Province of Kenya, by identifying the factors that influence effectiveness of TIVET, and indicators of effectiveness of the TIVET programmes, among them, student enrolments. Inadequate facilities and out-of-date reference materials were found to be major factors limiting effectiveness.



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Conclusions and recommendations

In line with the findings of this study, a number of conclusions were made. First, there are certain skill gaps on both the lecturers in general, and the management team in particular. An example of this is the lack of pedagogical skills in technical content delivery necessary to teach diploma level classes, given that most of the technical training content is foreign, and oriented to new and modern technology, and which is not available in the country, and management skills to manage technical training institutions as is required for international standards. Therefore, there are training needs within the teaching fraternity of the institution. As implementers of any curriculum, teaching skill gaps could affect implementation of the training programmes at TDC. Secondly, it was concluded that the TDC is well endowed with modern teaching-learning facilities and resources, except textbooks, and, of course a library. Thus, there are very few gaps in supply of teaching-learning resources to the extent that TDC has capacity to implement training programmes, even up to university level.

It is recommended that there is need to establish scholarships programmes for specific areas of technology with our development partners, especially from where industry investment is obtaining technology transfer. This will help our graduate engineers to be employable in relevant industry. It will also alleviate shortage of technical lecturers, as well as meeting the technological skills gaps in the technical training institutions. There is also a need to study come up with training needs of employees in industry, and the lecturers in the training institutions. This will assist in developing relevant and useful programmes for training of lecturers and the trainees, and development of relevant curricula is the result. Since it has been observed that TDC has excellent facilities and equipment for effective implementation of training programmes in the institution, it is recommended that NITA budgets for funds to market the training programmes. In this way, the equipment and facilities that are modern, and of high quality, will be efficiently and optimally utilized. Thus, this should be able to encourage more students to get more industry sponsors to the programmes, hence supporting implementation and overcoming the challenges facing the institution.

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