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Message From the Editor

Thank you for taking the time to read the first and only issue of the 29th volume of the International Journal for Vocational Education and Training. As I complete my second issue, I want to thank everyone who has helped to make this publication a success, including the authors, the editorial board and the IVETA officers.

I also extend my appreciation to Dr. Luke Steinke, the previous editor, who agreed to continue managing the layout and design of this online journal and Ms. Olga Harrison, IVETA's International Business Development Director, who tirelessly promoted this journal throughout the entire year. It indeed takes an entire team of dedicated individuals to make this journal available to IVETA members and other individuals interested in the latest research and analysis in Technical Vocation Education and Training (TVET).

A preliminary review of the articles published in this journal over the past decade indicates that the articles fall into five major areas: evaluation of post-secondary TVET curriculum and programs, analysis of workforce development programs, partnerships to promote TVET and workforce development, career guidance and development, and initial preparation and continued development of TVET educators and leaders.

This issue of the journal is no exception. The articles include a comparison of how prior learning is recognized, validated and documented in numerous countries around the world. There is also an article of how students and instructors worked together to build a facility to house their TVET program in building construction in Nigeria and an article about the importance of including mechanical engineering in TVET programs. Finally, there is an article describing the impact of soft skills training on students who are about to graduate from TVET colleges in Ethiopia.

For anyone interested in serving as a reviewer for upcoming issues of the journal or looking to publish quality TVET research and analysis, please contact me at juliefurstbowe@gmail.com. I am happy to discuss an idea, review a first draft or provide other assistance as you develop your article. Finally, for anyone who is interested in serving as a reviewer or an author for the new Spanish version of this journal, please contact Dr. Tulio Barrios Bulling at journales@iveta.com

Julie Furst-Bowe, Ed.D.

Editor—International Journal for Vocational Education and Training

EMPLOYABILITY OF TVET GRADUATES IN ADDIS ABABA CITY ADMINISTRATION OF ETHIOPIA

Yekunoamlak Alemu

Befekadu Zeleke

&

Dame Abera

ABSTRACT

This study aims at examining whether soft skills training provided to graduates of four TVET institutions works well to improve their employability. This study involved a related research review, quantitative methods, and reflections from practice on skills approaches. The findings indicate that the majority (70.4%) of TVET graduate respondents were employed while (29.6%) reported that they are currently unemployed. The data from respondents who reported they were employed indicated that the highest proportion of TVET graduates (89%) were employed in private enterprise. When graduates' fields of study were examined, most of them who are currently employed graduated from construction and automotive programs. The data also unveiled statistically significant variations in employment status of TVET graduates across the gender of the respondents and type of TVET colleges. Hence, it can be concluded that soft skills helped TVET college graduates to improve their social skills and obtain employment. Finally, policy options were forwarded to incorporate soft skills in TVET curriculum.

Keywords: *TVET, Graduates Employability, Soft Skills*

Introduction and General Background

The focus of this study is Ethiopia, a country located in the horn of Africa. Ethiopians are friendly people known for their hospitality and tradition of preserving their independence. Ethiopia is considered, due to its geographic location, in the midst of fragile environment. The capital, Addis Ababa, is the seat of the African Union and home to many international organizations. The city is also home to many diverse ethnic groups.

Agriculture is the mainstay of the country and employs 70 percent of the population. There are about 127 million inhabitants in Ethiopia. Nearly half are female and about 80 percent dwell in rural areas. It is also interesting to note that although nearly half of the total population constitutes the active labor force, urban unemployment is still a glaring problem in the country with nearly 20 percent unemployment. Ethiopia is currently investing in education, health, and infrastructure to reduce unemployment and poverty.

There has been significant educational expansion in Ethiopia at all levels. Nonetheless, the education system needs to travel a long distance to improve its quality. Inequality of education is observed between urban and rural areas between and males and females. Training institutes focus on knowledge acquisition without consideration for value and skill formation. Graduates also lack soft skills or employability skills. By way of addressing these challenges, the study focuses on one of the government's policy priorities, employability of technical and vocational education and training graduates in Addis Ababa.

Concepts of Employability

Skill sector assessments reveal that employers believe TVET graduates have unclear goals with very little understanding of their career paths. They are also viewed as having low self-confidence, poor motivation, low levels of academic qualifications, and very inadequate basic skills. TVET graduates are also seen as lacking in drive, ethics and enthusiasm for the work. They are believed to have undeveloped leadership potential, inadequate preparation for work and unrealistic salary and benefits expectations (LI-WAY Program Summary, 2019).

Based on the literature (e.g., Abas-Mastura, Imam & Osman, 2013; Gill, 2018; Warwick & Howard, 2015), the term employability skills can be interchangeably used with other terms such as transferable skills, generic skills, soft skills, behavioral skills, enterprise skills, key competencies, core skills, common skills, work skills, essential skills, and people skills. Unlike occupational or technical skills, employability skills are not entirely job-specific; instead, they include more generic attributes that cut horizontally across all types of jobs (service, industry, etc.) or vertically across all job levels including entry-level worker to the senior position (Robinson, 2000).

According to UNESCO (1997: 11), "curricula should be designed to develop learner work awareness or a self-questioning attitude that asks what else can be done with these skills? Thus, a person losing a job should not feel they are unemployable; instead, that person should search for other outlets for their competencies." Yorke (2006) also described employability skills as a

set of achievements – skills, understanding and personal attributes – that make graduates successful in their occupations.

Employment and employability are not the same thing. Being employed means having a job, being employable means having the qualities needed to maintain employment and progress through the workplace (Lees, 2002, p 3). According to Trought (2011), a degree allows graduates to enter the sector, and employability skills will differentiate them from the crowd. In summary, employability skills are those skills necessary for getting, keeping and doing well on a job.

Objectives of the study

The main objective of this study is to investigate the status of TVET graduate employability in Addis Ababa, Ethiopia, and thereby contribute to improve mobility of young people.

Based on this central objective, this employability study is targeted to:

- explore the extent to which training in employability skills facilitates employment opportunities of TVET graduates.
- promote entrepreneurial culture and self-reliance within TVET graduates.

Research Design and Methods

To achieve the objectives, a descriptive research design with a quantitative approach was used in this study. Moreover, a research review and reflections from practice, coupled with examples on skills approaches, were employed.

Sampling Techniques

Due to poor documentation in the TVET colleges, it was difficult to obtain clear, adequate, and complete data regarding past graduates. It was also difficult to arrange the soft skills training programs for those TVET graduates as they were busy searching for jobs.

To this end, the research team recommended a behavioral study to be carried out on TVET students who were in their final year (prior to graduation) to minimize the abovementioned problems. Employability skill training was also offered for graduates to see how far the training enhanced their job possibilities.

Randomization was considered in creating equivalent and representative groups that are essentially the same on all relevant variables. At the same time, depending on the actual number of graduating TVET students, different proportions of samples were taken from the various fields of study and from the four TVET colleges. Generally, the data summarized in the following table makes clear the entire procedures employed for selecting relevant and representative samples for the study.

Table 1*:* Summary of the sample selection procedures from the graduating TVET trainees

No	*TVET College*	*Population Size*	*Proportions taken*	*Samples selected*	*Remark*
1	EMD TVET College	218	31.3%	108	Variation in the proportion of sample taken from the three TVET Colleges is attributed to the desire to have an adequate number of trainees.
2	Misirak TVET College	176	28.4%	98	
3	Selam NGO TVET College	162	27.2%	94	Based on the relative population size of the respective TVET Colleges offering various levels of training (I, II, III, IV & V), all the fields of study were selected as samples in this study from Selam TVET
4	Kirkos Manufacturing TVET College	95	13%	45	As 100 subjects were required, the whole population of the four levels of the College were taken as samples of this study through availability sampling technique

Data Collection Instruments and Procedures

Prospective graduating TVET students (those in the final year) were the main subjects of the study. Both primary and secondary sources of data were used in the study. Firsthand information was obtained through questionnaires and observation. Secondary data were gathered from documents and reports.

It is expected that soft skills training will enhance employment prospects by giving prospective TVET graduates better skills and confidence in job searches. The soft skills training lasted for 10 hours (including lectures, reading and individual assignments). The soft skills training was conducted at four TVET colleges for 40 to 50 sample participants. Training took place between April 1 and April 30, 2019. The training was provided by three University professionals qualified in soft skills training.

Data Analysis

Prior to actual data collection, the team entered the data properly and screened, edited, and coded the entered data. All quantitative data were entered into computer and descriptive and inferential statistics were generated using SPSS. Before undertaking the main field study, a pilot study took place to check the reliability and validity of data gathering tools.

Results and Discussions

The major purpose of this study was to examine to what extent training in soft skills will facilitate opportunities for employment after graduation from TVET colleges in Addis Ababa. To achieve this purpose, four TVET colleges were selected from three groups: private, NGO and government. This section deals with the influence of the soft skills training on the graduates of the four TVET colleges.

Demographic Characteristics

In terms of gender, among the respondents, 181 (67.8%) are males while 86 (32.2%) are females. In terms of age, 209 (81.6%) are within the age category of 17 to 25 years while the next highest proportion of respondents are within the age category of 26 to 35 (15.6%). Regarding current employment status, 97 (38.8%), of the respondents reported that they are employed for wages, 47 (18.8%) reported they are self-employed, and 74 (29.6%) reported they are not currently employed. Generally, the above demographic data demonstrates that the study participants are fairly represented and that the data captured from such respondents can be considered as valid and reliable.

Table 2. Type of enterprise/organization the graduates are employed

Question	***Organization***	***Frequency***	***%***
In which organization/ enterprise are you currently employed?	Private	88	89
	Public	1	1
	Local Government	5	5
	NGO/CBO	5	5
	Total	***99***	***100***

As the data summarized in Table 2 above indicated, for the question "*in which organization/ enterprise you are currently employed*," a large proportion, 88 (89%) said they are employed in the private organization/enterprise while the smallest proportion, one (1%) reported they are employed in a public organization. This finding implies that the TVET graduates have more opportunities to be employed in private organizations compared to public organizations. In fact, why the graduates are more attracted to private companies, compared to public organizations, needs further investigation.

Table 3. Responses on information about how jobs were obtained

Questions	***Responses***	***Frequency***	***%***
1. How did you get the information about the job?	Newspaper	4	4.4
	Internet	2	2.2
	Family or friends	48	53.3
	TV/Radio	1	1.1
	Job centers	35	39
	Total	***90***	***100***
2. Apart from qualifications, which one of the following factors helped you most to become aware of and obtain your present job?	Staff contacts/ recommendations	28	*22.4*
	Job advertisement	5	4
	Self-contact	46	*36.8*
	Family or friends	45	*36*
	Gender	1	0.8
	Total	***125***	***100***

As the data summarized in Table 3 indicated, for the question "*how did you get the information about the job*," most respondents, 48 (53.3%), said they received the information about their job from family and friends. The next most frequent response, 35 (39%), was from job centers while only 1 respondent received information about the job from TV/radio.

According to Table 3, for the question "*apart from qualifications which one of the following factors helped you most to become aware of and get your present job,"* 46 (36.8%) and 45 (36%) respectively reported that personal contacts and family or friends helped them most to become aware of and obtain their present jobs, while 28 (22.4%) of the respondents said staff contacts/recommendations helped them most to become aware of and obtain their present job.

Consistent to this finding, ILO (1990) confirmed that job market information obtained from individual job seekers indicated that TVET trainers and planners, employment services, and career guidance and orientation services help graduates obtain information about jobs.

Table 4. Data on factors that contribute to graduates' opportunity to obtain the current job

Question	***Responses***	***Frequency***	***%***
Which of the following social factors have been influential in enhancing your opportunities for obtaining your present job?	Religion	12	10.1
	Personal relationships/family/	102	86.4
	Political	3	2.5
	Total	***118***	***100***

As depicted in Table 4, for the question "*which of the following social factors have been influential in enhancing your opportunities for getting your present job,*" the majority of the respondents, 102 (86.4%), reported that personal relationship/family/relatives were the most influential social factor that enhanced job opportunities.

Table 5. Satisfaction level and relation of current employment to TVET studies/profession

Question	***Responses***	***Frequency***	***Percent***
1. Is your employment related to your profession?	Yes	117	*70*
	No	50	30
	Total	***167***	***100***
2. What is the level of satisfaction with your earnings/ income in terms of your present professional qualifications and experience?	Highly satisfactory	27	16.2
	Satisfactory	94	56.2
	Less satisfactory	31	18.7
	Not satisfactory	15	8.9
	Total	***167***	***100***

As indicated in Table 5, for the question *"is the current employment related to your profession,"* many of the respondents, 117 (70%), reported that their current employment is related to their TVET studies/profession, while 50 (30%) of the respondents said their current employment is not related to their profession. Similarly, a study in Malawi revealed that the majority of the graduates were employed in professions that matched their training (Fanny, 2016).

For the question *"what is the level of your satisfaction with your earnings/income in terms of your present professional qualifications and experience,"* 94 (56.2%) respondents reported that they are satisfied with their current earnings/income considering their present professional qualifications and experience while 27 (16.2%) said they are highly satisfied.

Table-6. Perceived contributions of soft skills training for obtaining job (*N = 78*)

Question	***Soft Skills***	***Responses***							
To what extent did each of the listed soft skills help you in obtaining a job?		***To a little extent***		***To some extent***		***To a great extent***		***To a very great extent***	
		F	***%***	***F***	***%***	***F***	***%***	***F***	***%***
	Positive Self-Concept skills	1	1.2	24	30.8	45	57.7	8	10.3
	Self-Control skills	1	1.2	16	20.5	51	65.3	10	13
	Social Skills	1	1.2	25	32.6	39	50.6	12	15.6
	Communicatio n Skills	1	1.2	28	35.9	38	48.8	18	23.1
	Problem Solving Skills	1	1.2	40	51.3	29	37.2	8	10.3
	Job Search Skills	2	2.6	25	32	37	47.4	14	18

For the question "*to what extent did each of the listed soft skills helped you in obtaining a job,"* 45 (57.7%) of the respondents said that positive self-concept skills, 51 (65.3%) said that self-control skills, 39 (50.6%) said that social skills, 38 (48.8%) said that communication skills, 29 (37.2%) said that problem solving skills and 37 (47.4%) said that job search skills helped them in obtaining their current job (as multiple responses were permitted). In a similar study, a regression analysis on factors affecting employability skills asserted that self-concept was the main predictor ($\beta = 0.39$) followed by participation in career development activities ($\beta = 0.29$) (Dania, Bakar & Mohamed, 2014).

Table-7. Perceived contributions of soft skills training in dealing with others within the job (*N=78*)

Question	***Behavioral Performance***	***Responses***									
		Not at all		***To a little extent***		***To some extent***		***To a great extent***		***To a very great extent***	
To what extent did soft skills training help you deal with others and self as well as secure your job?		***F***	***%***	***F***	***%***	***F***	***%***	***F***	***%***	***F***	***%***
	Secure and maintain your job	1	1.2	3	3.9	39	50.6	29	37.7	5	6.6
	Work in collaboration with others	0	0	1	1.2	22	28.6	49	63.6	5	6.6
	Communicate effectively with your employer	0	0	1	1.2	28	35.9	40	51.3	9	11.6
	Communicate effectively with your colleagues	1	1.2	1	1.2	25	32.1	44	56.5	7	9
	Communicate with your supervisors	1	1.2	2	2.7	27	34.6	40	51.3	8	10.2
	Manage yourself and life	0	0	1	1.2	15	19.2	48	61.5	14	17.9

For the question "*to what extent did the soft skills training help you deal with others and self as well as secure your job,*" 39 (50.6%) respondents indicated that soft skills training helped them to secure and maintain their job, 49 (63.6%) said that soft skills training helped them to work in collaboration with others, 40 (51.3) replied that soft skills training helped them to communicate effectively with their employer, 44 (56.5%) said that soft skills training helped them to communicate effectively with their colleagues, 40 (51.3) reported that soft skills training helped them to communicate with their supervisors and 48 (61.5%) said that soft skills training helped them to manage themselves and their lives.

In terms of employment status, out of the 97 TVET graduates who participated in the study and who reported they were employed for pay/wages, the greatest proportion, 30 (30.9%), of them are in the field of construction, while 29 (29.9%) of them are in the field of automotive. Similarly, out of the 73 study participants who reported they were currently unemployed, 29 (39.7%) of them are in the field of automotive, 25 (34.2%) of them are in the field of textiles while 20 (27.4%) of them are in ICT.

In terms of field of study, out of 33 study participants in ICT, 39.3% of them reported that they were employed for pay/wages while 60.7% of them reported they were not employed.

Similarly, of 20 study participants in the field of textiles, 75% of them reported they were employed for pay/wages while only 25% of them were not employed. At the same time, out of 20 study participants in the field of food preparation, 50% of them reported they were employed for pay/wages while 40% of them were not employed. In addition, out of 64 study participants in the field of automotive, 45.3% of them reported they were employed for pay/wages while 45.3% of them were not employed. Moreover, out of 112 study participants of the field of construction, 26.8% of them reported they were employed for pay/wages, 36.6% of them reported they were self-employed and 9.8% of them reported they were not employed.

Table-8. Cross tabulation of employment status by gender

Current Employment Status	***Gender***				
	Male		***Female***		***Total***
	F	***%***	***F***	***%***	***F***
Employed for pay/wage	53	31.2	44	*55*	*97*
Self-employed without employees	45	26.5	2	2.5	47
Self-employed with employees	6	3.5	1	1.25	7
Unpaid family worker	25	14.6	0	0	25
Currently unemployed	41	24.1	33	41.25	74
Total	***170***	***100***	***80***	***100***	***250***

As the data summarized in Table 8 indicated, in terms of the *employment status*, out of the 97 sample TVET graduates who reported they were employed for pay/wages, 53 (54.6%), were males while 44 (45.4%) were females. Similarly, out of 47 participants who reported they were self-employed without employees, 45 (95.7%) were males while only two (4.3%) were females. Moreover, out of the 25 participants who reported they are unpaid family workers, all 25 were males. Besides, out of 74 study participants who reported they were not currently employed, 41 (55.4%) were males while 33 (44.6%) were females.

In a different vein, research findings on Assessment of Workplace Skills Acquired by Students of Vocational and Technical Education Institutions showed no significant differences of employability skills between trainees in term of gender or work experience (Bakar, Mohamed, & Hamzah, 2013).

Conclusion

The main aim of this study was to undertake behavioral research focusing on what works to improve soft skills among TVET graduates to enhance opportunities for employment. To realize this objective, the researchers employed a survey design with a quantitative approach. The target participants of this study were 267 TVET students in the final year of their programs. Primarily, the following areas were covered in soft skills training: communication and business writing skills, team building and teamwork skills, time management, positive and creative thinking, problem-solving and decision making skills.

Out of the sample TVET graduate respondents, the majority (70.4%) were employed while (29.6%) were unemployed. The data from respondents (who reported they were currently employed) indicated that the highest proportion of TVET graduates (89%) are employed in the private sector. Currently, in Ethiopia the private sector is emerging, particularly in the construction, service and manufacturing sectors. According to most of the respondents of this study, personal contacts and family or friends helped them become aware of and obtain their current jobs. The responses captured from participants also indicated that most of them are satisfied with their current incomes.

Moreover, most of the respondents stated that their current employment is related to their field of specialization. When fields of study of the graduates were examined, most of them who are currently employed were in the fields of construction, and automotive. In summary, it is concluded that the soft skills training helped TVET graduates improve their employability skills and obtain employment.

Implications and Recommendations

Hence, if the importance of soft skills training for TVET graduates is well acknowledged, the need to incorporate these skills into the curriculum ought to get due attention by the concerned body (Ministry of Education, and Regional Education Bureau, etc.) although some focuses are already in place to include them in the current curriculum of TVET colleges. The issue that needs further attention here is the point of '*to what extent these skills are being taught at these Colleges*'? This again requires the preparedness and readiness of TVET management and instructors in designing and teaching soft skills courses to college graduates. In general, cognizant of the relevance of soft skills training, the current level of its inclusion in the current TVET curriculum and magnitude of implementation in teaching these skills need to be further examined. As a result, we suggest concerned parties to make all the necessary efforts to strengthen the training programs on soft skills in the TVET Colleges in a better way than what exists now. In addition, improving the competencies of college instructors through different training programs on soft skills will help them teach these skills.

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THE IMPORTANCE OF MECHANICAL ENGINEERING AND ITS ROLE IN TVET

Dwayne McKay

ABSTRACT

This paper underscores the importance and role of mechanical engineering (ME) in Technical and Vocational Education and Training (TVET). By examining the historical development, branches, and functions of ME, the paper highlights its relevance to modern society. The integration of ME into TVET is presented as a strategic imperative for fostering industrial growth, technological advancement, and economic development. The paper analyzes the core components of successful ME TVET programs, including curriculum development, infrastructure, student support, and assessment. By emphasizing the impact of ME TVET on industry and society, the paper concludes with recommendations for strengthening these programs to meet future challenges and opportunities.

INTRODUCTION

Mechanical engineering can be defined as a branch of engineering that deals with the development and application of heat and mechanical power, as well as the design, manufacture, and usage of machines. Mechanical engineers analyze, develop, produce, and test a wide range of equipment, such as tools, engines, and machines. Mechanical engineering can be found in everything that can be envisioned, designed, and manufactured. Mechanical engineering plays a crucial role in shaping our world. This article explains why this field is essential, especially within the context of Technical and Vocational Education and Training (TVET).

History of Mechanical Engineering

Mechanical engineering has always existed, with works on mechanics and the construction of the first machines appearing in ancient Greece, medieval China, and Antiquity, to name a few examples. Indeed, the first steam engine was created by Heon of Alexandria in ancient Greece. The invention of the steam engine in the late 18th century provided a critical source of power for the Industrial Revolution and accelerated the development of all sorts of machinery. As a result, a new major technical classification dealing with tools and machines emerged, which was formalized in 1847 with the establishment of the Institution of Mechanical Engineers in Birmingham, England. Mechanical engineering has progressed from the practice of an art based mostly on trial and error to the application of the scientific method in design and manufacturing by professional engineers (Wyler, 2020).

During the nineteenth century, advances in physics and machine tools prompted the creation of machines and engines to provide the necessary power. Indeed, one of mechanical engineering's early challenges was the development of power-driven systems. Manufacturing progresses in lockstep with the advancement of civilization. The first power-driven machines were constructed in the nineteenth century, followed by more complex systems in the twentieth century. Both World Wars I and II saw extensive use of mechanical engineering in the development of aircraft, as well as other vehicles and armaments (Wickert and Lewis, 2020).

With the understanding of mechanical science, which encompasses dynamics, thermodynamics, energy creation, power, and heat transport, this discipline quickly expanded. Technologies like 3D printing are starting to take control in several industries in the twenty-first century. The separation of mechanical engineering from the other branches of engineering ensures its continued evolution as technology continues to advance.

The Role of Mechanical Engineering in TVET

Mechanical engineering plays a pivotal role in TVET programs. It provides a strong foundation for students to develop practical skills and knowledge essential for various industries. TVET curricula focused on mechanical engineering equip students with hands-on experience in:

- Manufacturing processes: Training in production techniques, quality control, and industrial automation.

- Maintenance and repair: Training in equipment maintenance, troubleshooting, and repair enhances problem-solving abilities.
- Energy systems: Understanding of power generation, distribution, and energy efficiency.
- Automotive technology: Knowledge of vehicle systems, mechanics, and maintenance supports the transportation sector.

By integrating mechanical engineering principles into TVET, countries can develop a skilled workforce capable of driving industrial growth and technological advancements. These countries can effectively address skill gaps in the industry, fostering a skilled workforce capable of driving industrial growth and technological advancements. Strong collaboration between industry and TVET institutions is crucial to ensure curricula remain relevant to industry needs.

Moreover, mechanical engineering TVET graduates are well-positioned to contribute to entrepreneurship and innovation. The problem-solving skills and technical knowledge gained through TVET programs can empower individuals to develop new products, services, and businesses. This incorporation of mechanical engineering into TVET is essential for a nation's industrial development and economic growth.

GENERAL ANALYSIS

The integration of mechanical engineering principles into TVET curricula is imperative for cultivating a skilled workforce capable of addressing contemporary industrial challenges. By grounding students in the fundamentals of mechanics, thermodynamics, materials science, and manufacturing processes, TVET programs can equip graduates with the requisite knowledge and abilities to excel in a rapidly evolving technological landscape. A robust mechanical engineering foundation is essential for fostering innovation and entrepreneurship. TVET graduates with a strong grounding in these principles are better equipped to identify market opportunities, develop new products, and optimize manufacturing processes. Moreover, the integration of Industry 4.0 concepts into mechanical engineering TVET programs is crucial for preparing students for the digital transformation of manufacturing.

While the benefits of mechanical engineering in TVET are substantial, challenges such as resource constraints, faculty development, and curriculum alignment must be addressed. Collaborative efforts between industry, academia, and government are essential to overcome these obstacles and maximize the impact of mechanical engineering in TVET programs.

The mechanical engineer will work on design and redesign, produce prototypes, analyze test findings, and track the manufacturing process while always innovating. Examples include batteries, power-generating machinery such as internal combustion engines, gas turbines, or any refrigeration or air-conditioning units. Many subgroups of mechanical engineering exist now because of technological improvements and the merging of other professions of engineering to create new areas of specialization (Fernandez et al, 2017).

Actualizing the Impact of Mechanical Engineering in TVET

The successful integration of mechanical engineering into TVET requires a strategic and holistic approach. This involves careful planning, implementation, and evaluation to maximize the benefits for students, industry, and the overall economy.

1. Curriculum Development and Implementation

To ensure that TVET graduates are equipped with the necessary skills to meet industry demands, a robust curriculum is essential. This involves:

- Needs Assessment: Identifying the specific skills and knowledge required by industry.
- Curriculum Alignment: Developing curricula that directly address these needs, incorporating hands-on training and practical projects.
- Industry Partnerships: Collaborating with industry experts to develop curriculum content and provide real-world examples.
- Continuous Improvement: Regularly evaluating and updating curriculum to reflect technological advancements and industry trends.

2. Infrastructure and Resource Development

Adequate infrastructure and resources are crucial for effective mechanical engineering TVET programs. Key components include:

- Modern Equipment: Providing students with access to state-of-the-art machinery and tools.
- Specialized Laboratories: Establishing dedicated workshops and laboratories for practical training.
- Qualified Instructors: Recruiting and retaining skilled instructors with industry experience.
- Industry Collaboration: Partnering with industries to share resources and expertise.

3. Student Support and Development

Holistic student support is essential for maximizing the potential of mechanical engineering TVET graduates. This includes:

- Mentorship Programs: Pairing students with industry mentors to provide guidance and support.
- Internship Opportunities: Facilitating industry internships to bridge the gap between academia and industry.
- Entrepreneurship Development: Cultivating entrepreneurial skills through incubation programs and competitions.

- Career Guidance: Providing career counseling and job placement assistance.

4. Assessment and Evaluation

Regular assessment is crucial for program improvement. Key evaluation metrics include:

- Student Outcomes: Tracking program completion rates, graduate employment rates, salaries, and job satisfaction.
- Industry Feedback: Gathering feedback from employers on the skills and competencies of graduates.
- Program Effectiveness: Assessing the overall impact of the mechanical engineering TVET program on students, industry, and the economy.

By implementing these strategies, TVET institutions can effectively integrate mechanical engineering principles and produce graduates who are well-prepared to contribute to the growth and development of the manufacturing and engineering sectors.

DISCUSSION

There are several advantages of mechanical engineering, and the impact of mechanical engineering in TVET on industry and society. Mechanical engineers are constantly challenged, which promotes innovation and creativity. They design intricate and strange items, and they produce new and better products to demonstrate their abilities. Secondly, mechanical engineering skills are transferable, meaning they will be useful across a variety of industries and add value to that industry. Thirdly, mechanical engineering ensures adequate problem solving where engineering is about finding better, more efficient ways of doing things.

Mechanical engineering TVET programs play a pivotal role in driving industrial growth and societal development. By equipping graduates with practical skills and a strong theoretical foundation, these programs contribute to:

1. Industrial Development

- Enhanced Productivity: Mechanical engineering TVET graduates can optimize production processes, reduce waste, and improve overall efficiency.
- Technological Innovation: By fostering a culture of problem-solving and creativity, mechanical engineering TVET programs can stimulate the development of new products and technologies.
- Supply Chain Optimization: Mechanical engineers contribute to supply chain management and logistics, ensuring the smooth flow of goods and services.
- Infrastructure Development: Mechanical engineers support the construction and maintenance of critical infrastructure, such as transportation and energy systems.

2. Societal Impact
    - Economic Growth: A skilled workforce in mechanical engineering is essential for driving economic growth and creating employment opportunities.
    - Technological Advancement: Mechanical engineers contribute to the development of new technologies that improve people's lives.
    - Sustainable Development: By focusing on energy efficiency and environmental sustainability, mechanical engineering TVET programs can support a greener future.
    - Global Competitiveness: A strong foundation in mechanical engineering enhances a nation's ability to compete in the global marketplace.

By investing in mechanical engineering TVET programs, countries can reap significant benefits in terms of industrial competitiveness, economic prosperity, and social well-being.

GENERAL RECOMMENDATIONS

The mechanical engineering industry is quickly evolving because of the advent of Industry 4.0. These technologies are revolutionizing the way engineers develop and design new equipment, from artificial intelligence and machine learning to big data. Mechanical engineers have more opportunity to create and launch superior goods and adapt them to changing client demands as technology advances. Traditionally, engineers have constructed numerous prototypes before the final version while designing new equipment and systems. As more data becomes available, mechanical engineers will be able to accelerate the design process, make more accurate evaluations, and manufacture products based on the results.

The way mechanical products are conceived, prototyped, and built is one of the most significant advancements in mechanical engineering. At the design stage and at the application level with a direct internet connection, there is a trend away from mechanical systems and toward more software and data-driven solutions. Employing computer-aided design and modelling, several product iterations are carried out on-screen, ensuring greater efficiency and accuracy when using field data.

Finally, to maximize the impact of mechanical engineering TVET programs, the following recommendations are essential:

- Increased Government Investment: Governments should allocate more resources to support mechanical engineering TVET programs, including funding for infrastructure, equipment, faculty and student support services.
- Industry Partnerships: Stronger collaboration between industry and education is crucial for ensuring curriculum relevance and providing students with real-world experience.

- Continuous Faculty Development: Investing in the ongoing professional development of mechanical engineering TVET instructors is essential for maintaining program quality.
- Research and Innovation: Encouraging research and innovation within mechanical engineering TVET programs can foster a culture of problem-solving and critical thinking.
- Global Collaboration: Facilitating international exchange programs and partnerships can broaden the horizons of both students and faculty.

By implementing these recommendations, countries can enhance the effectiveness of their mechanical engineering TVET programs and produce graduates who are well-prepared to contribute to the global economy.

CONCLUSIONS

Mechanical engineering is essential in the manufacturing of everything from automobiles to airplanes to refrigerators. As it delivers useful technology to our modern society, it allows one to conduct various daily chores with ease.

Engineering appears to have evolved in two directions. First, as the population grew and civilization advanced, it became necessary to build roads, harbors, buildings, bridges, and canals. The second development was the growing application of power to mechanical activities, which necessitated the hiring of experts who could design and build this equipment. Engineering practice is projected to undergo significant changes in the future. Global competitiveness, collaboration, innovation, and the entrepreneurial spirit are increasingly strategic priorities for industry, business and education. Mechanical engineers will continue to have fascinating prospects thanks to technologies that have generated wealth and economic progress.

To tackle future difficulties, five considerations must be addressed. First, build a flexible workforce. To develop globally competitive engineers who will contribute to our profession's expanding needs over the next two decades, future mechanical engineers must be able to adapt and adjust. There is a need to reconcile the vastly different professional engineering standards and educational levels around the world. Understanding educational issues and the need for curriculum reform in complex systems, as well as multidisciplinary coordination, is critical.

Second, to respond to the global environmental constraints brought on by economic expansion, create sustainability through new technologies and practices. New business structures and design methods will be required to be inventive in solutions, particularly in areas such as water management, energy and manufacturing. Third, adopt systems thinking, which allows engineers to approach design from a new perspective, with greater parameters for social and environmental concerns. With an understanding of systems thinking, engineers

will have a better knowledge of various cause and effect interactions. Further, greater depth in management and problem-solving skills, as well as the ability to coordinate across wider distances and timeframes, must be matched by increased technical understanding.

Fourth, as a key to being competitive in global marketplaces, integrate innovation into our business models and designers' minds. Creative abilities are important. Fifth, incorporate mechanical engineering in undergraduate TVET programs as this is instrumental in shaping the future of industries and societies. By equipping students with practical skills, theoretical knowledge, and a problem-solving mindset, these programs cultivate a skilled workforce capable of driving innovation and economic growth. To fully realize the potential of mechanical engineering in TVET, concerted efforts are needed to enhance curriculum, infrastructure, and industry partnerships. By investing in this critical area, nations can build a strong foundation for industrial competitiveness, technological advancement, and sustainable development.

As the world continues to evolve, the role of mechanical engineers will only become more important. Mechanical engineering in TVET programs must adapt to emerging trends and technologies to ensure that graduates are prepared to meet the challenges of the future.

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ENHANCING WORKFORCE MOBILITY AND LIFELONG LEARNING THROUGH RECOGNITION OF PRIOR LEARNING: LESSONS LEARNED FROM GLOBAL PRACTICES

Genene Abebe Tadesse

ABSTRACT

Recognition of Prior Learning (RPL) is a vital mechanism for acknowledging and validating competences acquired through various forms of learning, including work experience, non-formal education, and informal learning. This article examines RPL systems in Germany, Australia, Canada, France, the Netherlands, the Philippines, and Ethiopia, exploring assessment methods, challenges, and implementation strategies. By understanding the intricacies of RPL in these countries, stakeholders can enhance RPL practices to promote lifelong learning and workforce mobility.

Keywords: *recognition of prior learning, informal learning, assessment methods*

INTRODUCTION

Recognition of Prior Learning (RPL) has emerged as a significant approach to validating competences gained through non-traditional learning pathways. As educational systems strive to become more inclusive and flexible, RPL offers a way to acknowledge the skills and knowledge individuals acquire outside formal education settings (Harris, 1999).

RPL offers numerous benefits across different levels. For individuals, it enhances employment opportunities by validating their skills, making them more competitive in the job market, and potentially leading to career advancement with promotions and higher salaries. Personal development is also supported, as the recognition of existing skills boosts self-confidence and encourages lifelong learning. Moreover, RPL is both time and cost-efficient, as individuals can bypass training for skills they already possess, reducing the duration and expense of obtaining qualifications (Harris, 2000).

For employers, RPL ensures a more skilled workforce by identifying and validating the skills of employees, which in turn increases productivity. It also aids in recruitment and retention, attracting talented individuals seeking formal recognition of their competencies and leading to higher job satisfaction and retention rates among employees. Training efficiency is another significant benefit, as RPL allows for targeted training that addresses specific skill gaps, thereby saving costs associated with unnecessary training programs (Harris & Wihak, 2013).

Educational institutions and training providers benefit from increased enrollment, attracting a diverse group of learners who seek formal recognition of their existing skills. RPL offers flexible learning pathways, accommodating non-traditional learners, and enhances the institution's reputation by demonstrating a commitment to high standards and industry alignment (Harris, 1999). Additionally, there is a notable shortage of qualified trainers and assessors in many occupations, which can impede the effective delivery of vocational education and training (TVET) programs. One effective solution to this issue is the recognition of prior learning (RPL), a process that acknowledges the skills and knowledge individuals have acquired through their work experience, regardless of whether they have formal qualifications (Wheelahan, 2009).

RPL allows experienced industry professionals, who may not have formal teaching qualifications but possess substantial practical knowledge and skills, to be assessed and certified as trainers and assessors. This process ensures that their valuable industry experience is formally recognized, enabling them to contribute to training programs effectively (Boud & Solomon, 2001). By certifying experienced industry professionals through RPL, the pool of available trainers and assessors is significantly expanded. This approach helps to address the shortage in specific occupational areas where finding formally qualified trainers and assessors is particularly challenging (Wheelahan, 2009).

On a societal level, RPL promotes inclusive education by providing opportunities for marginalized and non-traditional learners to gain formal qualifications, thereby facilitating social mobility. It also contributes to economic growth by developing a skilled workforce essential for competitiveness and innovation. Additionally, RPL fosters a culture of lifelong

learning and continuous professional development, helping individuals and organizations adapt to technological advancements and changing job market demands (Boud & Solomon, 2001).

In summary, RPL offers significant benefits to individuals, employers, educational institutions, and society by recognizing and valuing the diverse learning experiences people acquire throughout their lives. It promotes efficiency, inclusivity, and continuous development, contributing to personal growth, organizational success, and societal advancement (Harris & Wihak, 2013).

Global Best Practices in Implementing RPL

This article delves into the RPL systems in Germany, Australia, Canada, France, the Netherlands, the Philippines, and Ethiopia providing a comparative analysis of their methodologies, challenges, and best practices. By examining these countries' RPL processes, we aim to identify effective strategies that can be adapted and implemented in various contexts to enhance the recognition and validation of prior learning.

Germany

Germany has developed a robust system for recognizing prior learning, which assesses and validates competences acquired through work experience, non-formal education, or informal learning. The German RPL system allows individuals to gain credit for their existing skills, thereby shortening the duration of formal training programs. This approach focuses on both professional and general competences, ensuring personalized learning pathways for adults (Konrad, 2010).

Germany employs a comprehensive approach to assess prior learning, which includes documentation review, interviews, skills tests, portfolio assessment, and validation committees. Individuals provide evidence of their competences through work certificates, training records, and other relevant documents. Experts interview candidates to understand their skills, experiences, and learning achievements, and practical assessments verify competences in specific areas. Candidates compile a portfolio showcasing their prior learning experiences, which is then evaluated by panels of experts who determine the appropriate credit. This rigorous and personalized assessment process ensures that individuals receive accurate recognition for their prior learning, facilitating their progression through formal education or training programs (Schroeder, 2012).

A practical example of Germany’s RPL system in action can be seen in the case of an individual who has worked as an automotive mechanic for ten years without formal qualifications. The individual can present their work experience, including certificates of completed tasks, letters of recommendation from employers, and evidence of specific skills gained on the job. This documentation is reviewed by a validation committee, which includes interviews to assess the depth of their knowledge and skills. The committee may also conduct practical tests to verify the individual’s competencies in diagnosing and repairing vehicles. Upon successful validation, the individual can receive credit towards a formal qualification, significantly reducing the time required to complete their training program (Konrad, 2010).

Australia

Australia's RPL system is well-established and recognizes skills gained through work, life experiences, and non-formal education. Individuals can receive credit for prior learning, reducing the time needed to obtain formal qualifications. The Australian Qualifications Framework (AQF) provides guidelines for RPL assessment and credit transfer, ensuring consistency and fairness in the process (Smith, 2004).

Australia's RPL process includes evidence collection, assessment tools, mapping to qualifications, and credit transfer. Candidates gather documents, work samples, and references to support their claims of prior learning. Assessors use various tools, such as interviews, questionnaires, and observations, to evaluate the evidence. They then map the prior learning to relevant qualifications and grant credit for equivalent units or modules. This structured approach, guided by the AQF, ensures that RPL assessments are conducted fairly and consistently across different institutions and sectors (Wheelahan, 2009).

Consider the case of a chef with 15 years of experience working in various restaurants but without formal culinary qualifications. In Australia, this chef can apply for RPL by submitting a portfolio that includes menus they have created, letters of recommendation from previous employers, and photos of their work. The portfolio might also include certificates from short courses or workshops attended. Assessors would then interview the chef to gain deeper insights into their skills and knowledge, possibly observing the chef in a kitchen environment to assess their practical abilities. By mapping the chef's prior learning to the relevant qualifications in the AQF, the assessors can grant credit for units or modules, allowing the chef to obtain formal recognition for their extensive experience without having to undergo full training from scratch (Smith, 2004).

Canada

Canada places significant emphasis on RPL to address skills shortages and improve workforce mobility. Various provinces have their own RPL policies and practices, allowing individuals to demonstrate their competences and receive credit. RPL assessments in Canada consider work experience, training, and other relevant factors, recognizing diverse learning experiences (Harris & Wihak, 2013).

Canada's RPL methods vary by province but generally include assessment centers, portfolio development, challenge exams, and workplace assessments. Candidates participate in practical assessments at designated centers, compile evidence of their skills in portfolios, take exams to test their knowledge and competences, and have their performance observed on the job by assessors. These varied approaches ensure that individuals' prior learning is recognized, allowing them to gain credit and progress in their education or career pathways (Conrad, 2008).

In Canada, an immigrant nurse with several years of experience in their home country can utilize RPL to integrate into the Canadian healthcare system. The nurse can compile a portfolio including transcripts from their nursing education, letters of recommendation, job descriptions,

and certificates from continuing education courses. The nurse might also take a challenge exam to demonstrate their theoretical knowledge and undergo a workplace assessment where an assessor observes their performance in a clinical setting. The province's regulatory body for nurses reviews this comprehensive evidence and grants credit towards the required Canadian qualifications, allowing the nurse to fast-track their integration into the workforce (Harris & Wihak, 2013).

France

France has implemented RPL mechanisms to recognize prior learning in vocational education and training (TVET). The system assesses competences acquired through work, volunteering, or other experiences, helping individuals access formal qualifications more efficiently (Schroeder, 2012).

France's RPL process involves individual interviews, skills validation, portfolio assessment, and validation commissions. Assessors discuss candidates' experiences and competences through interviews, validate skills acquired in various contexts, and review evidence presented in portfolios. Panels of experts, known as validation commissions, then decide on the appropriate credit to be granted. The French system emphasizes flexibility and inclusivity, ensuring that diverse learning experiences are recognized and valued (Boud & Solomon, 2001).

A detailed case in France could involve a volunteer community organizer seeking recognition for skills developed over years of managing projects and leading teams. The individual would undergo an interview to discuss their experiences and compile a portfolio with evidence such as project reports, testimonials from community members, and records of training sessions conducted. A validation commission, consisting of experts in community development, would review the portfolio and conduct further interviews if necessary. The commission would then determine the credit to be awarded, potentially granting the individual a formal qualification in project management or community leadership, reflecting their extensive experience and competences (Boud & Solomon, 2001).

The Netherlands

The Netherlands has established a comprehensive RPL system that integrates prior learning into formal education and training programs. The Dutch RPL framework focuses on competence-based assessments, enabling individuals to gain recognition for skills acquired through various learning pathways (Konrad, 2010).

The Netherlands' RPL process includes competence assessment, portfolio compilation, validation interviews, and personalized learning pathways. Candidates undergo assessments to evaluate their competences, compile portfolios with supporting evidence, participate in interviews to discuss their learning experiences, and receive tailored learning plans based on their prior learning. This structured approach ensures that individuals receive appropriate

recognition for their skills, facilitating their progression in education or careers (Harris & Wihak, 2013).

In the Netherlands, an IT professional with extensive self-taught programming skills can apply for RPL to gain formal recognition. The individual would participate in a competence assessment to evaluate their technical skills, compile a portfolio with evidence such as completed projects, code samples, and references from clients. They would then attend validation interviews to discuss their learning experiences and demonstrate their competences. Based on the assessment, the individual would receive a personalized learning plan outlining the additional training required to achieve a formal qualification, significantly reducing the time and effort needed to gain recognition for their skills (Konrad, 2010).

The Philippines

The RPL process, known locally as the Philippine TVET Competency Assessment and Certification System (PTCACS), allows individuals to gain recognition for skills and knowledge acquired outside formal education. This can include work experience, informal training, or non-formal education (Technical Education and Skills Development Authority [TESDA], n.d.).

The Recognition of Prior Learning (RPL) process in Philippines has several key features. It is grounded in competency-based assessment, relying on national competency standards developed in consultation with industry stakeholders to ensure that the recognized skills and knowledge are relevant to industry needs (TESDA, n.d.). Candidates compile a portfolio of evidence demonstrating their competencies, which can include job descriptions, work samples, references, and other relevant documentation (TESDA, n.d.). Various assessment methods, such as practical demonstrations, interviews, written exams, and performance evaluations, are employed to gauge these competencies. Successful candidates receive a National Certificate (NC) or Certificate of Competency (COC), which are recognized by employers and can facilitate career advancement or further education (TESDA, n.d.).

However, implementing RPL faces several challenges. Ensuring consistent standards across different regions and assessors is difficult, particularly in a country with diverse educational and training institutions (TESDA, n.d.). Many individuals and employers are unaware of the RPL opportunities available, leading to the system's underutilization (TESDA, n.d.). Additionally, conducting comprehensive assessments requires resources, including trained assessors and facilities, which can be limited. Maintaining high standards in assessments to ensure the credibility of the certification is also critical (TESDA, n.d.). To overcome these challenges, TESDA has invested in training assessors to ensure they are equipped to conduct reliable and valid competency assessments, with regular workshops and updates to maintain high standards.

For example, a factory worker with over a decade of experience but no formal qualifications applied for RPL under TESDA's PTCACS. The worker submitted a portfolio including job descriptions, supervisor testimonials, and samples of work products (TESDA, n.d.). The assessment included a practical demonstration of skills, an interview, and a written test. Despite initial challenges in gathering evidence and understanding the process, the worker received support from TESDA's local office, which provided guidance on compiling the portfolio and preparing for assessments (TESDA, n.d.). The assessment confirmed the worker's competencies aligned with the national standards for machine operators, and they were awarded a National Certificate (TESDA, n.d.).

Key initiatives and developments in Ethiopia in relation to the RPL

Ethiopia has approved its Qualifications Framework known as the Ethiopian Qualifications framework (EtQF), which includes provisions for RPL. The EtQF aims to standardize and recognize qualifications across different sectors, making it easier for individuals to have their informal and non-formal learning recognized. The existing TVET Proclamation No. 954/2016 provides a legal basis for the implementation of RPL within the Ethiopian TVET system. It outlines the roles and responsibilities of various stakeholders in promoting and administering RPL. The New Education and Training policy of Ethiopia also highlights the need to recognize skills and knowledge acquired through experience and other means outside of the formal education and training (MoE, 2023).

Ethiopia is collaborating with international partners, such as the International Labour Organization (ILO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), to learn from global best practices in RPL and integrate them into the national context. The International Labour Organization (ILO) has been actively involved in supporting the introduction of Recognition of Prior Learning (RPL) in Ethiopia (ILO, 2023).

The ILO has been working to enhance the capacity of constituents in Ethiopia. Their project aims to anticipate skills needs, develop inclusive skills policies, and improve employability for youth, vulnerable groups, and forcibly displaced people. The ILO emphasizes RPL as a key element in achieving fair globalization and poverty reduction. The ILO also organized a workshop discussing RPL in the context of skilling and upskilling. Topics included public-private partnerships, formalization of apprenticeships, and effective sectoral skills development.

Further, efforts are being made to integrate digital platforms for portfolio submissions and assessments. This can make the RPL process more accessible and efficient, especially in remote areas. The Ethiopian Labor Market Information System (E-LMIS) is an initiative that includes features for tracking and recognizing prior learning. It helps streamline the process by providing a centralized platform for managing RPL applications and assessments.

Challenges and Future Directions for RPL in Ethiopia

While significant progress has been made, there are still challenges in the widespread adoption of RPL in Ethiopia's TVET system. These include ensuring consistent assessment standards, raising awareness among employers and potential candidates, and providing sufficient resources for training assessors.

Future efforts are likely to focus on expanding the reach of RPL, enhancing the capacity of TVET institutions to implement RPL, and continuously improving the quality and reliability of assessments. By addressing these challenges, Ethiopia aims to create a more inclusive and flexible TVET system that recognizes and values the diverse learning experiences of its citizens.

Based on global best practices in recognition of prior learning (RPL) and education policy frameworks, Ethiopia can draw several valuable lessons to enrich its Education and Training Policy. First and foremost, establishing a clear policy framework dedicated to RPL within the education system is paramount. This framework should delineate the roles and responsibilities of stakeholders, set standards for assessment and certification, and provide comprehensive guidelines for implementation. Aligning RPL initiatives with a National Qualifications Framework (NQF) ensures consistency and comparability of qualifications, facilitating seamless recognition of learning outcomes across diverse educational and training pathways. Engaging industry stakeholders and employers in the development of competency standards and assessment criteria is crucial for ensuring that RPL certifications reflect current industry needs and contribute effectively to workforce development.

Furthermore, investing in the training and continuous professional development of assessors is essential to maintain the reliability and validity of assessments. Effective promotion and awareness campaigns play a pivotal role in increasing awareness and uptake of RPL among learners, workers, and employers. Leveraging digital platforms for portfolio submission, assessment, and management streamlines processes, making RPL more accessible and scalable while reducing administrative burdens. Conducting pilot projects allows for testing and refining RPL processes in controlled environments, with subsequent evaluations providing insights to optimize implementation strategies.

Moreover, implementing robust quality assurance mechanisms, such as regular audits and evaluations of assessment centers, ensures the credibility and integrity of RPL certifications. Ethiopia can also benefit significantly from international collaborations and partnerships with organizations like UNESCO and the ILO, which offer insights into innovative approaches and successful case studies in RPL implementation globally. By integrating these lessons into its Education and Training Policy, Ethiopia can strengthen its RPL framework, expand opportunities for lifelong learning and skills recognition, and better align education and training with the evolving needs of its workforce and learners.

CONCLUSION

Recognition of Prior Learning is a powerful tool for enhancing workforce mobility, promoting lifelong learning, and fostering social inclusion. By examining global best practices in RPL implementation, countries can develop effective strategies to recognize and validate diverse learning experiences, ultimately contributing to a more skilled and adaptable workforce

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USING TEACHER-STUDENT RESOURCES IN TECHNOLOGY EDUCATION FOR SUSTAINABLE SKILL DEVELOPMENT

Busari Rasheed Sekore

ABSTRACT

Training facilities are important for technology education programs. The lack of facilities for these programs has forced the lecturers in the Building Technology Unit, Department of Technical Education, Emmanuel Alayande College of Education, Oyo, Nigeria, to cumulatively make use of student projects in developing an educational facility. The study made use of the site allocated to the unit for the construction of the hall. The lecturers provided the production documents and students' yearly contributions were aggregated with the efforts of the college management to complete the project. The study revealed that lectures and learners have critical roles to play in the provision of physical infrastructure for the training of students and this improves teaching and learning in various courses taught in the unit. It is therefore recommended that school management should provide funds for students to construct meaningful projects for sustainable skills development,

Keywords: *Physical infrastructure, technology education, school management, adequate maintenance and skillful training.*

INTRODUCTION

Technological education is a form of vocational education that provides specific trades with practical skills that can be applied in future careers (Agrawal, 2013) and serves an important and effective tool for reducing youth unemployment (Baldi et al., 2014, Cabus, 2015, Eichhorst et al., 2015, McCarthy et al., 2016 and Mohammed, 2022). The training provides practical knowledge and skills that inculcates the attitudes that are required for making progress and is centered on practical skills that students can apply in future (Chalapati, 2020 and Oviawe, 2018).

According to Johnson and Adams (2013) and Comyn (2023), technology education is an educational program that involves competency-based training. It is essential to have adequate facilities and equipment for students to gain the practice they need to develop skills required for the world of work. Technological education enhances individual skills (Jothilaskhmi et al., 2009), incomes (Mahmud et al., 2007 and Asadullahi, 2019), economic well-being (Mahmoud et al., 2017) and employability (Nillson, 2007 and Oviawe, 2018).

Physical infrastructures are essential for training institutions to provide skills. Relevant and skillful trainings in any technology education setting requires appropriate infrastructures and skilled human resources (Carneiro et al., 2010, Carneiro et al., 2019, Abdullahi, 2019 and Tamrat, 2022). These physical infrastructures are provided by the proprietors of the tertiary institutions, and technology education places emphasis on practical skills and work preparedness which makes online learning difficult because hands-on experience is important (Munyi et al., 2021 and Maiba et al., 2023). The innovative approaches of e-learning adopted by teachers in the western world have yet to be adopted in developing countries like Nigeria (Eze et al., 2018) where teaching and learning still relies on provision of physical infrastructures for various activities (Aung and Khaing, 2016). Traditional technology education, including mastery of practical tasks, abilities and competencies, helps individuals to gain happiness and enjoyment of the trades (Wordu et al., 2018 and Udo, 2015) and students' performance is enhanced by physical learning environments (Barret et al., 2019).

In Nigeria and many developing countries, there is lack of appropriate funding to build physical infrastructures for technological education programs (Mubanga et al., 2019, Marpe, 2015 and Mohamed, 2022). The major sources of funding for educational services over the years has been dwindling, and the tuition and fees charged by the institutions is not sufficient to provide adequate funding (Okedi, 2014). The government funds allocated to the educational programs to achieve their aims and objectives are not sufficient (Depemu and Adeyefa, 2019) In Nigeria, resources are scare, and there is an inability to provide necessary infrastructure for teaching and learning in technology education (Mubanga et al., 2019). This paper describes the use of students and lecturers in building facilities to improve practical skills of students and acquire standard physical infrastructure for training.

Statement of the problem

The project was carried out in the Building Unit of the Department of Technical Education, Emmanuel Alayande College of Education, Oyo. This unit was the only one of five units that had no standard structure where students could engage in various types of active learning or practical activities. The lecturers in the unit formulated a hall that would take care of various adaptable functions and two offices attached for the lecturers. Since the expected source of funding was the students' annual final year project, the lecturers provided guidance and oversight to ensure that the project was carried out by the students within a short time and also enriched their knowledge in the practical and theoretical aspects of building.

Methodology

The lecturers in the unit formulated the plan which would solve the problem of inadequate teaching facilities in the unit. College management provided the site for the project. The site is a strip of land on the right flank of the existing building workshop and is located about 4.5 meters away from the existing building for easy linkage. Measurements were taken to ascertain the quantity of space available for the construction. The site is relatively flat and clear of trees; the substrata of the soil is laterite.

Since this was a student activity, efforts were made to produce a simple and functional design. Cost estimates were prepared in stages since the project would be executed by the students. The students provided the funds and labour while the lecturers designed the facility and supervised the students to ensure strict compliance with the specifications. The project costs for the various stages were divided by number of students for each year of the project.

Results and Discussion

The unit includes technology education professionals who are specialists in various fields in building construction. The drawings were prepared, and approval was given for the construction. An architect prepared the detailed working drawing after which the structural detailing was prepared by a building engineer. The ring beam that tied the entire hall and the lintel schedule were neatly detailed and the archway that leads into the porch was also given maximum attention. The following spaces are provided as shown below:

Table 1. Space Allocation

Space	Area (m^2)
Hall	68.69
Office 1	8.94
Office 2	8.94
Lobby	5.76

The construction of the project commenced with the final year students in the Building Technology program in 1997. These students were able to construct the foundation after which other students continued the project on yearly basis. The part-time students also took active roles at some stages in the construction until it got to a reasonable level of completion in 2014.

Table 2: Execution of the Project

Year/set	Activities	Methodology
1997	Clearing of the site and construction of the substructure	The students contribute to procure materials and provided labor
1998	Compaction of laterite filling and casting of 'German' floor	The students made equal contributions, procured the materials and then supplied labor (skilled and unskilled)
1999	Commencement of the setting of block wall to about four courses	The students molded the blocks using the facilities in the unit and provided other materials
1999	Completed the block wall to the lintel level	The students molded additional blocks
2000	Casting of a lintel	The unit had a student and ensured that the student prepared and cast one of the lintels
2001	Construction of the ring beams	The students contributed and prepared materials like steel, wood, cement and sand to construct this aspect of the project
2002	Completion of ring beam, lintel and archway	See above
2003	Completion of walls above the ring beam and pointing of block wall	The students provided the materials and labor
2004	Roofing with timbers	The students provided the wooden roof timbers and carried out the installation of the roof frame
2004	The college management provided the roof covering	The assistance of college was sought and the materials for the roof covering were provided. The students completed the installation
2005	Installation of timber noggins	The students arranged for the materials and then did the installation
2006	Commencement of timber slats ceiling for the building hall	The electrical students collaborated with building students and completed the electrical aspect of the project
2006	Electrical conduit piping and wiring	The electrical students collaborated with building students and completed the electrical aspect of the project
2009	The college management provided doors and windows	The college management provided funds for the project on a direct labor basis
2010	The students did the rendering of internal walls	The students provided the funds and carried out the rendering

Table 2: Execution of the Project, cont.

Year/set	Activities	Methodology
2011	The students were allocated flooring of the spaces and marking/plastering of the chalkboard	The contributions were made and the construction completed
2012	The molding on windows were allocated to these students	The materials were arranged and molding done perfectly
2013	The pointing on the wall joints and beams were allocated to these students	The students estimated materials needed and carried out jointing finishing
2014	Pointing faces were allocated to these students for painting	Materials for painting were purchased and produced, and applied to the pointing faces

The study is similar to a study by Blank (2010) which discussed financing of community schools and concluded that teachers and students are mutually dependent and purposeful partnerships between them are essential to students' academic success. This project thoroughly confirmed that creating partnerships to build schools is where learning happens. Also, UNESCO (2021) also concurred with the fact that establishing social contracts between stakeholders in education will help build peaceful, just and sustainable futures for all. These social contracts provide the foundation for the renewal and transformation of the societies, which creates opportunities and provides routes for development of new physical infrastructure. The results also fall in line with the study of Alabi (2019) which empirically confirmed that there is a significant relevance of facilities to the teaching and learning of building construction in colleges. Yangambi (2023) also confirmed that facilities are a major factor in ensuring quality education.

CONCLUSION

Education is a kind of business in which every citizen has a stake. The students and lecturers in Building Unit of the Department of Technical Education made material and financial contributions towards the provision of physical facilities in the college. Students combined the normal discrete projects carried out individually to produce a simple hall and offices for effective teaching and learning in the college. They have demonstrated what they were taught by engaging in the design and construction activities that produced this elegant building hall.

Recommendation

Students gained a lot in the construction processes, from project planning to completion stage. The project has also demonstrated that the students and the lecturers have capabilities to assist the college in improving physical infrastructures if given the necessary materials and encouragements. The institution should make funds available to students in building technology to carry out different developmental projects in order to lessen financial burdens. Also, adequate maintenance should be carried out by the unit to ensure proper functioning of the spaces.

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