TVET Trainers' Pedagogical Competence in Technical Training Institutions in Bungoma County, Kenya

Oroni Barasa, Echaune Manasi, Rispah Wepukhulu

Kibabii University, Bungoma, Kenya

ABSTRACT

Technical trainers' competencies are essential for success in any career like Technology Education program which centers on skills acquisition among Trainees for production. The objective of the study was to; establish the extent of TVET trainer's pedagogical competence in Bungoma County, Kenya. The study was guided by the Signaling Theory of Learning. The study employed descriptive survey design. The study targeted the 800 trainees enrolled for technical course and 400 trainers in Bungoma County. Simple random sampling technique was used to arrive at the participants. A sample of 200 trainees and 80 trainers participated in the study. The study used questionnaires and Focused Group Discussion guides and interview to collect data. Test- retest technique was employed to ascertain reliability of the questionnaires at alpha 0.70. Quantitative data was analyzed using descriptive namely; percentages, frequencies, means and standard deviation and inferential statistics namely; correlation and Pearson coefficient. Statistical Package for Social Scientists (SPSS Version 25.0) was used to analyze data. Qualitative data was recorded, transcribed and reported thematically. The findings were presented using figures and tables. The study found that TVET trainers could effectively communicate with trainees and to somewhat extent, trainers utilized assessment for the benefit of the trainees. However, trainers could to a little extent develop trainees critical thinking skills and trainers were to somewhat extent knowledgeable of current technologies in their areas of specialization. In addition, the study found that majority of the trainers could somewhat extent relate classroom content to workshop experiences. The study found that the strongest positive correlation existed between trainers' use of practical examples to explain concepts and acquisition of skills among trainees [$r = 0.788$, $p < 0.05$]. Other variables that were positively correlated with the outcome variable were; trainers motivated learners [$r = 0.758$, $p < 0.05$], trainers used variety of teaching approaches [$r = 0.783$, $p < 0.05$], trainers used relevant examples [$r = 0.748$, $p < 0.05$] and trainers allowed trainees to design teaching and learning activities [$r = 0.755$, $p < 0.05$]. The results for the multiple linear regression model with all the eleven trainers' pedagogical competence variables that were statistical correlated with the outcome variable produced an adjusted R-Square of 0.481, $F_{(11,177)} = 1.862$, $p < 0.05$. The study recommended that there was need to enhance the TVET trainers' pedagogical competence and there was need to increase government capitation to TVET to assist them acquire training material and equipment that support more practice based learning.

KEYWORDS: skills acquisition, trainers, pedagogy, work place

1. INTRODUCTION

Technical training was viewed as a strategy to bridge the gap that existed once the expatriates left when the African countries gained independence. Lauglo (2005) in his study on TVET in Sub- Saharan Africa noted that since 1970s, TVET attracted increased government funding to enhance production of highly skilled mid-level managers for the expected increase in demand for labour in the production Technical colleges for developing economy. Lauglo (2005) indicated that as a result of these developments African governments set up technical and vocational education institutions based on colonial education model. The main aim of African governments was to raise individuals' job prospects and productivity. Konayuma (2008) suggested that graduate education provided a fast track to the most powerful and

prestigious positions in the available occupations. As a result, enterprises were expected to become more competitive and to make a greater contribution to economic growth, on condition that those trained in these institutions actually matched the requirements of the labour market. A study carried out in Ghana on challenges that face technical training noted that the major issues that affect the quality of trainees included inadequate equipping of technical training centers (Dasmani, 2011). In Ghana various ways of overcoming challenges in technical training called for collaboration between the various agencies and government.

Nirmala, et. al. (2012) argued that TVET continued to attract a great deal of criticism due to the nature of the trainees from the TVET. Nirmala et. al. (2012) noted that TVET were unable to train skilled workers to meet the requirements of enterprises and were unaware of the market needs. They also held that the TVET were very costly and often their trainees joined the pool of unemployed trainees from the mainstream higher education an indication that the training provided did not match the jobs available.

A study conducted by Simiyu (2009) in Kenya noted that to start with the community had great regard to technical training centers competence to produce very competent trainees. However, the study noted that in the new century the quality and competence level of trainees of technical trainees has been falling owing to technology and pedagogical competence of trainers in the facilities. In many countries, including Ghana, public TVET institutions have not been able to adapt to the new structure of the labour market and the new skill requirements of Technical colleges in both the formal and informal sectors. Ayuba (2000) posited that some African countries have made TVET a post-basic education in order to provide the much needed technical personnel needed to drive growth and expansion at mid-level management.

Technical training institutions were intended to train mid-level managers and practical skilled personnel to support the Kenyan independent economy. However, as the level of funding from the government plummeted, the quality of training offered in technical institutions became poor and the public lost confidence in the TVET. The national and county government move under the new constitutional dispensation has put more emphasis on technical training. However, the TVET still attract some students while many keep away to join the universities. The managers of many Technical colleges have also complained on the pedagogical competencies of the trainees from the TVET. Despite these interventions to encourage Kenyans to join

technical institutions and inform the Kenyans on the importance of technical institutions, the same has not translated into increased enrollment in these institutions.

Gachie (2013) argues that there are approximately 800 technical institutions with majority of them being registered by the Directorate of Technical Accreditation and Quality Assurance with the rest holding provisional registration. No technical institute is allowed to operate in Kenya without being issued with a certificate from the Ministry of Basic and Higher Education. Currently there is a TVET Authority that is charged with licensing, registering, accrediting, monitoring and evaluating training institutions to protect parents and trainees from fraudsters seeking profits.

Tilak (2002) posits that it was commonly accepted that all forms of education would help people to improve themselves and to get better jobs, but many parents shunned TVET for university education which they deemed would offer their children the opportunity to acquire a good job. As a result, many countries found that the number of trainees from universities far exceeded the capacity of the labour market to provide appropriate employment. At the same time, these countries are unable to attract enough people to train for those positions of greater need, which might be, blue collar' jobs that might appear to involve manual labour, be dangerous, dirty and difficult.

In Uganda, noted that the supervisors and mid-level managers who are charged with induction of newly employed trainees noted that the trainees of technical institutions were not as competent compared to mainstream trainees. This was attributed to ill-equipped facilities used to train the trainees and poor trainers. Most technical institutions have also been converted into constituent colleges of mainstream universities as the communities favour university education compared to technical training.

1.1. Objective of the Study
The objective of the study was;
➢ To establish the extent of TVET trainer's pedagogical competence in Bungoma County, Kenya

1.2. Theoretical Framework
The study was guided by signaling theory which according to Kjelland (2014), explains that education only reflects inherent human signals to identify productive individuals. Signaling theory is useful for describing behavior when two parties such as individuals or organizations have access to different information (Connelly et al., 2015). Typically, one party the sender who are the colleges managers

(principals, heads of department and the trainers), must choose whether and how to communicate (or signal), the relevant information and the other party the receiver who are the technical education trainees must choose how to interpret the signal/information for effective skills acquisition.

Spence (1973), as the proponent of the signaling theory demonstrated that there could be too much information disclosure(signals) which may not generate the desired outcomes judged by the standard of social efficiency. The theory applied to this study since it describes the principals who are the college managers, the heads of department who are the middle managers and curriculum supervisors, the trainers who are the curriculum or skills implementers, their competence and skills acquisition.

1.3. TVET Trainers' pedagogical competency.
One of the efforts to develop the quality of learning is by improving trainers' professionalism. It is very important because trainers have a crucial factor to determine the quality of education system. Trainers should have the competencies affecting the trainees' achievements and performances. To meet the demand, trainers should also be able to answer the trainees' need in their learning. According to the Minister of National Education Regulation No.16 of 2007, there are four competencies of trainers' academic qualifications through trainer education; pedagogical, personal, professional, and social competencies. Those competencies are aimed to actualize the need in improving the quality of education in widely scope.

According to Ryegard, et.al (2010), pedagogical competence refers to educational and teaching qualifications. One of the qualifications, the trainers should have the ability to manage and run the process of teaching and learning in the classroom. The flow of interaction, trainers' performance, the ability to design a lesson plan, the appropriateness in choosing the method and media of learning also become the indicators of pedagogical competence (The Law No. 14 of 2005).

In practical domain, pedagogical competence needs to be built through practices in classroom setting that faces real problems and trainees with various characteristics. However, some trainers may not have fortunate condition in executing the jobs. The condition can be in several forms; the minimum source in designing a lesson plan, the lower competence of the trainees, the lack of facilities, and so on. By the time, it requires the willingness to take part in discussions and/or collaboration between the trainers to share ideas in fulfilling the goal to make

his teaching is effective. Lesson study could be arranged to answer the problems. It emphasizes on the improvement of teaching and learning process focusing on the trainers' pedagogical competence through others' point of view that may dig one's strength and potential (Lewis, 2002). It also focuses on trainees' learning and progress developed by their trainers considering their pedagogic techniques to improve a particular aspect of teaching and learning (The National Strategies, Secondary, 2009). In conducting lesson study, the trainers collaborate to investigate the teaching and learning process based on the collegial principle and mutual learning to build learning community (Hendayana, et.al, 2006). They collaboratively planning, teaching, observing, and analyzing the teaching and learning process in the classroom (Dudley, 2011). Hurd, and Musso (2005) also mention that the cycle of lesson study is focused on professional development of trainers' planning, observing, and revising. It is also in line with Hollingsworth and Oliver (2005) state that a collaborative process of lesson planning, implementation, evaluation, and refinement are engaged by small groups of trainers. They begin their lesson study by reading and discussing the different instructions (Tomlinson, 1999). Through discussion, the trainers collaboratively could share their experience and knowledge to clarify the goal of that learning so that they can design, and create multiple pathways for improving their teaching (Cerbin and Kopp, 2006). It also enables them to bring their ideas about effective teaching in order to evaluate the research lesson, the trainees, and their own understanding about teaching and Learning (Lewis, 2002). Lesson study offers a different way of thinking about teaching and learning. It is more oriented toward trainees learning, so that the trainers need to know how to stimulate and sustain the trainees' motivation to learn in order to teach them effectively.

According to Keller (2000), one of approaches to stimulate and sustain the trainees' motivation of learning is through attention, relevance, confidence, and satisfaction (ARCS) model of motivation. It provides guidance for analyzing the motivational characteristics of a group of learners and designing motivational strategies based on the analysis of attention, relevance, confidence, and satisfaction. It enables the trainers to effectively and efficiently stimulate trainees' motivation. Motivational design theory asserts that instructional material should be configured with the strategies increasing the attention, relevance, confidence and satisfaction of the trainees for an instructional design ensuring the continuity of learning motivation (Malik, 2014). However, the amount of trainees in a classroom might cause the

trainer to have less opportunity in grasping the trainees' responses. The disadvantage condition can be supported by trainer's colleague through collaborative discussion in informing the classroom situation. This support can be used by the trainer to adjust the strategy in the refinement of the next lesson plan. By knowing the trainees who are attentive, eager to join the classroom, and also those who are confidence, the trainer can maximize the classroom atmosphere to pursue the learning goals in an interesting way. Further, the responses of the trainees sometimes contribute to neither advantage nor disadvantage of the classroom delivery, and trainer should be aware to this factor to maintain the quality of his/her teaching.

1.4. Challenges faced on provision of technical education in Bungoma county

There are many challenges which include staffing, fees, physical access, information, ensuring access for women and technical curriculum.

On Staffing, Trainers are a critical component of the training requirements. The GOK (2005) emphasizes on the need for adequate staffing for the effective education at all levels of training. However, Sang, Muthaa and Mbugua (2012) concluded that shortage of TVET trainers emerged as one of the biggest challenges facing Technical Training Institutes (TTIs) in Kenya. The study further established that industrial exposure of the trainers through industrial attachments was minimal. This in itself is a weakness given that Technical Training Institute (TTI) graduates require extensive practical exposition through industrial attachments.

Another challenge in the colleges is the issue of Fees, just as with Primary and Secondary school education is a barrier to vocational training (Glennerster, Kremer, Mbiti & Takavarasha, 2011). Although the provision of subsidies in the vocational sector has reduced the financial burden, fees is still more than Kshs 50,000 a year accounting for over 15% of average per capita household expenditures from the 2005 Kenya Integrated House-hold Budget Survey (KIHBS) adjusted to 2009 prices (Kenya National Bureau of Statistics, 2005; Glennerster, Kremer, Mbiti & Takavarasha, 2011). This is reinforced by evidence from a recent randomized project in Western Kenya where close to 75% of trainees who were randomly awarded a voucher for vocational training (a scholarship) enrolled in a training program, while less than 5 percent of individuals who were not awarded a voucher, but were equally interested in pursuing vocational training, enrolled in a program (Glennerster, Kremer, Mbiti & Takavarasha, 2011). The high fee charged by

Technical and Vocational institutions is discouraging many people from enrolling. This explains the recent low enrolment rate experienced by most Technical and Vocational training institute across the country.

The Physical access, in Vocational and Technical colleges are not always available within the reach of potential trainees (Glennerster, Kremer, Mbiti & Takavarasha, 2011). checking across the country there are just over 1,600 registered Private and Public vocational centers, with public institutions accounting for 45% of the total number of institutions (Ministry of Education, 2010). The supply of vocational institutions has grown recently. Ministry of Education statistics (2010) show that, the number of public institutions grew by 7% from 2004 to 2007, while Private institutions grew by 16% over this period. This growth in part reflects the rapid growth in the demand for vocational training, where enrolments have risen by 11% over the same period (Ministry of Education statistics, 2010). Data from the Western Kenya vocational training project shows that on average approximately 23% of individuals in the study were within three kilometres of either a Public or Private vocational institution at baseline. On average there were two Public institutions within ten kilometres of the homes of the over two thousand individuals in the study (Hicks, Kremer, Mbiti & Miguel, 2011). This makes day schooling a real challenge to the Vocational and Technical education trainees.

On Information, it is possible that individuals do not have an accurate view of the true returns of vocational training in Kenya. They may also be mistaken about the distribution of earnings by vocation. This assertion is supported by data from the Western Kenya vocational project Hicks, Kremer, Mbiti and Miguel (2011) which indicates that on average both men and women appear to have had somewhat optimistic perceptions of the increase in earnings associated with vocational training: they believed that the average increase in earnings associated with training was 65% higher than the estimated amount. In addition, individuals were also mistaken about the highest earning trades. This miss-information gives individuals challenges when it comes to selecting vocational careers. Also, most graduates get frustrated after graduation as the market salary rates and job specifications do not meet their 21 expectations. In some instances, it has been reported that the frustrated graduates discourage their friends from pausing Technical and Vocational career terming it as useless (Wanyeki, 2012)

On ensuring Access for Women there is a challenge, Data from the 2008 Demographic and Health Survey

show that 26% of women aged 20–24 had given birth by the age of 18. Furthermore, approximately a third of women were married by the age of eighteen. Marriage and fertility can prevent girls from attending vocational training courses. Indeed, data from the Western Kenya vocational training project by Hicks, Kremer, Mbiti and Miguel (2011) showed that marriage, maternity and childcare issues were the most important barrier that prevented girls who had won scholarships from enrolling in a course. Girls who had won scholarships were also more likely to cite distance as a barrier to enrolling in a course, compared to boys. This is consistent with previous research that has argued that girls schooling is more sensitive to distance than boys schooling (Alderman & King, 1998)

The technical Curriculum that we have in Kenya may need to adopt specific pedagogical techniques to address problems common in their colleges such as large class sizes, varied education levels, family backgrounds, irregular student attendance and poorly-trained college trainers (Glennerster, Kremer, Mbiti & Takavarasha, 2011). Current teaching methods and curricula are failing very large numbers of students who attend college regularly but learn very little. The curricula are not adapted to local challenges and needs. Too often, it presumes competencies that many of the first-generation learners do not have. Further, inflexible TVET curriculum is unresponsive to changing needs of the labour market, leading to mismatch between skills learned in training institutions and skill demands from industry (UNESCO, 2010; Nyerere, 2009). Also, TVET institutions are managed by different government departments, making it difficult to harmonize training Programs and standards (UNESCO, 2010). This may lead to ineffective training co-ordination that may result to duplication of skilled personnel (Nyerere, 2009; UNESCO, 2010).

2. Methodology
The study adopted descriptive survey research design. According to Nwagu (2005) a descriptive survey research design is used to collect data from well-defined population or systematically selected segment of the population for the purpose of determining and identifying the attributes and characteristics of the population of the study. The design has been considered suitable because the study would determine the influence of technical trainers' competencies on skills acquisition among automotive trainees in Bungoma County, Kenya. The researcher also used the design to determine the prevailing conditions or needs of the technology education program and provide insight on which the desired

decisions will be based, in aiming to help improve the training.

The term population refers to the group of people or study subjects who are similar in one or more ways and which forms the subject of the study in a particular survey (Kerlinger, 2003). The target population in the current study comprised of 400 TVET trainers and 800 trainees.

This is shown in table 1 below.

Table 1: Target Population

S/no.	Strata	Target Population
1.	TVET trainers	400
2.	TVET trainees	800
4.	TVET college principals	85
Total		1285

Technical and vocational colleges were selected using stratified random sampling to ensure representation from each cadre of the strata. The strata were composed of technical and vocational colleges, colleges of science and technology and technical and vocational training centers (youth polytechnics). Principals and heads of department were selected using purposive sampling technique, so as to cater for the different categories of institution as stated above. Purposive sampling requires access to key informants in the field who can help in identifying information rich cases (suri, 2011). For colleges of science and technology and technical training colleges census sampling was done because Bungoma County had only one known college of science and technology and three technical training colleges (T.T.I) at the time of study. One principal and one heads of department were picked per colleges. The principal was picked because the colleges principal is the central factor determining skills acquisition in the colleges (Nasongo and Lydiah, 2009), and the head of department was in charge of the practical sessions and the department in the colleges. The trainers and the trainees in technical and vocational colleges were obtained using stratified sampling techniques to ensure equal representation of males and females.

3. Results and Discussion
3.1. Extent of TVET trainers' pedagogical competence in Bungoma County.
The study sought to establish the extent of the trainers' pedagogical competence. The trainees were asked to rate the extent to which trainers were competent in twenty aspects. These aspects were; trainers could communicate effectively (vartb1), trainers utilize assessment for the benefit of learners (vartb2), trainers provide a wide range of learning

activities (vartb3), trainers use variety of teaching styles to enhance learning (vartb4), trainers make learning more inclusive (vartb5), trainers allow trainees to design learning activities (vartb6), trainers vary teaching strategies to match trainees needs (vartb7), trainers can develop trainees critical thinking skills (vartb8), trainers can easily integrate Information Communication Technology (ICT) into teaching and learning processes (vartb9) and trainers can guide learners to understand technical concepts (vartb10).

The other variables were; trainers enhance collaboration among learners (vartb11), trainers use practical examples to explain technical concepts (vartb12), trainers often use varied teaching approaches (vartb13), trainers inform trainees of the competences required in the job markets (vartb14), trainers provide adequate information that allow trainees to gain better understanding of content (vartb15), trainers often motivate trainees (vartb16), trainers are readily accessible to trainees outside class (vartb17), trainers are aware of trainees level of understanding (vartb18), trainers allow trainees to ask questions (vartb19) and trainers use relevant examples during teaching (vartb20).

The responses of the trainees were collected and analyzed in form of percentages and frequencies. The findings are portrayed in Figure 1 and 2.
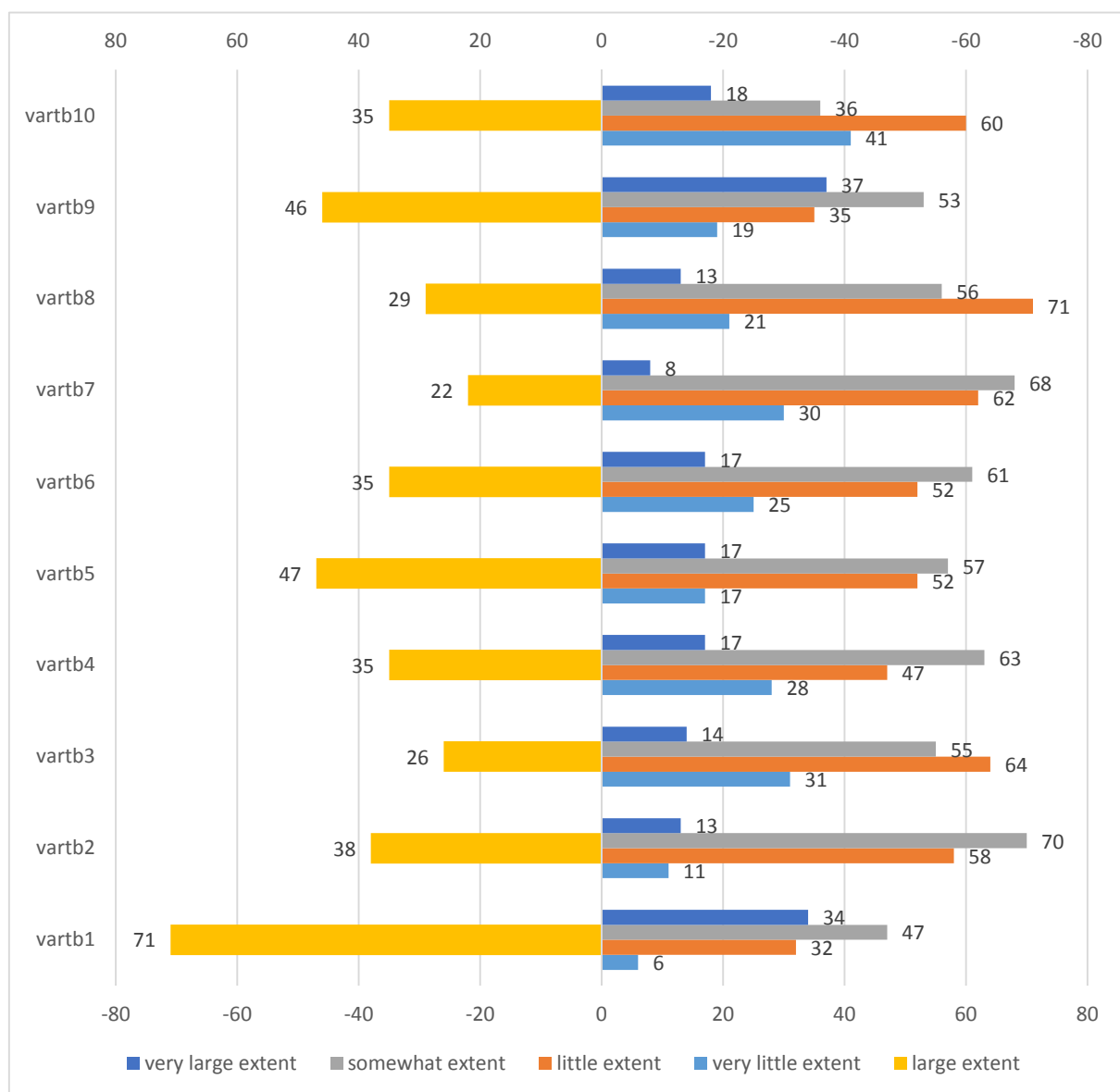

Figure 1 Trainees responses on extent of TVET trainers' pedagogical competence

The findings presented in Figure 1 show that 71 (37.4%) of the trainees reported that to a large extent, TVET trainers could effectively communicate with trainees (vartb1). Another 70 (36.8%) trainees said that somewhat extent, trainers utilized assessment for the benefit of the trainees (vartb2). 71(37.4%) of the trainees were of the opinion that trainers could to a little extent develop trainees critical thinking skills (vartb8).

In addition, the findings presented in Figure 1 reveal that 41(21.6%) of the trainees reported that TVET trainers were capable of guiding trainees to understand technical concepts (vartb10) to a very large extent. Otherwise

trainers could vary teaching strategies to match trainees needs (vartb7) somewhat extent as supported by 68 (35.8%) of the trainees.
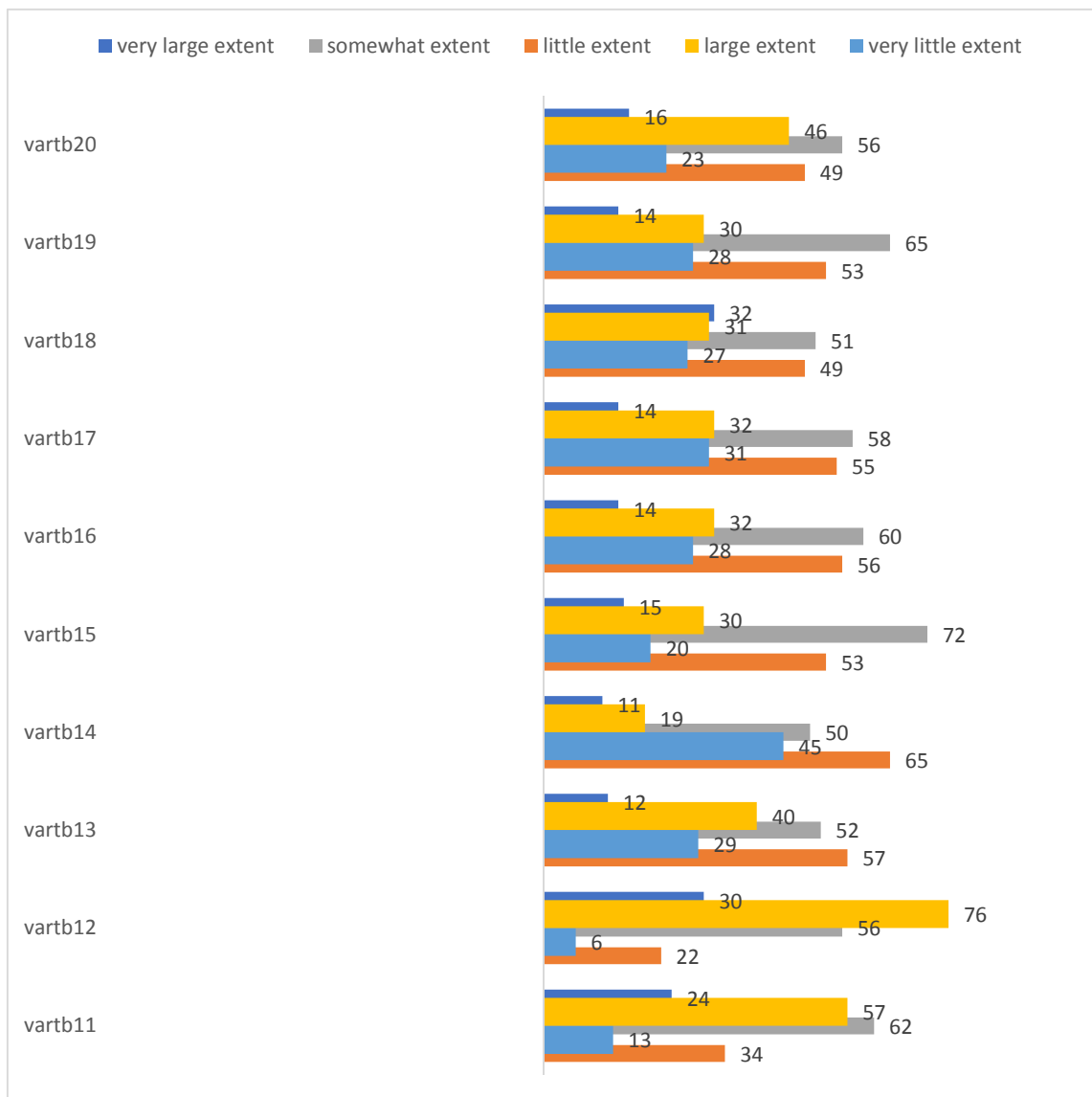

Figure 2 Trainees responses on extent of TVET trainers' pedagogical competence (cont.')

The findings shown in Figure 2 indicate that 76 (40%) of the trainees felt that trainers could to a large extent use practical examples to explain technical concepts (vartb12). 72(37.9%) of the trainees reported that TVET trainers somewhat extent provided adequate information to allow trainees gain better understanding of concepts (vartb15). As to whether trainers encouraged collaboration among trainees (vartb11), 57 (30%) and 62 (32.6% reported large extent and somewhat extent respectively.

4. Summary, Conclusions and Recommendations
4.1. The extent of TVET Trainer's pedagogical competence in Bungoma County, Kenya

The first objective sought to establish the extent of TVET trainers' pedagogical competence in Bungoma County. To address this objective, trainees were asked to rate the extent to which trainers were competent in twenty pedagogical aspects namely; trainers could communicate effectively (vartb1), trainers utilize assessment for the benefit of learners (vartb2), trainers provide a wide range of learning activities (vartb3), trainers use variety of teaching styles to enhance learning (vartb4), trainers make learning more inclusive (vartb5), trainers allow trainees to design learning activities (vartb6), trainers vary teaching strategies to match trainees needs (vartb7), trainers can develop trainees critical thinking skills (vartb8), trainers can easily integrate Information Communication Technology (ICT) into teaching and learning processes (vartb9) and trainers can guide learners to understand technical concepts (vartb10).

The other variables were; trainers enhance collaboration among learners (vartb11), trainers use practical examples to explain technical concepts (vartb12), trainers often use varied teaching approaches (vartb13), trainers inform trainees of the competences required in the job markets (vartb14), trainers provide adequate information that allow

trainees to gain better understanding of content (vartb15), trainers often motivate trainees (vartb16), trainers are readily accessible to trainees outside class (vartb17), trainers are aware of trainees level of understanding (vartb18), trainers allow trainees to ask questions (vartb19) and trainers use relevant examples during teaching (vartb20).

The study found that 71 (37.4%) of the trainees reported that to a large extent, TVET trainers could effectively communicate with trainees (vartb1). Another 70 (36.8%) trainees said that somewhat extent, trainers utilized assessment for the benefit of the trainees (vartb2). 71(37.4%) of the trainees were of the opinion that trainers could to a little extent develop trainees critical thinking skills (vartb8). 41(21.6%) of the trainees reported that TVET trainers were capable of guiding trainees to understand technical concepts (vartb10) to a very large extent. Otherwise trainers could vary teaching strategies to match trainees needs (vartb7) somewhat extent as supported by 68 (35.8%) of the trainees. In addition, 76 (40%) of the trainees felt that trainers could to a large extent use practical examples to explain technical concepts (vartb12). 72(37.9%) of the trainees reported that TVET trainers somewhat extent provided adequate information to allow trainees gain better understanding of concepts (vartb15). As to whether trainers encouraged collaboration among trainees (vartb11), 57 (30%) and 62 (32.6% reported large extent and somewhat extent respectively.

4.2. Conclusion of the study
Based on the findings of the study it was concluded that;
A. Technical and Vocational Training trainers were somewhat competent in knowledge of subject content.
B. Trainers could develop trainees critical thinking skills to a little extent
C. To a large extent, trainers used practical examples to explain technical concepts
D. There a statistically significant relationship between trainers' pedagogical competence and acquisition of skills among trainees

4.3. Recommendations
Based on the findings and conclusions of the study, it was recommended that;
➢ There was need to enhance the TVET trainers' pedagogical competence. This can be achieved through colleges based trainer support and mentorship and in-service programs. The mentorship programs should aim at assisting the trainers to gain competences that can help them develop the trainees critical thinking skills.

➢ There is need to increase government capitation to TVET to assist them acquire training material and equipment that that support more practice based learning.

➢ Training of TVET trainers should have more focus on pedagogical competences. Otherwise, the government may retrain in post trainers with a view to enhancing their pedagogical competences.

REFERENCES
[1] Hollingsworth, H. and Oliver, D. (2005). Lesson Study: a Professional Learning Model that actually Makes a Difference. In Hillary Hollingsworth and Delwyn Oliver MAV Annual Conference. Retrieved from https://www.mav.vic.edu.au/files/conferences/2005/hilaryhollingsworth.pdf.

[2] Hurd, Jacqueline, and Musso, Lori Licciardo. (2005). Lesson Study: Trainer-Led Professional Development in Literacy Instruction, Language Arts, 82, 5, 388-395, Retrieved from http://www.lessonstudygroup.net/lg/readings/LessonStudyTrainerledprofessionaldevelopmentinliteracyinstructionHurdJLiciardoMussoL/LessonStudyTrainerledprofessionaldevelopmentinliteracyinstructionHurdJLiciardoMussoL.pdf

[3] Keller, John. (2000). How to Integrate Learner Motivation Planning into Lesson Planning: The ARCS Model Approach. Paper Presented at VII Semanario. Santiago: Cuba. Retrieved from http://apps.fischlerschool.nova.edu/toolbox/instructionalproducts/ITDE_8005/weeklys/2000-Keller-ARCSLessonPlanning.pdf

[4] Keller, John. (2014). Instructional Design Models and Theories: Keller's ARCS Model of Motivation. Retrieved from https://www.learning-theories.com/kellers-arcs-model-ofmotivational-design.html

[5] Kopp, Bryan, and Cerbin, William. (2006). Lesson Study as a Model for Building Pedagogical Knowledge and Improving Teaching. International Journal of Teaching and Learning in Higher Education. 18, 3, 250-257, Retrieved from http://www.isetl.org/ijtlhe/pdf/IJTLHE110.pdf

[6] Ryegard, A, Apelgren, K, and Olsson, T. (2010). A Swedish Perspective on Pedagogical Competence. Retrieved from https://www.google.co.id/?gws_rd=cr,ssl&ei=9z4MWLqrBIz3vgSRyL3wDA#q=pedagogical+competence. The Law of the Republic Indonesia No. 14 (2005).