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STRENGTHENING INSTITUTIONAL CAPACITY AMONG TECHNICAL VOCATIONAL ENTREPREURSHIP TRAINING (TVET) IN KENYA, A CASE STUDY OF BUNGOMA COUNTY

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ABSTRACT

The contribution of Science and Technology (S&T) to development is well observed world over, and in Kenya as a development priority. However, this has not been the case due to lack of proper investment technical institutions that offer technological innovations. Investing in S & T is the global new catchword not only for individual countries but also donors like the World Bank. Promotion of S & T cannot take place unless technical institutions are properly funded for research as well as enhanced man power development to allow generation and diffusion of scientific knowledge. This paper is about strengthening technical institutions for S&T in Kenya. The paper discusses the challenges faced by lecturers and students at TVET institutions in Bungoma County. In this paper, we have presented results of observation and personal interviews from lecturers and sampled students from departments of ICT, Building and Civil Engineering, Textile and Electrical Engineering; on the challenges impending actualization of S&T to benefit society. Through the analysis, it was established that professional development for scientific and technological research in TVET institutions is minimal. It was also established that most of the equipment for experiments, laboratory and field practical are good for examination purposes but not good enough for industrial experiences which is dynamic. The paper concludes that Ministry of Education Science and Technology (MoEST) must provide proper funding to these institutions for purchase of modern equipment which meets industrial demand. The teaching staff also needs frequent refresher courses and continuous professional development in various fields to update them on current technological innovations and industrial trends.

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INTRODUCTION

Science, Technology and Innovation (ST&I) are essential ingredients for industrial and sustainable development of a country. Research products play an important source of new knowledge used to formulate policies that give direction for social economic development. Promotion of S & T cannot take place unless technical institutions are properly funded for research as well as enhanced man power development to allow generation and diffusion of scientific knowledge. In the recent years, development initiatives have centred on the role of S&T in promoting and sustaining development. The call for developing and teaching S&T in technical institutions however should also put into consideration the institutional capacity requirement for the technological development to occur.

Today's "new economy" has largely become knowledge-based and technology-driven, with technology now becoming the determinant of the competitive position of the nation states, be it economic leadership, military power (for better or worse) and world hegemony (McCulloch, 1988). A healthy economy and a stable government must be dynamic, knowledge-based and linked into the global scientific and technological community (The Smith Institute, 2005). Oni (1999), observed that the advancement of the developed countries since the end of the World War II has been through an aggressive development of technological capacity, both human and institutional; and that the phenomenon of globalization of the present age could not have been possible without the development of technology and institutional capacity to sustain it. United Nation (UN) Millennium Project (2005) asserted that "the long-term driving force of modern economic growth has been science-based technological advance".

Farley (2005), in his report stressed further, that the importance of S&T including knowledge for development cannot be understated as they are undeniably fundamental to the wealth and health of individuals as S&T play an instrumental role in the reduction of poverty, improvement of competitiveness and delivering results in key sectors – (education, agriculture, health, information and communication, transportation, biotechnology among others). The World Summit for Sustainable Development (WSSD) held in Johannesburg -South Africa in 2002 focused on key role of S&T in sustainable development. The UN Millennium Project task force on science, technology, and innovation also reiterated the need to harness S&T sustainably to accelerate development. The development distance between different countries is now being attributed to the level of S&T in these countries. Therefore;

The lessons of the last two centuries have shown the crucial difference between having and not having the S&T capability, even for countries with vast natural resources. The difference lies in being able to exploit these resources themselves or be exploited by others. In this 21st century, the winner will be the one who can, with capability of ST&I, extract the most value out of them. Whereas deduction from the above reveals that ST&I are now globally recognized as the prime movers of modern economies; whereas, the level of technological development of country or state is evaluated on the ability to acquire, adopt, adapt and diffuse technological innovations as well as technological infrastructure in place (Okafor,2007); whereas, in developed economies, the innovation systems serves the role of maintaining or improving the already established level of competitiveness and growth; unfortunately, developing countries and their regions have shown sheer lack of technological development capability which is the source of their social economic and technological underdevelopment.

The new focus on S&T in technical training institutions, calls for right training facilities for practical and experiments as well as professional development in various fields in institutions for real benefit to society. In Kenya, the government has put more emphasis on technical education by initiating a number of technical training institutes across the country as a way of diffusing S&T into the development and industrialization as enshrined in vision 2030 strategic blue print. However, much has not been achieved over the years because most graduates from these technical institutes fall short of the skills competence to drive industrial take off, this therefore call for a proper strengthening of capacities in the technical training institutions both at infrastructure and human resource levels, to make them relevant to industrial demands which is dynamic.

Purpose of the Study

The study sought to discuss institutional challenges for the promotion of S&T among technical training institutes in Bungoma County.

Objectives

The objectives of the study were to:

- Find out the existing facilities, machines and scientific infrastructures in technical training institutes.
- Establish the level of inefficiency within the existing facilities, machines and scientific infrastructure in these technical institutes.
- Determine the knowledge gaps which exist among human resources in these technical institutions and industrial requirements.

METHODOLOGY

This was a case study of technical training institutes in Bungoma County. It took on board three technical training institutes namely: Sang'alo Institute of Science and Technology, Kisiwa Technical Training Institute and Musakasa Training Institute of Technology. The study employed descriptive research approach to gather information from lecturers and students from departments of ICT, Building and Civil Engineering, Textile and Electrical engineering. Simple random sampling was used to select one lecturer and 5 students from each department in each of the three technical institutes as shown in table 1.1 below.

Name of Technical Institute	No. of Lecturers selected	No of Students Selected
Sang'alo Institute	5	25
Kisiwa Institute	5	25
Musakasa Institute	5	25
TOTAL	15	75

From table 1.1 above, 15 lecturers and 75students were used as respondents. The study therefore used personal interview with respective lecturers and students selected in each department from the three institutes, to get the in-depth status of current state of affairs in their departments in terms of teaching materials, laboratory and experiment equipment and the lecturers' competence in terms of modern trends in technological innovations and advancements. The study also adopted observation in which the researcher did move to various departments and observed the state of the laboratories, equipment and experiment and demonstration sites to corroborate with information gathered through interviews. Qualitative techniques and descriptive statistics were used to analyze data which were presented in percentages.

RESULTS AND DISCUSSION

The preceding situation analysis highlights several problems and weaknesses in the human resource, research capacity and facilities in the technical training institutions. It was established that the human resource capacity for research is minimal and non-existent in most technical training institutions; 94% of lecturers interviewed lacked capacity for research due to financial constraints and lack of modern equipment in laboratories for research and experiments as well as inadequate training on new scientific and technological innovations.

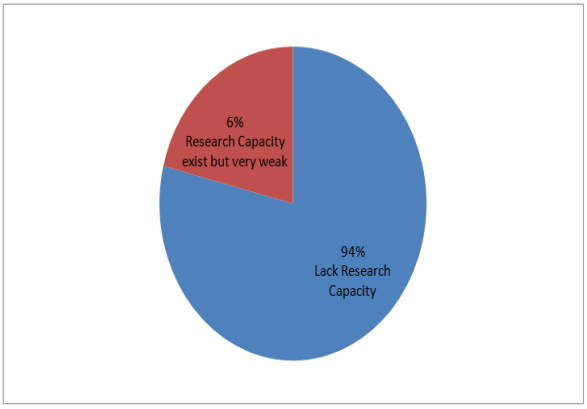
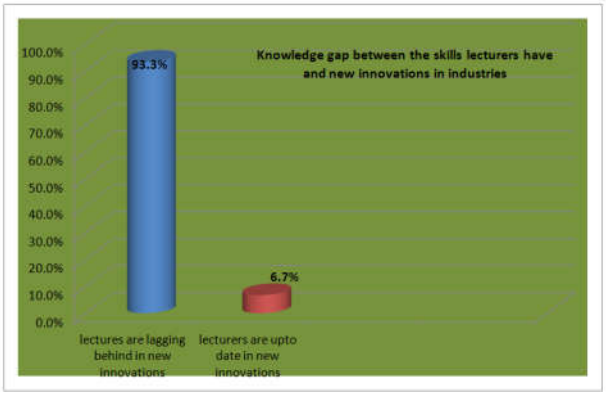


Figure 1.0 Lecturers' response on their capacity to do research

The weak human resources base means that most technical training institutes' lecturers are not in a strong position to diffuse modern technological skills in their teaching. This was evident from the fact that 93.3% of lecturers interviewed felt so. For instance, many lecturers' in automotive department particularly in Sang'alo were facing challenges in using new equipment which the college acquired through collaboration with development partners.



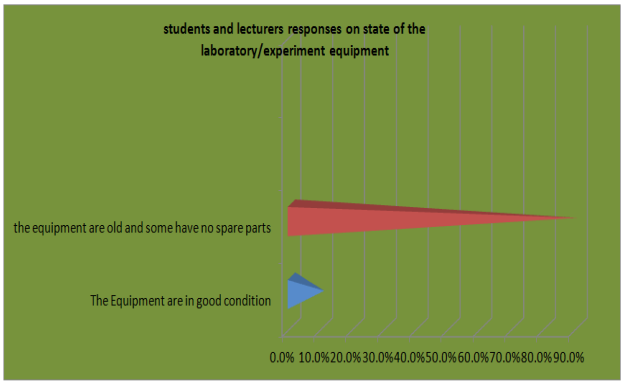


Figure 3. The state of laboratory equipment

They were of the view that they needed some refresher courses to be able to use the equipment excellently in their teachings. Lecturers and students in building and construction departments in the three colleges were in agreement that the building code CP114, for reinforced concretes which the colleges use, has evolved to BS8110, which is used currently in industry. The lecturers even stated further that the BS8110 has also evolved to Euro Code (EC) currently used in developed countries. This posed challenge to many graduates from these departments as they are forced to learn fresh outside the college. The lecturers also felt that they too need to update on the modern building code used in the field. All lecturers in electrical departments in the three colleges, lack training in programming languages, so they find it hard to handle digital circuit appliances which require knowledge in programming.

The third challenge is the weak institutional capacity to build infrastructure. In particular, the physical facilities required for training scientists are very weak. From observations in most departments as well as interviews with students and lecturers, about 89.7% of laboratory equipment in some department in all technical institutions is not in a state in which they can be used to carry out experiments. Some of the equipments are no longer in production and hence spare parts are not readily available. There is poor maintenance. The average age of the available is very high. The modern construction plant which students must learn in the field is not available in all technical training institutions. Survey equipments are old models. In the field, students find new and electronic equipment eg total stations which most technical training institutes do not have, so the students are forced to learn how to use them a fresh in the field. In the electrical departments, colleges do not have logic circuits which are used in industries, so students are forced to learn a fresh how they work or how to use them. Reliable ICT infrastructure and modern library facilities for research are also lacking.

Conclusion

It was established that the human resource capacity for research is minimal and non-existent in most technical training institutions. In most technical training institutions, lecturers are not in a strong position to diffuse modern technological skills in their teaching. There was weak institutional capacity to build infrastructure, in particular, the physical facilities (equipment, tools, materials and machines) required for training scientists are very weak in these technical training institutions. It was also clear that most of the equipment for experiments, laboratory and field practical are only good for examination purposes but not good enough for industrial experience which is dynamic. Last but not least, all technical training institutes are underfunded or lack financial resources to be able to purchase and adopt modern technologies to meet requirements of dynamism in industries.

Recommendation

- The government of Kenya (through the Mo EST), being the major stakeholder in these technical training institutes, need to carry out a baseline study to evaluate the exact financial requirement in all technical training institutes that can meet their demand for modernization.
- Various technical training institutes should do an assessment for all lecturers in all departments to ascertain the knowledge and skills competency gap which exist between what lecturers possess and industrial requirement which are dynamic and evolving rapidly. This will make them organize refresher course as well as continuous professional development for lecturers in various departments to align their skills and knowledge with new innovations in the field and industries.

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