**Journal of Technology & Socio-Economic Development**
https://zenodo.org/deposit/new?c=ciris
ISSN Print: 2223-9227
ISSN Online: 2616-9614
DOI: 10.5281/zenodo.8117725


# Collaboration with Industry to provide Technical training: A case study of The Eldoret National Polytechnic, Uasin Gishu County

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Published online: 5th July, 2023

## Abstract

Technical and vocational education and training (TVET) institutions and industries need more collaboration to provide relevant practical skills for industrialization. COVID-19 pandemic disrupted learning globally in all institutions since the year 2019, leading to a desire have alternative means of providing practical technical training to learners, including online learning. The research objectives for this study were to: determine the capacity of industry to provide technical training to trainees; probe trainees' ability to use learning management systems that link TVET institutions to industry; and identify suitable assessment methods. This study investigated how The Eldoret National Polytechnic (TENP) and industry within Uasin Gishu County can collaborate to provide technical training. Several visits were made to selected companies participating in TVET training, in order to identify their best practices through one-to-one interviews, questionnaires, observation of activities and achievements, collection and interpretation of results. An attempt was also made to interpret enterprise-based TVET using theories and explanations applied successfully in other fields, as a means to achieve an original understanding using transferable and reliable methods of how TVET works, and why and where it is appropriate. The results indicated that linkages between TVET institutions and industry were weak. More consultations between the two parties as far as curriculum development, implementation, assessment and certification are concerned were needed.

**Key words:** Technical training, Collaboration, Industry, Institution

## Introduction

Technical institutions should have close linkages with the world of work to solicit support of industry in the enhancement of practical training through such activities as donations of equipment and tools, staff exchange programs and placement of students and staff on work experience attachment.

The population of Uasin Gishu County has generally been increasing, thus exerting pressure on both existing natural resources and social amenities. This therefore calls for investment in economic and social facilities such as health services, education, infrastructure, agriculture and livestock among others, to ensure food security and availability of employment opportunities.

Uasin Gishu county has 6 public tertiary institutions, 11 Vocational Training Centres (VTCs) and several private commercial colleges. The tertiary institutions play a key role as they provide knowledge and skills relevant to the development needs of the County. There is a need for more investments in tertiary education to equip youths with the necessary skills for gainful employment (CIDP, 2016-2022). The Eldoret National Polytechnic is one of the public TVET institutions that provide technical training in collaboration with industry within the county. According to Voogt et al. (2013), teachers must know various pedagogical approaches to take advantage of ICT and support the development of students' twenty-first century skills.

## Problem statement

COVID-19 pandemic caused interruptions in schools' programs leading to prolonged closures, necessitating trainers' use of alternative methods to offer instruction. It may not have been fully possible to take practical lessons if instruction was to be done online, hence the need to have structured on-the-job training (S-OJT) to facilitate practical training.

## Objectives of the study

1. To determine the capacity of industry to provide on-the job training.
2. To examine trainers' ability to use learning management systems effectively.
3. To suggest suitable assessment methods applicable in the industry environment.

## Theoretical Framework

This study was based on two models. The structured on-the job training (S-OJT) and the Technological Pedagogical Content Knowledge (TPACK) theoretical models.

**Structured on-the job training (S-OJT).**

Charles R. "Skipper" Allen (2018) drew upon his experiences as a vocational educator to devise a four-step method of delivering OJT. A seven-step training process based on Allen's four steps was devised. The seven steps were:

- Show him how to do it.
- Explain the key points.
- Let him watch you do it again.
- Let him do the simple parts of the job.
- Help him do the whole job.
- Let him do the whole job—but watch him.
- Put him on his own.

Recent surveys of industry training practices confirm that OJT remains the most frequently used training method for a wide range of jobs, including skilled, semiskilled, sales, supervisory, and management positions; types of organizations; and sizes of organizations. Futrell(19880); Churchill, Ford, & Walker, (1985) and Rothwell & Kazanas (1990) studied the use of structured on-the-job training in various types of organizations and found that most organizations, especially manufacturing organizations, were doing a substantial amount of their training through OJT, but it was unclear whether the OJT that they had observed had been planned and delivered in a systematic manner.

Jacobs (2003) defined S-OJT as the planned process of having an experienced employee train a novice employee on a unit of work at or near the actual work setting. The design process includes six phases: deciding whether to use S-OJT, conducting a task analysis, developing the trainers, preparing the training materials called modules, delivering the S-OJT program, and evaluating the S-OJT program.

In terms of the S-OJT system, Jacobs proposed a system-based framework that consists of four components: training outputs, training process, training inputs, and organizational context.

**TPACK theoretical model**

According to Mishra, Koehler and Henriksen (2010), the TPACK framework can be used for different pedagogical approaches as well as different content areas and technologies.

Specifically, three major knowledge components form the foundation of the TPACK framework as follows:

• *Content knowledge* (*CK)* refers to any subject-matter knowledge that a teacher is responsible for teaching.

• *Pedagogical knowledge* (*PK)* refers to teacher knowledge about a variety of instructional practices, strategies, and methods to promote students' learning.

• *Technology knowledge* (*TK* ) refers to teacher knowledge about traditional and new technologies that can be integrated into the curriculum.

Four components in the TPACK framework address how these three bodies of knowledge interact, constrain, and afford each other as follows:

• *Technological Content Knowledge* (*TCK)* refers to knowledge of the reciprocal relationship between technology and content. Disciplinary knowledge is often defined and constrained by technologies and their representational and functional capabilities.

• *Pedagogical Content Knowledge* ( *PCK* ) is similar to Shulman's (1986) notion of "an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction".

• *Technological Pedagogical Knowledge* (*TCK)* refers to an understanding that technology can constrain and afford specific pedagogical practices.

• *Technological Pedagogical Content Knowledge* (TPACK*)* refers to knowledge about the complex relations among technology, pedagogy, and content that enable teachers to develop appropriate and context-specific teaching strategies.

**Capacity of Companies to provide Training.**

When the issue of training capability is being addressed, there are two very integrated but entirely different issues at stake. The first involves the capability of the company or the external provider to develop skills and knowledge; the second involves the capability of the trainee to be developed.

There will inevitably be differences concerning the criteria of training value according as the emphasis is on production expansion, human resource consolidation, profit increase, dynamic increasing returns and adaptability sourced from learning by doing and the appearance of complementary activities and norms (Teubner, 2017), and the wider implications related to locality, community, sector, general industry and society at the national level.

The principles underpinning a firm's training behaviour (partly adapted from Hobday, Rush and Bessant (2002)) are:

(i) Awareness of the need for specific skills and for the corresponding capacity-building structure and activities.

(ii) Ability to search for, select, absorb, and implement an appropriate training response.

(iii) Ability to create, support or contract competent core training capabilities.

(iv) Development of a skills development strategy that will support the firm's operations.

(v) Ability to learn from experience and operate flexibly through training-change capabilities.

(vi) Ability to identify, form and exploit linkages with other learning organizations, in a way which directly benefits the firm and may indirectly help the same collaborators and others.

TPACK theoretical model

**Learning Management Systems**

The technologies that facilitate the provision of courses over long distances are broadly termed "learning management systems" or "LMSs."

Course management systems (CMS) on the other hand, according to Watson and Watson (2007), are: used primarily for online or blended learning, supporting the placement of course materials online, associating students with courses, tracking student performance, storing student submissions and mediating communication between the students as well as their instructor.

To further complicate matters, some vendors and academics prefer to use the acronym LCMS which stands for "learning content management system" when referring to content management systems. The difference between a LCMS and a LMS is that the latter is broader in scope and includes the ability to track learner progress through an online course. In this entry, the term LMS will be the only acronym used to refer to online learning platforms.

The earliest manifestations of electronic LMSs were little more than a platform for the dissemination of learning materials online. These systems could broadly be categorized as belonging to one of two camps: proprietary and open source. One of the earliest proprietary systems was WebCT, developed at the University of British Columbia in 1995. WebCT was later acquired by Blackboard Corporation who phased out the WebCT name in favor of the Blackboard brand.

Open-source systems by contrast, were developed collaboratively by software specialists with a view to making the source code readily available to organizations and individuals free of charge. They were initially popular with universities and colleges who could readily download the source code, adapt it to their own circumstances, and build their own tailored LMS solutions. A prominent example of an open-source system in operation globally today is

Moodle. The acronym Moodle stands for "Modular Object Oriented Dynamic Learning Environment."

A robust, high-quality LMS is a vital tool to the success of any online course and can make or break an institution's reputation in the highly competitive education market. LMSs not only need to provide content to learners, but they must also facilitate timely and accurate communication between learners, course facilitators, and other institutional stakeholders. Yildirim et al. (2004) emphasize that in addition: an LMS should be dynamic; that is, it should be active, flexible, customizable and adaptable.

These functions include the ability to disseminate knowledge, assessment of learner competency, the recording of learner attainment, support for online social communities, communication tools, and system security.

The alternative approach is for an organization to develop its own LMS based on readily available open-source code.

**Desirable Assessment Methods**

Desirable assessment methods and tools must be identified and used at institutional and industry levels. The purpose of subjecting trainees to formative and summative assessments is to report whether they are competent enough to earn certification.

Various methods of assessment have been suggested by curriculum developers such as TVET-CDACC, aimed at giving feedback on the attainment of employability skills. Such methods may include but are not limited to oral questioning, observation, written tests, workshop/lab assignments, practical assessments, case study, Third-party reports, Portfolio, Interview, Role Play, Demonstration, Projects, and Simulations, etc.

Additionally, case studies, written tests, oral questioning are considered as theory assessments while Role plays, simulation, Practical tasks, Demonstration, Projects, Presentation are considered as Practical assessments. There must be sufficient assessment items covering each of the six levels of the Blooms Taxonomy i.e. knowledge, comprehension/understanding, application, analysis, evaluation and creation.

A good assessment tool constitutes validity, reliability, fairness, flexibility and cost effectiveness.

Suitable assessment methods for industry.

Training events that can facilitate the development of suitable assessment methods were reviewed as shown below.

Comparison of Three Sets of Training Events: Gagné, TWI, Jacobs.

Gagné's events of instruction (1999, 2005)

1. Gaining attention
2. Informing the learner of the objective
3. Stimulating recall of prerequisites
4. Presenting the stimulus material
5. Providing learning guidance
6. Eliciting performance
7. Providing feedback about performance correctness
8. Assessing the performance
9. Enhancing retention and transfer

Training steps from the TWI service (1945)

1. Prepare the worker
2. Present the operation
3. Try out the performance
4. Follow up

Jacobs' S-OJT steps (2003)

1. Prepare the trainee
2. Present the training
3. Require a response
4. Provide feedback
5. Evaluate performance

Note. TWI = Training within Industry; S-OJT = structured on-the-job training.

**Methodology**

This study was undertaken using the following methods:

1. A review was carried out on the most pertinent literature on technical and vocational education and training (TVET), which focused on attachment of trainees to relevant industries for skills acquisition.

2. Several visits were made to institutes and companies participating in TVET, in order to identify their best practices through one-to-one interviews, questionnaires, observation of activities and achievements, data collection and interpretation of results. An attempt was also made to interpret enterprise-based TVET using theories and explanations applied successfully in other fields, as a means to achieve an original understanding using transferable and reliable methods of how TVET works, and why or where it was appropriate.

3. Interview schedules were prepared with the aim of seeking answers to whether the companies had capacity to accommodate and train students, financial implications and any technical support needed.

Data was obtained by interviewing responsible persons in firms where students pursuing Diploma in Building Technology and Civil Engineering were placed on industrial attachment within Eldoret town and its environs. A total of twenty firms were interrogated and their responses recorded for further analysis.

**Sampling**

All the firms in Uasin Gishu county which placed trainees from The Eldoret National Polytechnic taking Diploma in Building Technology and Diploma in Civil Engineering were selected for the study. A total of eight firms for Civil Engineering namely AKUPAK, BOSCO ENG. LTD, BOWEN., KENHA, KOSLAM, KURA, PUBLIC WORKS, DITMAN and Seven for Building Technology, namely CHEMICHEMI, GOBLO, HARMO, KISHAN, VIRO, NOAH'S GROUP and ASTRA participated in the study. Trainers who were assigned supervision and assessment duties in those firms were also selected to fill a trainers' questionnaire. The same trainers were also instructed on how to administer the interview for companies.

**The Research Instrument**

An interview schedule was prepared and administered by trainers assigned supervision duties to assess trainees. Responsible respondents from the firms were interviewed and their responses were recorded for further analysis and comparison. The working environment was also assessed through observation. Interview was preferred because it presented first-hand information which was more reliable. A separate interview was conducted to course trainers who were five(fifteen are too many to interview) to find out if institutions were well equipped with pedagogical, technical and content knowledge to run a structured-on-the job training using a reliable learning management system (LMS).

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. Key informant interviews are qualitative in-depth interviews with people who know what is going on in the organization.

**Data Analysis Techniques**

The data obtained was entered into spreadsheets and cleaned by pairing similar responses and recording their frequencies. Descriptive statistics which mainly included frequencies and percentages were calculated and tabulated to reveal the perception levels of respondents.

**Results and Discussion**

All respondents interviewed were Engineers in their respective fields of duty and held either an advanced diploma or degree in Building construction or Civil Engineering. Majority of them were doing supervision work and generally managing construction works on roads or Building sites on behalf of the company.

Training capacity of construction companies.

Five out eight companies in the Civil Engineering category were willing to employ additional workers and train them. All the companies in the Building Technology category were willing to employ and train new workers. Most firms were willing to absorb three to four trainees. They all cited inadequacy of skilled workers on construction sites and expressed the desire to train more skilled workers in respect of technological advancements in the industry. All the respondents said that they inducted new workers by rotating them through all sections in the establishment in order to identify where their abilities lied. They also introduced them to existing staff and specified the tasks that the company carried out.

The companies were sufficiently equipped to handle construction work. It was however observed that only 60 % of the companies provided personal protective equipment to their workers. Concerning the experience of workers, 7 % of workers were experienced, 20 % were specialists while the rest were either novices or experts. Only five of the companies interviewed were willing to disclose the qualifications of their workers, three of which were public firms and two were private firms. Those in top management possessed degrees while the lower cadre possessed diplomas or certificates. More than 70 % of workers were either semi-skilled or casual.

Most respondents cited weak linkages between industry and TVET institutions, probably from busy schedules faced by both parties. The only time they were involved was when they were invited to meetings to inform Government policy and during industrial attachment training. On the TVET/CBET curriculum, most firms confirmed that the trainees were not very competent in practical skills and had to gain experience when employed. The productivity of workers was average according to 90 per cent of the companies' responses. Productivity of workers only improved after about three years of workers being in employment.

Increased equitable access to private sector-led and competency-based skills development opportunities linked to Building Technology/ Civil Engineering.

Five of the companies confirmed that they conducted labour market surveys (LMS) to identify the number of trades required in their respective sectors, although not quite often. All the companies confirmed that they participated in training their own staff as well as trainees on attachment. The organizations did not have a structured training, assessment and certification. They relied on Government accredited TVET institutions. Majority of the companies stated that they had financial capacity to train their workers, however additional support was required to obtain more equipment. When asked whether training of employees was beneficial, their response confirmed that benefits were many. They cited increased productivity, workers' adaptation to organizational objectives and values, efficiency, responsiveness and skills development.

Strengthening capacities of training providers, TVET trainers to deliver market-oriented skills training to meet the immediate and emerging labour market demands through LMS and virtual learning in Building Technology and Civil Engineering fields.

Some employees had undergone CBET training in their trades and understood the process of assessment while others attended the traditional training program. The use of learning management systems had not been introduced in any of the companies visited. However, most of them confirmed that workers knew how to use smart phones, laptops, desktops, tablets and could access the internet quite easily. The companies rarely conducted training needs assessments. Only three companies had conducted training needs assessments for their employees. Some capacity building was necessary if they were to adopt a learning management system.

Skills delivery, assessment and certification standardized through further improvement and expansion of scope and coverage of the National Qualification Framework (KNQF).

Some of the top management workers confirmed having been involved in meetings concerning the National Qualification Framework. Only five out of the fourteen companies visited had sent their workers to workshops where the National Qualification Framework was discussed. None of the organizations had accessed or possessed the following documents:

a) KNQF Implementation manual
b) Accreditation manuals
c) Assessment and certification guidelines

All the companies visited had a considerable representation of skilled workers who were capable of imparting technical skills to fresh trainees. There were also a good number of

Engineers in their respective fields. Generally all the companies visited had capacity to train with a few challenges which could easily be improved.

Trainers' Responses

Twelve (12) male and two (2) female respondents returned self-administered questionnaires. Two trainers were aged between 26-29 years; four were between 30-33, two were between 34-37, two between 42-45, one between 46-45 and over 50 respectively. Two of the trainers had master's degrees and twelve had undergraduate degree qualifications. The trainers held the following employment grades: Trainer- four (4), Senior Trainer- five (5), Chief Trainer- four (4) and Principal Trainer- one (1). Ten trainers had completed an Educational computing course while four had not. All trainers had participated in the supervision of trainees on industrial attachment.

**Conclusion and Recommendations**

Technical institutions should have close linkages with industry to solicit support in the enhancement of practical training through such activities as donations of equipment and tools, staff exchange programs and placement of students and staff on work experience attachment. The existing collaboration between technical institutions and industries in Kenya remains weak. More collaboration is required in terms of consultations between the two parties as far as curriculum development, implementation, assessment and certification is concerned. The industry had capacity to provide technical training and they only needed more engagements and support. Technical trainers were willing and capable of using technology, including learning management systems to train. Ultimately, the workforce that is the result of Dual mode training must improve productivity, promote innovation, adapt to emerging technological advancement and develop new skills to solve future problems such as COVID-19. It is therefore imperative that the following recommendations are given closer consideration:

1. Allocate more hours of practical training in relevant industry to courses of study after trainees receive some theoretical and basic practical assignments from technical institutions.
2. Regularize capacity building concerning emerging technologies for both trainers and industry staff to support skills acquisition for fresh trainees to meet labour demands.
3. Enhance practical training through such activities as donations of equipment and tools by government and other stakeholders, staff exchange programs and placement of students and staff on work experience attachment.

4. Government policies and guidelines should be shared between the two parties to cultivate mutual consultations as far as training is concerned.
5. The Government should subsidize the cost of acquiring technological tools such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, and internet access.
6. Encourage the use of online teaching and community collaboration using suitable learning management systems (LMS) recommendations are too many

**Future Research.**

1. Similar research should be encouraged in other regions within Kenya.
2. Related objectives should be investigated to elicit more understanding of the topic.

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