

# Technical and Vocational Education and Training for Producing Graduates with Necessary Skills on Demand of Labour Market: The Moderating Role of Labour Market Information

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## Article Info

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## ABSTRACT

This study analyzed the effects of technical and vocational education and training in acquiring graduates with the necessary skills that are labor market on demand. This analysis came following many graduates completing TVET college studies but finding they are not conforming to the skills a labor market is in demand with. To address this gap, the study used quantitative research approaches. While the research design was explanatory, the sampling technique was simple random sampling from a population of 3000 unit of analysis: students, graduates, tutors, and management staff from 3 selected NACTVET colleges, and 254 samples of respondents was obtained. Moreover, data collection from the sample extracted used a questionnaire. Before actual data analysis, a pilot survey, data cleaning, and factor analysis were conducted. The actual data analysis employed multiple linear regression from which the results were:-TVET-theoretical, practical, and behavioral attitudinal education found to be positively and significantly related to the production of resourceful graduates if the labor market information is intruded in the model system. These analytical results suggest that education stakeholders, policymakers, and curriculum developers adopt the model this study introduced by calling for the moderation role of labor market information.

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## 1. INTRODUCTION

The world has reported many graduates completing their college studies but missing the necessary skills to meet the labor market requirements [1]. In Tanzania, about 800,000 to 2,000,000 students are completing their college studies but only to find them unemployable [2]. Based on research that most students were found to possess academic certificates with good grade classification but only to find that they cannot be employed in

the current labor market [3]–[5]. It was revealed that the significant source of these discrepancies is the nature of education and the pieces of training they are provided being not focused on labor market requirements on demand [6].

It has to report that most graduates from middle technical and vocational colleges and higher learning institutions are found to be not employable because of too much theoretical education and pieces of training the graduates are provided. Nevertheless, practical education and training apply theoretical education, and the learner should be acquainted with it first. Theoretical education acquaints students with the necessary theories, models, principles, and processes for practical production [7]. Only what is to be insisted on is that theoretical education and training should be subjected to field practicum. That means whatever is to be taught as theories covering the cognitive domain should be on labor market demand [8].

Practical education and training expose a learner to the labor market. It is through practical doings that a student gets experience before completing studies [9]. Through practical field excursions, students meet with challenges and try to invent them into opportunities while still at the college. These challenges spare a student to think critically about solution implementation [10]. Thus practicals enable a student to become a problem solver even before graduating. This fact was also reported by Kaula [11] on the importance of practical education in higher learning institutions for the revelation of the industrial revolution. Indeed as Wang reported, Wu and Chi [12] are that the facilities, types of machinery, materials, and technologies should be relevant to the labor market on demand. Being used to old technologies is irrelevant because this would accelerate the problem of why many graduates are completing their college studies but find they cannot fit the labor market. This is also a reason which causes most of the graduates to found not productive. Thus apart from modern facilities/technology to be used for practical education should put more emphasis on on-site works and research projects.

Behavioral education and training are the knowledge a student should be equipped with. Behavior or moral attitudinal education intends to equip students with integrity and moral attributes to impart efficiency [13]. Ethical education and training equip students to act morally while being used to what to do and what not to do. Behavioral education creates a sense of positivism, risk-taking, and objective focus to plan student learning skills and affective attributes [14]. Moreover, behavioral attributes may change, so this study called for labor market information. Learning from changes in the labor market is where new labor market behaviors are adopted and intruded into the education curricula. This is a reminder that apart from a robust, dynamic, and sustainable curriculum development unit, the same issue is emphasized by Kollias, Schulc, Hajiyev, and Zafeirioo [15]. The curriculum development unit would take up the new behavior from the dynamic labor market and discoveries and put them into writing (syllabuses, curricula, course outlines, and programs). The only thing to consider is that the new behaviors to be included in the revised curricula should be good and universally accepted by society. This means that the behaviors included in the syllabuses (course programs) should be environmentally focused. Behavioral attributes are cultural values that have to change the traditional ways a graduate used to do to new ones, which are indeed mindset transformative [16].

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In Northern Korea, the technical and vocational practical education and training revealed by Ahn and Yi [17] to be the great cause of youths employed in the informal sector of the computer and information technologies industry. It was revealed that while others were involved in software engineering, others were engaged in website/blog designing, and others were engaged in computer hardware maintenance. It is this informal sector that is found to employ 85% of youth graduates.

Moreover, theoretical education and training were found to cause 76% of middle college graduates to contribute to about 21% of the national income of Botswana [18]. The creativity and eager behavior of the students who start their enterprises after completing their studies has revealed that the economy of Botswana is being sustained. These family economic activities have smeared the unemployment gap by 51%.

By the TVET education and training in Rwanda being behavioral and reflexive, the informal sector, which involved most graduates from VET and middle technical colleges found to contribute to about 75% of employment opportunities [5], [19]. The same informal sector was revealed to contribute about 2.1% of GDP to national output. It was more over-reported that while other graduates were engaged in agriculture, keeping livestock, and beekeeping, others were involved in the electronics and electrical installation industry.

Despite constructive reviews on the effects of TVET on producing resourceful graduates, none of those studies reported the moderation effects of intruding on the labor market information. Employment of the variable labor market information would be necessary for producing graduates with skills that are in demand in the labor market. This is because the world is subjected to fast and gradual changes in which professionals or skills on demand are also changing now and then. Thus with this study which has suggested the inclusion of labor market information, the discrepancies of most graduates from colleges found to have professionals who are no longer usable (not employable) would not be an issue. To uncover this knowledge gap, the study used four formulated objectives:- to examine the effects of theoretical –TVET on producing resourceful graduates who are in demand in the labor market; to analyze the effects of practical TVET in creating resourceful graduates with skills on demand in the labor market. Moreover, the other two research objectives were:- to assess the effects of behavioral TVET on producing graduates with skills on demand of the labor market; and to assess the moderation effects of labor market information on the TVET system in producing resourceful graduates with skills on demand of labor market.

## **2. METHOD**

The study was conducted in Mbeya City, where 3 NACTVET colleges were involved. The area was chosen, exemplifying other areas in Tanzania facing the problem that despite a large number of graduates completing their studies, once subjected to the labor market, they were found un-useful. The target group being graduates and students, tutors, and staff in the managerial section, the study used a causal–effect research design. From a population (N) of 3000 selected from Mbeya Zonal VET college, Mbalizi Institute of Health Sciences, and Mbeya Agricultural Institute, 254 samples were deduced given the

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level of precision ( $\alpha$ ) = 0.06. Using systematic sampling and in the interval of 12th, at least 1,000 population sample was selected from every college while 83 respondents were selected to obtain a sample. Data collection employed a questionnaire research instrument. The pilot survey was conducted to ensure reliability and accuracy, where only 24 responses were involved. The pilot study was followed with factor analysis, reliability, and construct validity testing for  $n = 180$ .

Exploratory and confirmatory factor analysis being one part called pre-testing, the fundamental data analysis used multiple linear regression. Before actual data analysis, the collected data were screened, checked for missing values and extreme data, and tested for normality. Moreover, multiple linear regression was undertaken to test for multicollinearity, linearity, and homoscedastic. The multi-collinearity testing was fostered using multiple coefficient determinant (R) and Beta coefficient ( $\beta$ ). Linearity testing applied chi-square hypothesis testing, while homoscedastic testing used modification fit indices and t-test values.

To reveal that multicollinearity existed between items and factors, the R and R-adjusted were in a range of 0.1 to 1 while  $\beta$  is to be  $< 0.5$  [20]. The strength of linearity between factors was revealed given the acceptance decision influenced by chi-square value  $> 0.5$  while  $p < 0.05$  [21]. Homoscedasticity was revealed as indented given absolute fit indices value, 2.1 – 3.1;  $\chi^2 < 0.8$  and incremental fit indices (IFI)  $> 0.90$  [22]. The equation models that guided the study were:-

$$CG = \beta_0 + \beta_1 TET + \beta_2 PET + \beta_3 BA + e \quad 1)$$

$$CG = \beta_0 + \beta_1 DA + \beta_2 LMI + \beta_3 DA * LMI + e \quad 2)$$

Where CG=college graduate; TET=theoretical education and training; PET=Psychomotor education and training; BA=behavioral attitudinal education; DA=education domain attributes; LMI=labor market information; e= stochastic value.

### 3. RESULTS AND DISCUSSION

#### 3.1. Pilot Survey Results

The pilot survey was conducted to test for reliability. This pilot survey (a pretest) involved 24 respondents. From this experiment, the Cronbach's alpha ( $\alpha$ ) values were 0.72; for theoretical education and training (TET), 0.80 for practical education and training (PET), 0.79 for compelling attribution (BA), and 0.76 for skilled college graduates (CG). The questionnaire research instrument proved reliable for the other tests and analyses with these results.

#### 3.2. Data Cleaning and Normality Testing

Before factor and data analysis, the collected data were subjected to cleaning and normality testing. Data cleaning involved deleting missing values and removing outliers. Using the pair-wise data deletion method and from a data set of 8, 5% of missing data were deleted. Using Mahalanobis Distance (MD) computation, 46 extreme data were removed.

Thus, following MD computation, n = 180 responses were retained and subjected to reliability and construct validity, factor analysis, and data analysis. Normality testing used the coefficient of skewness in which the results were spread inform of  $-3\delta \leq z \leq +3\delta$

### 3.3. Reliability and Validity Testing

Reliability testing of the research instrument with n=180 used composite reliability (CR) tool. With the results, C.R  $\geq 0.9$  showed that internal consistency of the questionnaire was to be achieved (See Table 1). The construct validity used average variance explained (AVE) to test for the accuracy of the questionnaire. Given the results (AVE)  $\geq 0.5$ , this shows the validity to be attained (Refer to Table 1).

Table 1. Reliability and Construct Validity Testing Results (n=180)

Constructs	Composite Reliability (C.R)	Validity (AVE)
TET	0.92	0.64
PET	0.90	0.70
BA	0.96	0.59
DA*LMI	0.97	0.65
CG	0.99	0.72

### 3.4. Exploratory and Confirmatory Factor Analysis

Exploratory factor analysis was conducted to test for the strength of belongings of the items or indicators to their respective latent constructs (factors). This qualitative part of factor analysis employed the Keiser Muller Oklin (KMO) and Bartlett test. With the results, KMO  $> 0.5$  while Bartlett us test significance value,  $p < 0.05$ . This indicated that the items fit the model (See Table 2)

Table 2. Rotated Component Matrix

Construct	Items	KMO	Bartlett's test	Absolute fit indices	X <sup>2</sup>	IFI
TET	Theories	0.72	0.03	2.4	0.2	0.91
	Models	0.70				
	Principles	0.56				
	Processes	0.69				
	Standards	0.54				
PET	Furnished facilities	0.71	0.00	2.8	0.4	0.92
	New technologies	0.53				
	Materials	0.61				
	Field excursion studies	0.76				
	Research projects	0.74				
BA	Creativity	0.68	0.00	3.0	0.6	0.91
	Innovation	0.75				
	positivism	0.58				
	Integrity	0.62				
DA*LMI	Education domain attribute1	0.70	0.02	2.6	0.5	0.94
	Education domain attribute 2	0.63				
	Education domain attribute 3	0.68				
	Labor market information	0.71				
CG	Intellectual ability (reasoning)	0.69	0.01	2.5	0.6	0.91
	Experience	0.71				
	Problem-solving	0.75				

### **3.5. Multi colinearity and Hypothesis**

#### **3.5.1. Theoretical education and training for the production of resourceful graduates**

With this subtitle, the study aimed to determine the effects of theoretical education in producing knowledgeable, skilled graduates. The items defining theoretical education and pieces of training included theories, models, principles, processes, and standards in production.  $R = 0.54$ ,  $\beta = 0.21$ , and  $\beta = 0.43$  at  $p = 0.01$  (Refer Table 3) showed that items were positively correlated to their respective construct, i.e., theoretical education and training. The same fact was revealed given  $\text{Chi}^2 = 8$  at  $p = 0.10$ , insignificant (H2a) (See Table 4) the results after moderation. This study's contribution is that TVET theoretical education and pieces of training should be burrowing the new model, theories, processes, and standards from the current labor market. This would either mess up the complaints of most employers and the community at large that their children have gone to school with such costs incurred but are unemployable. Complaints about why most graduates finish their studies with good certificates and grades but cannot find jobs. Adopting the moderator 'labor market information' would make students and graduates creative and innovative, even eager to start and run their businesses. This later would reduce the problem of unemployment for those young graduates, a fact resembling that by Sweller [23].

#### **3.5.2. Practical education and training for the production of resourceful graduates**

With this subtitle, the study aimed at determining the TVET –practical education and training for producing resourceful graduates, that is, graduates with necessary skills on the labor market demand. The practical education and training insist on using modern facilities, technologies, materials, field excursion studies (site works), and research projects are undertaken. From the field area (Refer to Table 3), it was found that  $R = 0.54$  and  $\beta = 0.30$  at  $p = 0.00$ , and  $\beta = 0.43$  at  $p = 0.01$  indicated that practical education and training and its attributes were correlated. Moreover, with  $\text{Chi}^2 = 5$  at  $p = 0.31$  (H2a) (insignificant), the correlation matrix between practical education and training and the production of skilled labor who fit the labor market requirement on demand was deduced. Furthermore, (H2b) results given  $\text{Chi}^2 = 17$  at  $p = 0.01 < 0.05$  in Table 4 showed the results to be highly modified, more positive, and significantly different from before. The positive and significant results prove that practical education and training are crucial for producing resourceful graduates. This is why the derived researcher conducted this study by chipping in on the moderation role of labor market information. Either the study has suggested that for a graduate/student acquainted with necessary skills that confer the labor market pre-requisites on demand, modern facilities or technologies, materials, and research projects cannot be avoided. Indeed the NACTVET colleges should be effectively used by Research Unit to reveal the innovations from the current labor market, as said by Jin [24].

#### **3.5.3. Behavioral attitudinal education and training for the production of resourceful graduates**

With this subtitle, the study was motivated to analyze the effects of behavioral education and training on producing resourceful graduates. The items conforming to

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effective behavioral education and training included creativity, innovation, positivism, and integrity. It was, therefore, with  $R = 0.54$  at  $\beta = 0.44$  and  $\beta = 0.43$ ,  $p = 0.01$ , which proves the multicollinearity relationship to persist between the mentioned items and their respective construct. More positive results were revealed with H3a given  $\chi^2=4$  and  $p=0.20$  (insignificant) (Refer Table 3). Furthermore, linearity positive and significant results were with H3b, where the Chi-square value was 17 at  $p = 0.01$  (significant) (See Table 4).

Those positive results indicated that a student acquainted with behavioral education becomes creative, a risk taker, an innovator, and eager to bring a solution or convert challenges in the environment into opportunities, consistent with what was said by Mandalapu and Gong [25]. Behavioral education was found to raise a student's or graduates' positivistic attitude. This study has said that behavioral TVET education and training prepare candidates to become creators or problem solvers, which was also reported by Matinfar, Bigdeli, and Mashhad [26]. Behavioral TVET education was revealed to produce graduates curious to run their enterprises while exercising integrity.

Table 3. Multiple regression analysis results

Predictors	Coefficients				
	Standardized $\beta$	Unstandardized $\beta$	Error	t	Sig.
Constant	-0.10	-0.20	-	0.10	0.00
TET	0.21	-0.60	-2.90	0.20	0.00
PET	0.30	0.12	0.40	0.31	0.00
BA	0.41	0.01	0.02	0.40	0.00
DA*LMI	0.43	0.02	-0.94	0.43	0.01
R		0.54			

Table 4. Wald's chi-2 Test

Null hypothesis:  $H_1$ :CG =TET; CG=PET;CG=BA;CG=DA\*LMI

Tests	Value	df	Prob.	Remarks
<b>H<sub>1a</sub></b> : CG=TET	8	(4,176)	0.10	Not supported
<b>H<sub>2a</sub></b> : CG=PET	5	(5,175)	0.31	Partially supported
<b>H<sub>3a</sub></b> : CG=BA	4	(5,175)	0.20	Not supported
<b>H<sub>1,2,3 b</sub></b> : CG = DA*LMI	17	(4,176)	0.01	Strongly supported

#### 4. CONCLUSION AND RECOMMENDATIONS

Technical and vocational education and training positively affect production graduates with the necessary skills for the labor market demand. Positivism became intense when the labor market intruded into the system for moderation. The TVET theoretical education and training a student should be acquainted with have positive and significant effects in producing resourceful graduates only if the labor market information is brought into the system. Moreover, it was revealed that the TVET practical education and training were found to have positive and significant effects in creating resourceful graduates. Consistent results were with the construct of behavioral attitudinal education and training, but if labor market information is brought into the system. This either call for the following recommendations to be taken into action:-

Policymakers, government, and through Ministry of Education, Science and Technology need to ensure for emanating teaching and learning infrastructures, materials, and incoming technologies. The NACTVET college management should collaborate with employers (labor market, and conduct research for discoveries and behaviors. Moreover, NACTVET colleges must establish substantial research project units and curriculum updating and development units. Moreover, the curriculum reviews should be of 5 years time interval. Also, tutors are to be equipped with the necessary skills; sent for seminars and workshops to equip them with new ways and methods of teaching.

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