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Promoting Youth Employment through Information and Communication Technologies in Vocational Education in Tanzania

Joel Mtebe, Mussa M. Kissaka, Christina Raphael and Josephine K. Stephen

University of Dar es Salaam, Tanzania

Abstract: Africa is the most youthful continent in the world with approximately 20% of the global youth population, which is expected to increase by 42% by the end of 2030. This great number of youths, which could be used as a huge asset for the continent's economic growth and development, is largely unemployed. As a result, governments have introduced Vocational Education and Training (VET) by providing occupation-oriented training in a bid to reduce unemployment amongst youth. Despite these efforts, the majority of VET graduates remain unemployed due to the inadequate employability skills needed in the current job market. This study reports on the implementation of a project aiming at enhancing employability skills through ICT in four centres in Tanzania: Nangwa VTC, Manyara VTC, Arusha VTC, and Mto wa Mbu FDC, as well as Ketumbeine secondary school with a total of 100 students and 20 teachers. Through participating in the project, it was expected that students would gain the ICT skills as well as the 21st-Century skills required in their current workplaces. At the end of the project, an evaluation was conducted using a self-administered survey, where a total of 80 students were involved in the four centres. Moreover, Focus Group Discussions (FGDs), non-participatory observation, and documentary review were adopted as qualitative data instruments. It was found that students' perceived competence and level of skills on technology knowledge of multimedia was moderate (M = 3.63), while that of CISCO was found to be high, with 76 students having graduated and obtained a CISCO certification. In terms of the 21st-Century skills, it was found that students' self-reported confidence levels in all four 21st-Century skills domains were found to be high, with collaboration skills (M = 4.5) being the highest, followed by communication skills (M = 4.26), leadership (M = 4.20) and creativity and innovation (M = 4.06). Nonetheless, the lowest 21st-Century skills element was critical thinking skills (M = 3.9). The findings from this study show that with some planned activities within colleges, students can easily acquire the needed employability skills. The implication of these findings are discussed at the end of the paper.

Keywords: Technical and Vocational Education and Training (TVET), Vocational Education, 21st-Century skills, youth employment, employment in Africa, school-industry collaboration, workplace training.

Introduction

Africa is the most youthful continent in the world with approximately 20% of the global youth population and is expected to increase by 42% by the end of 2030 (INCLUDE, 2017). Similarly, Tanzania's youth population is estimated to be 35% of the total population (Gaddis, Wane & Morisset, 2013). Unfortunately, this great number of youth, which can be used as a huge asset and resource for the country's economic growth and development, is largely unemployed (Haji, 2015). According to the African Union report, nearly 60% of Africa's youth are unemployed and a significant number of them are graduates (AAU, 2013). The youth unemployment rate in Tanzania, for instance, has

averaged 14% from 2006 until 2014, reaching a high for that period of 15% in 2006 (Haji, 2015; Trading Economics, 2019).

In order to address the unemployment problem, many African countries have introduced Vocational Education and Training (VET) to develop competencies in the relevant technical and vocational subjects for the world of work (Sarfo, 2016; UNESCO & ILO, 2002). Most of the courses offered under VET provide training that lead to skilled occupations, whereby learners are pursuing competence-based training to become skilled workers for meeting the specific requirements of occupations (Sumra & Katabaro, 2016). In Tanzania, VET is offered through Folk Development Colleges (FDCs) and Vocational Education Centres (VTCs). As of 2011, there were more than 100,000 students enrolled in over 800 centres pursuing various courses such as agriculture, food processing, automotive repairing, and business administration (Nkirina, 2010). Other courses include clothing and textiles, plumbing, carpentry, electrical, hospitality and tourism, laboratory technology, and mechanical and printing.

Despite the progress made by various African governments to skill youth through VET, the majority of them still remain unemployed (Nkirina, 2010). According to the World Bank report, the unemployment rate among VET graduates was reported to be 86% in 2014 (World Bank, 2014). Studies show that increased unemployment rates amongst VET graduates is due to the mismatch between the skills acquired in colleges and the skills required by the labour market (Bezy, 2013; Haji, 2015; Hobson & Goldin, 2016). In most of the sub-Saharan African countries, about two-thirds of all graduates in the labour market—95 million people—lack the basic skills that industries seek (or the skills necessary for self-employment) (Garcia & Fares, 2008). The current labour market requires graduates with high academic qualifications but also the so-called employability skills like the ability to communicate, collaborate, mediate information, and solve problems with people worldwide (Ananiadou & Claro, 2009; Saavendra & Opfer, 2012; Suarta, Suwintana, Sudhana, Kadek & Hariyanti, 2017). Most of these skills are missing in the majority of the graduates in sub-Saharan Africa, and Tanzania in particular.

The survey by UNIDO amongst employees in selected firms in Tanzania ascertained that most of the employees lacked employability skills such as communication and teamwork skills, problem-solving, and analytical skills (UNIDO, 2012). Research conducted by Sabarwal (2013) disclosed further that 34% of surveyed firms cited behavioural skills and interpersonal skills (30%) as skills that are extremely hard to find in Tanzania. Similarly, in its report on Formal Sector Employment and Earnings Survey of 2014, the government of Tanzania reported that despite good educational qualifications, many employees in the government sector lacked employability skills such as communication skills, problem-solving, teamwork, leadership skills, and time management (URT, 2014).

It is clear that the current VET curriculum does not prepare learners in responding to the changing nature of economies and societies and the impact of globalization (Bourn, 2018; Suarta et al, 2017). It is acknowledged that the current labor market requires graduates with both job specific skills and the employability skills known as 21st-Century skills, facilitated by the emergence of Information and Communications Technologies (ICT) (Dede, 2009; Voogt & Knezek, 2013). Nonetheless, the 21st-Century skills are rarely taught in the Tanzanian education system as teachers have continued to adopt a transmission model of education while relying too much on theories (Dede, 2009; Saavendra

& Opfer, 2012). The challenge, therefore, is how VET training can produce graduates with skills that can respond to the needs of a highly competitive and dynamic global market and industry.

In a bid to address this problem, World Vision Tanzania (WVT) implemented a Cycle of Transformation (CoT) project for four years (2015 to 2019) aiming at enhancing employability skills for VET and in secondary school students through ICT. The project was implemented at Nangwa VTC, Manyara VTC, Arusha VTC, and Mto wa Mbu FDC, as well as Ketumbeine secondary school involving 100 students and 20 teachers. Students and teachers were trained in ICT courses and the 21st-Century skills, while practicing them through School-Based Student-Run Enterprises (SBSREs). The ICT courses that were taught were Intel Learn curriculum, Cisco IT Essentials, and Multimedia skills (digital video, web design). Similarly, the Tanzania Small Industry Development Organization (SIDO) equipped students with entrepreneurship skills, such as preparing business plans, business registration and financial management, which, in turn, helped students in forming SBSREs. Armed with technology, 21st-Century skills, and business skills, students were then required to use these skills to run their SBSREs, while creating valuable technology products and services needed by the nearest communities. A total of five SBSREs were formed, one in each centre with a total of 20 students.

Through this process, it was expected that the students would gain work-based learning skills in technology, and employability skills through participating in the SBSREs. Each school was provided with 20 workstations, a server, a printer, a multimedia projector and Internet connectivity. This study aimed to assess changes resulting from the CoT project through equipping students with relevant skills needed for employment and self-employment.

Literature Review

VET is concerned with acquisition of knowledge and skills for the world of work (Reeve, 2016). However, the knowledge and skills needed in the current labor market are different from that of the 20th Century due to the emergence of ICT (Ananiadou & Claro, 2009; Dede, 2009). The current labor market requires employees to have educational qualifications plus 21st-Century skills. The 21st-Century skills are described as important skills to support the current knowledge-based economy (Reeve, 2016).

Several frameworks have been developed to explain various skills that are needed in the 21st Century. These frameworks include the Partnership for 21st-Century Skills, the Metiri Group and NCREL, the American Association of Colleges and Universities, and the Organization for Economic Cooperation and Development (Dede, 2009). Across these frameworks, it is generally agreed that collaboration, communication, critical thinking, creativity and innovation, and leadership skills are essential key competencies needed in the 21st-Century skills (Hixson, Ravitz & Whisman, 2012; Voogt, Erstad, Dede & Mishra, 2013).

Critical thinking refers to students' ability to analyze complex problems, investigate questions for which there are no clear-cut answers, evaluate different points of view or sources of information, and draw appropriate conclusions based on evidence and reasoning (Hixson et al, 2012). They require higher levels of concentration, deeper analytical abilities, and improved thought processing (NEA, 2014). These skills are needed in the current job market as they enable employees to better serve customers, develop better products, and continuously improve themselves within an ever-changing

global economy (Scott, 2015). Employees with higher critical thinking skills will be able to compare evidence, evaluate competing proposals and make responsible decisions (Scott, 2015).

Communication skills refers to students being able to organise their thoughts, data, and findings; and share these effectively through a variety of media, as well as, orally and in writing (Hixson et al, 2012). Despite their technical abilities, students' future career success may have as much to do with their ability to communicate with co-workers, sell ideas, and manage their time (Goldberg, 2006). These skills need to be taught in school in order to prepare students to be members of a larger community with a voice and a sense of responsibility to others (Ananiadou & Claro, 2009). Similarly, with the availability and advancement of ICT, much of the work is accomplished in teams, across geographic and language boundaries (NEA, 2014). As a result, employees are required to have the ability to collaborate with people across the world whom they may never meet face-to-face (Dede, 2009; Kay & Greenhill, 2011). These skills should be gained in schools when working collaboratively in groups during various class projects.

In today's world of global competition and task automation, innovative capacity and creative spirit are becoming requirements for today's job market (NEA, 2014; Scott, 2015). This is because emerging industries rely on employees' ability to think unconventionally, imagine new scenarios, and produce astonishing work. In the context of this study, creativity and innovation skills referred to students' ability to generate and refine solutions to complex problems and then combine what they have learned in developing products and services via established SBSREs.

Finally, leadership skills are important in the new workplace as they will enable employees to pick the best work opportunities for an existing or new organization (Goldberg, 2006). The development of leadership skills is not part of the academic curriculum in most schools (Omatsu, 2012). In this study, students were equipped with leadership skills necessary to take responsibility of their own learning as well as manage various activities in the established SBSREs.

After four years of project implementation, it was important to find out if students acquired these 21st-Century skills needed for the current workplace environment.

Methodology

The study was carried out in five centres involved in the CoT project, namely Nangwa VTC, Manyara VTC, Arusha VTC, and Mto wa Mbu FDC, as well as Ketumbeine secondary school in Tanzania. Concurrent triangulation design was deployed where quantitative and qualitative data were collected and analyzed at the same time. In this type of design, priority is equally given to both forms of data while data analysis is usually separate, and integration usually occurs at the data interpretation stage (Hanson, Creswell, Clark, Petska & Creswell, 2005). The quantitative approach involved data collection through a self-administered survey while the qualitative approach involved Focus Group Discussions (FGDs), non-participatory observation, and documentary review as the main data collection instruments.

Questionnaires

The questionnaire was distributed to students in order to investigate their competence levels in the courses they were taught. The assessment of technology competence and skills was achieved through the application of Technological Skills (TK), and Technological Content Knowledge (TCK) elements of

the Technological Pedagogical Content Knowledge (TPACK) domain. The 21st-Century skills were included in the data collection instrument through adopting a validated tool developed by Hixson et al (2012). The 21st-Century skills elements included collaboration skills, critical thinking, communication skills, creativity and innovation skills, and leadership (self-direction) skills. The study instrument items were re-worded to suit the context of the study. Participants were required to answer each question using a five-level Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree).

Focus Group Discussions

The Focus Group Discussions (FGDs) were conducted with a group of 6 - 8 students in each of the five centres. Krueger (1994) suggested that a group of 5 - 7 participants is more appropriate for an in-depth conversation. The FGDs aimed to validate data obtained from the questionnaire but also to get a broad range of viewpoints about the issues raised in the questionnaires.

Non-participatory Observation

The non-participatory observation aimed to investigate the accessibility and usage of facilities to students and teachers. Additionally, the quality of developed products such as websites, brochures, business cards, and videos were assessed.

Document Review

Important documents were reviewed, such as CISCO certification records, business plans, and financial statements, to investigate the evidence on entrepreneurship tendencies as a result of project activities.

Participants

A total of 80 students out of 100 students from five established SBSREs participated in the study. The majority of them were from Nangwa VTC (25%) followed by Manyara VTC (22.5%), Ketumbeine secondary (22.5%) and Arusha VTC (21.5%). The smallest number of students were from Mto wa Mbu FDC with 8.8 % as shown in Figure 1.

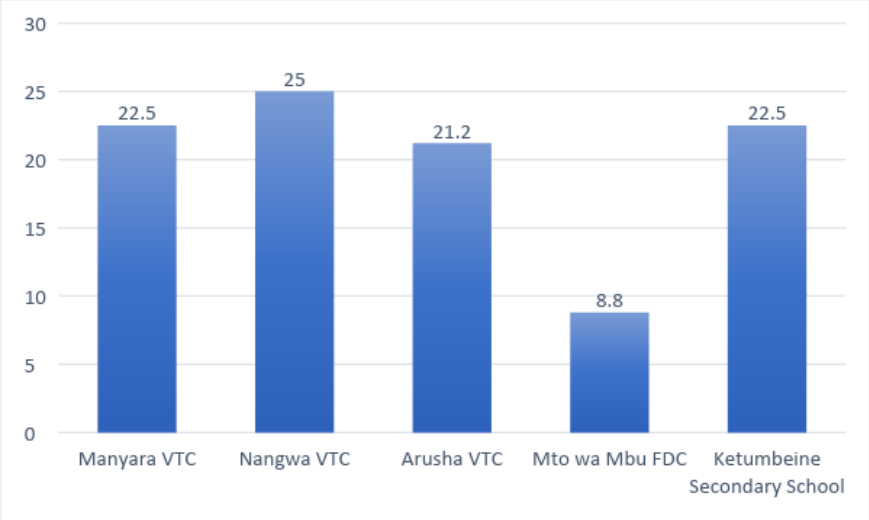

Figure 1: The percentage of respondents sampled for different schools.

Of the 80 students, 62.5% were males, while 37.5% of them were females. In terms of year of study, many students were in the second year of the study (65%), followed by third year with 23.8%. Few students (3.8%) were in the first year of the study.

Findings

Students' Use of Computers

A total of 20 computers, 1 printer, 1 camera, 2 routers, 1 multimedia projector and 1 server computer were provided to each centre. It was important to assess the extent to which the installed facilities for each centre were used. This is because the increased ICT facilities usage is an important indicator that they are producing the expected benefits (DeLone & McLean, 2003). Using a self-assessment questionnaire, it was revealed that nearly half of the students (47.5%) indicated that they access the computer laboratory infrequently, while 21.3% of them indicated that they access the computer laboratory quite often. The percentage distribution of students' access to the computer laboratory is summarised in Figure 2.

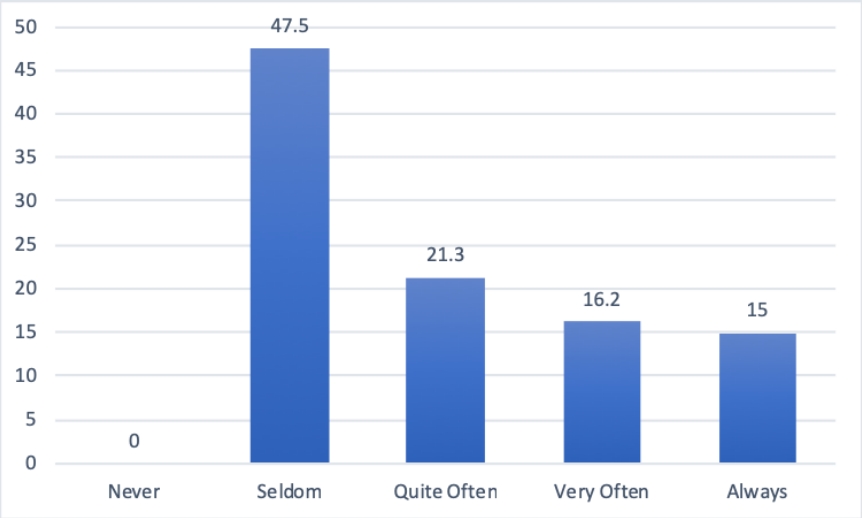

Figure 2: Percentage distribution of the students' access to computer laboratories.

This finding implies that students did not have enough time to use computers installed in their centres. During FGDs with students, several reasons were provided by them. In some centres, such as Manyara VTC, the computers were kept in an office and were made available to students only during the project activities. As a result, students were not able to access the computer lab during normal timetable routines, even if they had time to work on their projects.

It was also revealed that project activities were not included in the normal school timetable in almost all centres. Most of the time the project activities were scheduled outside normal timetable routines and therefore students had very few hours to use the computers. In Arusha VTC, for instance, students agreed to meet after classes for two hours. Nevertheless, due to varied subject specializations, this happened to be very challenging, since students were not studying the same courses, thus, some students came very late.

Technology Knowledge

In terms of competence and skills levels in the courses they attended, students' competence and skills levels on CISCO were found to be high. Out of 100 students who attended the CISCO course, 76 graduated and passed the CISCO examination. Nangwa VTC led, with 40 students, followed by Manyara (19), Mto wa Mbu FDC (10) and Arusha VTC (7). Ketumbeine secondary school had no students who could manage to obtain the CISCO certification.

The competence and skills levels of multimedia were assessed using self-assessment of technology knowledge (TK). It should be noted that if mean scores of tests are between 1 and 2.33, the level of perception is considered as "low"; if between 2.34 and 3.67, the level of perception is considered as "moderate"; if between 3.68 and 5.00, the level of perception is considered as "high" (Yurdakul et al, 2012). Based on Table 1, overall students' competence and skills levels in multimedia technologies, were found to be moderate (M = 3.63).

Table 1: Descriptive Statistics of Students' Responses on TK (N = 80)

Item	Mean	Std. Dev.
I have the technical skills to use Multimedia tools to create various products (e.g., videos, brochures, websites) effectively	3.37	0.917
I can learn how to use Multimedia tools (e.g., MS Publisher, web development tools, video creation and editing tools, etc.) effectively easily.	3.92	0.878
I know how to solve my own technical problems when using Multimedia tools (e.g., MS Publisher, web development tools, video creation and editing tools, etc.).	3.30	0.982
I keep up with important new multimedia software tools (e.g., MS Publisher, web development tools, video creation and editing tools, etc.) made available in the market	3.53	1.042
I have the technical skills I need to use Multimedia software and tools (e.g., MS Publisher, web development tools, video creation and editing tools, etc.)	3.67	0.898
Overall Mean: 3.63		

With technical competence and skills acquired from this project, students were able to produce various products such as websites, business cards, brochures, and record videos. For instance, with web design and developments skills, students at Nangwa and Manyara VTCs were able to develop websites for their centres. Some students testified that they acquired skills necessary to develop websites which they consider very crucial for their future world of work:

> I can now develop my own website now and put in its products that I will be producing. I am taking the electrical installation course here. I will use the skills I got here to advertise my services to the community, and I know I will get customers. Student, Nangwa VTC.

> We developed a college website with our teacher. It is now ready for launching. The skills I got is very useful for me as I plan to employ myself after I graduate here. A website is a powerful tool for advertising my products. Student, Manyara VTC.

Technology Content Knowledge

Technological Content Knowledge (TCK) is students' knowledge about the technologies used within the courses they were studying in their programmes. This is to say, the knowledge about how to use training technologies in different ways to enhance their learning activities, and gain further knowledge and skills about those technologies. As indicated in Table 2, students' perceived competence in TCK was found to be moderate (M = 3.51).

Table 2: Descriptive Statistics of Students' Responses on TCK (N = 73)

Item	Mean	Std. Dev.
I know websites with online materials for studying multimedia software and tools (e.g., MS Publisher,, web development tools, video creation and editing tools, etc.)	3.58	0.971
I know ICT-applications which are used by professionals in the multimedia industry	3.36	1.046
I know ICT-applications which I can use to better understand the contents of multimedia software (e.g., MS Publisher, web development tools, video creation and editing tools, etc.)	3.51	1.029
I have various ways and strategies of developing my understanding of multimedia software (e.g., MS Publisher, web development tools, video creation and editing tools, etc.)	3.62	1.150
Overall Mean 3.51		

During FGD, many of the students, especially those who were in their first year, revealed that it improved their performance in ICT courses offered in the existing curriculum. Students in almost all schools had comments like the following:

> I can now search various samples of products developed elsewhere and learn how others have designed their brochures and other products before deigning mine. Sometimes I can find a very nice sample and I just edit it for my cuctomers. Student, Arusha VTC.

> Internet have a lot of thing that I can easily learn. There are many documentatins of software, samples of business cards, brochures, photos etc. It is just a matter of time and know what exactly you want to learn. Student, Nangwa VTC.

Moreover, students at Mto wa Mbu FDC indicated that the skills from Intel Learn curriculum enabled them to learn how to search online resources from the Internet about various agricultural courses. For instance, one student at Mto wa Mbu indicated:

> I can now use internet searching skills to identify any symptoms of any animal desease I read in Class. Initially, I had to depend on books which are not available or wait for notes from the teachers. Having learnt how to search notes via the Internet it now easier for me to read a lot of notes about animals, their disseses, sympolts and suggested dosses. Student, Mto wa Mbu FDC.

The 21st-Century Skills

One of the main components of the project was to equip students with 21st-Century skills as employability skills. By being members in the SBSREs developing products and services and other related activities, it was expected students would gain the needed 21st-Century skills. Therefore, students' perceived competence and skills levels on 21st-Century skills were assessed using the self-

administered questionnaire adapted from (Hixson et al, 2012). The instrument consists of collaboration skills, critical thinking, communication skills, creativity and innovation skills, and student leadership (self-direction) skills as 21st-Century skills domains. The findings of each 21st-Century skills domain is explained next.

Critical Thinking Skills

Students were asked to indicate their perceived competence on critical thinking skills using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). The findings showed that students' perceived competence and skills on critical thinking was found to be high (M = 3.90) based on the scale proposed by Yurdakul et al (2012). Table 3 shows students' responses to critical thinking skills.

Table 3: Students Responses to Critical Thinking Skills (N = 80)

Item	Mean	Std. Dev.
I can compare information from different sources before completing a task on an assignment	3.78	1.031
I can draw a conclusion based on the analysis of numbers, facts or relevant information	3.84	0.961
I can summarise and interpret what I have been taught and read	4.25	0.684
I can analyze competing arguments, perspectives or solutions to a problem	3.80	0.818
I can develop a persuasive argument based on supportive evidence or reasoning	4.03	0.763
I can try to solve complex problems or answer questions that have no single correct solution or answer	3.73	0.914
Overall mean: 3.90		

Collaboration Skills

In the SBSREs, students worked collaboratively with each other in designing and developing products and services. It was expected that through working together as a team, students will gain the needed collaborative skills. Therefore, students were asked to indicate their perceived competence and skills levels on collaboration skills using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). The findings show that students' perceived competence and skills on collaboration was found to be high (M = 4.50) based on the scale proposed by Yurdakul et al (2012). Table 4 shows students' responses to collaboration skills.

Table 4: Students' Responses on Collaboration Skills (N = 80)

Item	Mean	Std. Dev.
I am able to work in pairs or small groups to complete a task together	4.59	0.650
I am able to work with other students to set goals and create a plan for a team	4.67	0.497
I am able to create joint products using contributions from each team member	4.40	0.686
I am able to present my group work to the class, teacher or others	4.50	0.656
I have skills to work as a team to incorporate feedback or group tasks or products	4.41	0.706
I have skills to give feedback to peers or assess other students' work	4.45	0.727
Overall Mean: 4.50		

Communication Skills

As they were working in a group, students developed products and services before presenting them to school management for comments. Once the products were refined, students were supposed to market and sell them to the nearest communities. Through this process, it was expected that students would gain needed communication skills in the current workplace environment. To assess if students acquired these skills, students were asked to indicate their perceived competence and skills levels on communication skills using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). It was found that students' perceived competence and skills on communication skills was found to be high (M = 4.26) based on the scale proposed by Yurdakul et al (2012). Table 5 shows students' responses on their competence levels on communication skills.

Table 5: Students' responses on communication skills (N = 80)

Item	Mean	Std. Dev.
I can create charts, tables and graphs of my products for presenting them in written or oral presentations	4.10	0.805
I can convey ideas of the product I want to produced using posters, video, etc. other than a written paper	4.20	0.604
I can prepare and deliver an oral presentation of the products and services we have developed to the teacher, clients or others people	4.26	0.707
I can answer questions in front of an audience (e.g., class, others)	4.34	0.594
I can discuss how I will present my work or demonstrate what I have learnt during the process of developing my products	4.41	0.688
Overall Mean: 4.26		

Using skills attained from this project students managed to open social media accounts where they were able to sell products and services. For instance, we found that one student at Arusha VTC, who studied the certificate in electrical installation, was found to have opened an Instagram account where

he could market his products. During FGDs, it was evident that students gained various communication skills through participating in various project activities. For instance, students claimed:

> I was very shy to stand before people and present, but when I joined CoT, I got skills on how to present what I am doing before people. The skill enables me to present other things before my classmates out of the project activities. Student, Ketumbeine secondary school.

> I have been the one selling all products we produce in our group. Once I graduate, I believe it will be very easy for me to open up my own business and attract a lot of customers as I have negotiation skills. Student, Arusha VTC.

Creativity and Innovation Skills

Creativity and innovation involved the ability of students to evaluate the effectiveness of their ideas and products, and refine ideas and products in pursuit of specific end goals (Mishra & Kereluik, 2011). In this project, it was expected that students would acquire creativity and innovations skills in the cause of developing products and services during the implementation of the project. Therefore, students were asked to indicate their perceived competence on creativity and innovation skills using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). In this study, students' perceived competence and skills in creativity and innovation were found to be high (M = 4.06) based on the scale proposed by Yurdakul et al (2012). Table 6 shows students' responses on their competence levels on creativity and innovation.

Table 6: Students' responses to creativity and innovation skills (N = 80)

Item	Mean	Std. Dev.
I can use brainstorming or concept mapping technques when I have an idea about a product or service	4.05	0.710
I can generate ideas about how to confront a problem or question	4.08	0.671
I can test out different ideas of a product or service and work to improve them	4.08	0.776
I can invent a solution to complex, open-ended question or problem	4.00	0.763
I can create an original product or performance to express my ideas	4.09	0.715
Overall Mean: 4.06		

During FGDs, it was evident that students gained creativity and innovation skills during through participating in various project activities. For instance, students claimed:

> I had an idea of designing brochure that will help truck company at Manyara town to market their products, then design how the brochure will look like in a paper with sample items, then I used Publsiher to design it. When I preseted the sample brochure to the customer, they like it. With few comments I was able to finalise it. Student, Nangwa VTC.

Another student claimed:

> I used to sell soaps without putting any lables on it. After learning Publisher I was able pack my soaps printed with designed lables with contacts and the name of my firm, surprisingly my customers loved the packed soaps and I was able to sell more than unpacked one. Student, Nangwa VTC.

Leadership Skills

In acquiring leadership skills it is important for students to be able to set goals and work as a team to achieve those goals collaboratively. Whether students are going to be self-employed or are planning to be employed, leadership skills are important. In the established SBSREs, each student was given a specific role to play in the group and interchanged for a certain period of time. The roles included being a chairperson, secretary, and treasurer. Therefore, it was important to assess if the expected skills were achieved using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). In this study, students' perceived competence and skills on leadership skills were found to be high (M = 4.20) based on the scale proposed by Yurdakul et al (2012). Table 7 shows students' responses on their competence levels on student leadership.

Table 7: Students' responses on leadership skills (N = 80)

Item	Mean	Std. Dev.
I can take initiative when confronted with a difficult problem or question	3.98	0.826
I can choose topics of learning or questions to pursue	4.34	0.594
I can plan the steps to take in accomplishing a complex task	4.04	0.645
I can choose for myself what examples to study or resources to use	4.19	0.658
I can monitor my own progress towards the completion of a complex task and modify my work accordingly	4.16	0.645
I can use specific criteria to assess the quality of my work before it is completed	4.11	0.683
I can use peer, teacher or expert feedback to revise my work	4.30	0.604
I am sensitive to others' emotions and feelings and an understanding of the effects that they can have to work and relations	4.15	0.765
I have ability to respond positively to changing circumstances and new challenges	4.29	0.640
I have ability to manage own learning, invest time and effort to learn new skills in any setting	4.40	0.608
Overall Mean: 4.20		

During FGDs, it was evident that students gained leadership skills through participating in various project activities. For instance, Manyara, Nangwa, and Arusha VTCs went as far as registering their SBSREs, had a constitution, and opened bank accounts. Through SBSRE, it was found that students were conducting formal meetings, which showed that leadership skills had been gained. For instance, students claimed:

I can prepare minutes of the meeting and also act as a secretary in any meeting. In the meetings I have been taking minutes and filing them for our group. Student, Ketumbeine secondary school.

Through participating in the SBSRE, I can now plan in advance what time I should learn and what subject on which day. But also, I can plan time for relaxing and time for studies. It is important to have timetable as they are so many activities I have to accomplish. All my plans have been document in the notebook. Student, Mto wa Mbu, FDC.

Overall Results

Overall, the students' self-reported confidence and skills levels in all four domains of 21st-Century skills were found to be high. The highest students' self-reported confidence and skills levels in 21st-Century skills domains were collaboration skills (M = 4.5), followed by communication skills (M = 4.26). Nonetheless, the lowest 21st-Century skills element was critical thinking skills (M = 3.9). Figure 5 summarises the overall students' responses on the 21st-Century skills domains.

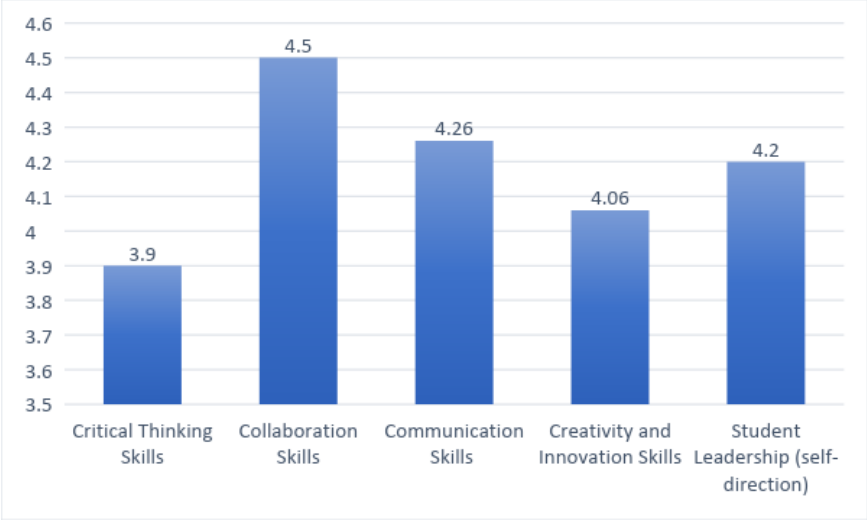

Figure 3: Overall students' responses on the 21st-Century skills elements (N = 80)

Generally, it was evident that the project managed to equip students with skills and knowledge on ICT courses, and with employability skills that are needed in the current labor market. As part of practicing business and entrepreneurial activities, each SBSRE managed to sell some products and the amount of money collected was deposited into the bank for those centres with bank accounts. Through selling these products, students learnt marketing skills, as they were required to visit the nearest communities to market and sell developed products and services.

Discussion

The vocational education sector has been contributing significantly in reducing unemployment by providing occupation oriented training. Some students join VET aiming at securing an initial occupation, while others join to develop their skills further or shift from one occupation to another (Billett, 2011). Despite the increased number of VET graduates in Tanzania, the majority of them remained unemployed. Many VET graduates have good technical skills, as represented by the subject they studied but have inadequate employability skills, termed as 21st-Century skills (Suarta et al, 2017). To address this problem, the Cycle of Transformation project was implemented in four VET

centres: Nangwa VTC, Manyara VTC, Arusha VTC, and Mto wa Mbu FDC, as well as Ketumbeine secondary school, aiming at enhancing employability skills through ICT. A total of 20 teachers and 100 students were trained in ICT courses and the 21st-Century skills while practicing these through SBSREs.

Through participating in the project, as noted earlier, it was expected that students would gain the ICT skills in the courses they were taught and use the skills to develop products and services. Moreover, it was expected that students would gain the needed 21st-Century skills by being active members in the SBSREs. At the end of the project, an evaluation was conducted using a self-administered survey where a total of 80 students were involved in the four centres. Moreover, Focus Group Discussions (FGDs), non-participatory observation, and documentary review were adopted as qualitative data instruments.

The study found that students' perceived competence and skills levels on technology knowledge of multimedia was moderate (M = 3.63). One reason contributing to this was that students were not given enough time to use ICT facilities and software installed in their centres. Most of the project activities were conducted outside the normal timetable. The installed ICT facilities cannot improve users' performance if they are not used (Davis, Bagozzi & Warshaw, 1989). Interestingly, the competence and skills levels of CISCO were high amongst students. Out of 100 students who were enrolled in the CISCO course, 76 students graduated and obtained a CISCO certification. A possible explanation for this might be that the CISCO IT Essential module suited the nature of VET students who normally rely on hands-on labs in the majority of their courses.

In terms of the 21st-Century skills, it was found that students' self-reported confidence levels in all four 21st-Century skills domains were found to be high, with collaboration skills (M = 4.5) being the highest followed by communication skills (M = 4.26). The finding implies the level and intensity of interaction amongst students in the SBSRE activities enabled them to gain the much-needed collaboration skills. Students worked together from the planning of project activities, developing products and services, and marketing them to the nearest communities. They gained collaboration skills which will enable them to work effectively in the current environment where many of the activities are accomplished in teams and, in many cases, global teams scattered across various geographical areas (NEA, 2014). Similarly, in the SBSRE activities, students were required to present the developed products and services to the centre management as well as marketing them to the nearest communities. By doing so, students improved their communication skills in terms of their ability to write and present their products and services to an audience.

The study also found that students' self-reported confidence levels of leadership skills were high (M = 4.2). In the established SBSREs, each student was given a specific role in the group and interchanged for a certain period of time. The roles included being a chairperson, secretary, and treasurer. The idea was to ensure that each student had an opportunity to practise some leadership skills during the lifetime of the project. Therefore, students gained the needed leadership skills being able to review their own work, lead a team of individuals with different backgrounds as well as responding to feedback from the team.

The critical thinking skills (M = 3.9), and creativity and innovation (M = 4.06) were found to be the lowest students' self-reported confidence levels in the four 21st-Century skills domains. A possible

explanation of this finding is that these two 21st-Century skills domains require higher levels of concentration and deeper analytical abilities which, due to the nature of students who participated in the project, were difficult to attain. Many students who participated in the project were standard VII, Form II (e.g., Mto wa Mbu FDC) while at Ketumbeine there were secondary school pupils (Form I to Form IV). The variability of levels of students made it a little bit difficult for the project to design activities that could foster critical thinking skills, and creativity and innovation.

Notwithstanding these limitations, students gained the needed creativity and innovation skills which included the ability to plan for the products to be developed and refine them based on comments from school management and customers. These skills are important in the current workplace where industries rely on workers' creative capacity—the ability to innovate new product lines, acquire new customers, adopt new technology, and implement better business practises (Goldberg, 2006; Kay & Greenhill, 2011).

Another interesting finding that emerged from this study was that not only students, but also teachers, needed to acquire 21st-Century competencies — in order to support students learning in the new environment. The range of skills required of a VET graduate of the 21st-Century implies that teachers' roles need to change (Power, 1999). The project trained 20 teachers, two teachers from each centre, who were involved in training students and supporting project activities. An important lesson learnt from this project was that teachers need to be prepared for new pedagogical approaches that fit the 21st Century in order to be able to facilitate the development of 21st-Century competencies in their students. For this reason, there is a need to incorporate 21st-Century skills in teachers' preparation programmes and during their professional development programmes.

Conclusion

The main barriers to VET graduates in entering the world of work are the mismatch between the skills acquired in colleges and the skills needed in the workplace. The current labor market requires VET graduates with high technical skills as represented by the subject they studied in the colleges and the 21st-Century skills. In fact, countries with well-established VET systems have lower youth unemployment as VET is coupled with the acquisition of employability skills to address issues such as skills mismatch amongst graduates. This project has shown that with some planned activities within colleges, students can easily acquire the needed employability skills. However, this implies that teachers' roles need to change. The range of skills required by VET graduates of the 21st Century implies that teachers need also to be equipped with the necessary skills to be able to facilitate learning in the new knowledge domain. There is a need for equipping teachers with extensive knowledge and the skills needed for the 21st Century through professional development programmes.

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Authors:

Dr. Joel S. Mtebe is a Senior Lecturer in Computer Science at the Department of Computer Science and Engineering of the University of Dar es Salaam. He has supervised and examined a number of Masters, and PhD students, and currently coordinates an eLearning Research Group with more than 20 Master's students and 8 PhD students, conducting various aspects of computer science and eLearning research. He has published more than 25 scientific articles in international journals and has presented at several national and international conferences.. Email: jmtebe@gmail.com

Mussa M. Kissaka. Eng. Dr. M.M. Kissaka received a B.Sc. degree in Electrical Engineering from the University of Dar es Salaam (UDSM), Dar es Salaam, Tanzania in 1989, and a Ph.D. in Telecommunications Engineering from the University of Manchester, United Kingdom in 1994. He is a Senior Lecturer in the Department of Electronics and Telecommunications Engineering, College of Information and Communication Technologies (CoICT), University of Dar es Salaam. His is involved in teaching and supervising undergraduate and postgraduate students and carrying out research and consultancy activities in the field of ICT. His research interests include Wireless Communication and e-Learning. Dr. Kissaka is also an external examiner to local and

abroad international academic institutions. Currently he is a member of Wireless Communication Research Groups (WCRG) and e-Learning Research Group (eLRG) at the University of Dar es Salaam, College of Information and Communication Technologies (CoCT). Email: mkissaka@yahoo.com

Christina Raphael Raphael is a Lecturer in the Department of Educational Foundations, Management and Life Long Learning at the Dar es Salaam University College of Education (DUCE), a constituent college of the University of Dar es Salaam. She is also a coordinator of Chang'ombe pre-, primary and secondary demonstration school. Currently, Dr. Raphael is involved in various country-wide training and consultancy activities. She is also interested in Educational Policy making and analysis issues. Email: christin.raphael@gmail.com

Josephine Kalekwa Stephen is a Registered Telecom Engineer with more than 10 years of experience in the telecommunication industry in Tanzania. She received a B.Sc. degree in Telecommunications Engineering from the University of Dar es Salaam (UDSM), Dar es Salaam, Tanzania in 2008 and an M.Sc. degree in Telecommunications Engineering from the same University in 2015. Currently, she is an Assistant Lecturer in the Department of Electronics and Telecommunications Engineering, College of Information and Communication Technologies (CoICT), University of Dar es Salaam. She is also currently pursuing Ph.D. studies in the area of Digital Signal Processing. Her research interests are on Signal Processing, Digital Communication and Wireless Communication. She is a trainer and a coach at the University of Dar es Salaam ICT incubator (UDICTI) where she grooms youth to develop ICT products and solutions using Human Centreed Design approach. Email: josfn2010@gmail.com

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