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Effect of Nature of Technical Vocational Education and Training Academic Programs on Employment Category Status of Graduates of National Polytechnics in Kenya: A Multinomial Logistic Approach

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Abstract

This paper looks at determinants of the employment category status of Technical and Vocational Education and Training (TVET) graduates in Kenya. The study's objective was to examine how the structure of TVET programs—specifically whether modular or non-modular—affected the employment outcomes of graduates from national polytechnics in Kenya. The study was anchored on the job search theory. Employing stratified and simple random sampling methods, data was collected through interviews from a sample of 1834 graduates who were part of the 2016 admission cohort at selected national polytechnics in Kenya. Results of the multinomial logistic regression showed that; the nature of course was a significant determinant of employment with the non-modular programs relative to modular programs having a lower relative risk for finding employment. Additionally spell duration, migration patterns, reservation wage, and jobs search intensity were significant determinants of employment category status. For example, When the spell duration increased by one month, the relative risk of finding self-employment in one's field of study to unemployment increased by 12.25% holding other variables constant (RRR=1.1225, $p = 0.000$). Further, by increasing the number of job applications by one, the relative risk of finding employment in one's field of study to unemployment increased by 27.43% holding other variables constant. Additionally, for graduates who migrated, the relative risk of finding employment in their field of study was 84.73% higher compared to those who never migrated. The paper recommends TVET institutions to lay more emphasis on modular programs and offer training on dynamic job search mechanism that can assist young graduates have a smooth transition from college to the world of work.

Key Words: *Employment; Unemployment Spell; Nature of Course; Relative Risk Ratio*

Introduction

Globally the debate over modular versus non modular academic programs in Technical and Vocational Education and Training (TVET) reflects broader educational trends aimed at enhancing employability. Modular programs are increasingly favoured for their ability to provide flexibility and targeted skill development which align closely with industry needs (Hubert, 2010). Countries like Germany and Australia have integrated modular systems that allow students to accumulate credits and competence is specific job roles resulting in higher employment rates among graduates (Weise, & Christensen, 2014). However, non-modular programs still play a significant role in vocational education, particularly by providing a comprehensive understanding of foundational concepts and skills. Critics argue that non-modular programs can sometimes lead to a lack of focus on specific competencies, resulting in graduates who may not be fully equipped to meet precise labour market demands. Nonetheless, the broad educational foundation offered by non-modular programs can foster critical thinking and problems solving abilities, which are highly valued by employers (Cedefop, 2022; Gayan, 2018).



In Africa, the debate between modular and modular academic programs in TVET institutions is increasingly significant, particularly as economy evolve and labour market demands change (Cedefop, 2022). Modular programs approach has been shown to enhance employability by allowing students to acquire specific competencies that are directly applicable in the work force (Cedefop, 2015a). However, many institutions still rely on traditional non-modular curricula, which emphasize broad-based education but may lack the specialization that employers seek. This gap contributes to a persistence skill mismatch, as graduates struggle secure relevant employment due to the insufficient alignment between their training and the specific needs of industries (Esposito, & Scicchitano, 2022; Kahn, 2015; Restrepo, 2015).

Transition into the world of work marks an important milestone, especially for graduates whose vision is to put into practice all the acquired skills learned from training institutions (Ecclestone, Biesta, & Hughes, 2010; Pastore, & Zimmermann, 2019). For TVET graduates, their ability to translate these skills into meaningful employment speaks a lot about the nurturing institutions (Gershon, 2024). Whereas unemployment is a global issue, the extent to which training institutions can channel out graduates with employable skills for employment- whether employed or self - marks a clear demarcation of efficiency and distinction among competing training institutions (Jorre & Oliver, 2018; Ornellas et al., 2019). Better employment opportunities are indicators of training programs that are sensitive to the demands of the industry. Further, the ability to offer specialized, industry-relevant skills and real-world experience is the crux of a forward-looking training institution. TVET graduates are either unemployed, employed in the field of study, employed in a different field of study, self-employed in a field of study or self-employed in a different field of study. Graduates who get employment in their field of study often benefit from a curriculum that is closely aligned with the industry's needs and technologies (Mardis et al., 2018; Cummings, & Janicki, 2020).

1.1 Non-Modular Academic Programs

Non-modular education programs, characterized by their extended and conventional academic pathways, can influence employment category in two distinct ways (Staker et al., 2020; Luke & Young, 2020). On one hand, these programs may offer a broad-based education that could initially contribute to longer periods of unemployment (Doss et al., 2024; Luke & Young, 2020; Rajabalee, 2023). On the other hand, they can also create immediate job opportunities in specific contexts, demonstrating their potential to positively impact employment prospects (Bridgstock et al, 2019; Luke & Young, 2020; OECD, 2023;). Non-modular programs offer a broad integrated approach curriculum that potentially leads to longer job searchers (Healy, 2023). Stewart et al., (2021) posit that non-modular programs having a broader educational scope might result in graduates finding employment in a different field since the skills acquired can be transferable to multiple industries. Davis & Taylor (2023) on the other hand observe that graduates from non-modular courses might face longer unemployment durations if their education does not directly match current job demands. The broad nature of non-modular programs may require additional time for graduates to identify and secure roles that align with their generalized training (Bridgstock, 2009). Lee & Walker (2022) opine that they may not focus as intensely on entrepreneurship or business skills, leading graduates to self-employment in different fields or require additional training to develop a business within their area of expertise. They conclude that the broad-based training of non-modular programs can support diverse entrepreneurial ventures, though they might not be as specialized. Non-modular programs might encourage more diverse self-employment opportunities (Githinji, 2023).

Self-employment in a different field of study can be influenced by the broader scope of non-modular education. Graduates from non-modular programs might leverage their diverse knowledge and skills to start businesses in various fields, benefiting from a wide range of expertise (Staker et al., 2020; Luke, & Young, 2020). Non-modular education often provides a broad skill set that can be applicable in different contexts, supporting entrepreneurial ventures outside the original field of study. Additionally, non-modular programs may lead to jobs in unrelated industries or fields because they have a wide educational content and do not focus on specific skills demanded by the job market (World Bank, 2023)

However, graduates from non-modular programs might experience longer unemployment periods or find employment in different fields due to the less targeted nature of their training (World Bank, 2023). This broad approach can lead to versatility but may not always meet specific job market requirements, affecting the speed and relevance of job placements. These programs might face challenges in securing relevant employment due to the generalized nature of their education, which may not always correspond to specific industry demands (Cedefop, 2015a). Consequently,



graduates from such programs are more likely to secure employment directly related to their field due to the relevance of training and skills acquired (Cedefop, 2015b).

1.2 Modular Academic Programs

There is a belief that modular programs are tightly aligned with market demands and often lead to faster college-to-work transition (OECD, 2023; Stokes, 2017; UNESCO, 2022). When graduates are employed in a different field of study, the nature of their educational program can be a significant factor. Modular courses, by providing specialized skills, might lead graduates to roles in related fields if their targeted skills apply to various industries (Fuller et al., 2022; Weise, & Christensen, 2014). For example, a modular course in digital marketing might prepare students for roles in diverse sectors, even if those roles are not exclusively marketing-focused (Barkas& Dixon, 2023). Hunt et al., (2013) observed that modular programs have a shorter period of unemployment because they emphasize practical and current industry needs. Graduates with targeted skills and certification from modular programs might experience faster job placement.

Self-employment in one's field of study can be particularly influenced by the nature of the course. Modular programs often include modules on entrepreneurship, business management, and industry-specific practices, providing a strong foundation for starting a business in the graduate's area of study (Fuller et al., ; Palmer, 2020; Weise, & Christensen, 2014). This practical approach can facilitate self-employment in the specific field of study, as graduates are equipped with relevant knowledge and skills. Modular programs, which focus on specific industry-related skills, might limit graduates to self-employment opportunities closely related to their field (Mack et al., 2019; Tondi, 2023). The specialized nature of modular courses can also enable graduates to apply their expertise in innovative ways within different sectors, depending on the flexibility of the skills acquired.

Modular TVET programs, which emphasize practical skills and local industry needs, have been shown to improve employment rates in one's field of study. For instance, South Africa's modular programs in engineering and ICT have been linked to better job placement rates due to their alignment with industry standards (African Development Bank, 2023; Ochieng, 2024). In addition, the practical components and industry partnerships, tend to result in higher employment rates within the field of study. For example, modular programs in ICT and manufacturing have been linked to shorter unemployment durations and better alignment with local job market needs (Kenya National Bureau of Statistics, 2024; Ochieng, 2024).

Modular courses, structured into distinct, manageable units, offer flexibility and can be tailored to meet current industry demands. One of the primary advantages of modular courses is their capacity to provide targeted skills and knowledge that align closely with specific job market needs (Gekara, & Snell, 2018; Okolie et al., 2019). This alignment can lead to reduced unemployment duration, as graduates are equipped with relevant and up-to-date skills that are directly applicable to their chosen fields (Okolie, Igwe, Nwosu, Eneje, & Mlanga, 2020; Guàrdia et al., 2021). For example, a modular course in information technology might include specific modules on the latest programming languages and tools, making graduates more competitive in a rapidly evolving industry (Gayan, 2018). Additionally, modular courses often incorporate practical experiences, such as internships, which can enhance employability and ease the transition from education to employment (Okolie et al., 2020;).

However, modular courses can also have drawbacks. The flexibility of modular courses might lead to a fragmented educational experience, where students do not gain a cohesive understanding of their field (Hedges et al., 2014). While modular courses offer targeted skills, they might lack the depth and broad theoretical knowledge provided by non-modular programs (Bragg et al., 2021). As a result, graduates may excel in specialized areas but struggle with broader or interdisciplinary roles that require a more comprehensive educational background (Estaiteyeh et al., 2023). Additionally, the focus on specific skills may limit the adaptability of graduates to roles outside their direct area of study, potentially affecting their employment status if their skills do not align perfectly with available job opportunities.

1.3 Graduate Employment Status

Globally, the employment status of TVET graduates varies significantly across countries, influenced by national policies, economic conditions, and cultural attitudes towards vocational training. In nations like Germany, the dual education system effectively integrates apprenticeships with classroom learning, leading to high employment rates in



graduates' field of study (Gessler, 2019; Kithinji, 2022). Similarly, China has made substantial investments in vocational education, aligning curricula with market demands, particularly in imaging sectors such as technology and renewable energy (Yinghui et al., 2024). However, in the United States, many graduates find themselves employed in fields unrelated to their training, highlighting a significant skills mismatch and the need for better alignment between education and workforce needs (Bureau of Labor Statistics, 2022). This situation underscores the challenges faced by graduates across various contexts whether they are finding work in their field of study, in different fields or remaining unemployed.

In Africa, the employment status of TVET graduates reflects both challenges and opportunities. While many graduates struggle to secure jobs in their trained fields, with a notable number working in different fields, there is also a growing recognition of the importance of vocational training for economic development. (Dixit & Ravichandran, 2023; Maurer, 2021; McGrath, & Powell, 2016). Countries like South Africa have initiated policies to enhance vocational education and promote apprenticeships, aiming to bridge the gap between education and employment (Heaviside et al., 2018; Khare, 2014; Tran, 2016). In many African nations, including Kenya, the disconnect between TVET curricula and the labour market persists, leaving graduates ill prepared for available job opportunities. Many find themselves self-employed in unrelated fields out of necessity, facing barriers such as lack of funding and business training (Birch et al., 2017).

In Kenya the situation is particularly pressing with many TVET graduates finding it difficult to secure employment in the trained fields. This challenge is compounded by societal stigma associated with vocational education which can deter graduates from pursuing relevant job opportunities (Japheth, & Dimo, 2019). Despite the growing demand in sector such as construction and information technology, geographical disparities and inadequate access to resources limit opportunities for many graduates (Alwy, & Schech, 2004; Nyangau, 2014). While some graduates successfully secure jobs in their field of study, a substantial portion find themselves in unrelated roles or self-employment, often driven economic necessity rather than choice (Khainga, & Mbithi, 2018). Addressing these issues requires collaborative efforts between government, educational institutions, and industry to enhance curricula, improve job placement services, and promote entrepreneurship as a viable career path for TVET graduates in Kenya.

2.0 Research Methods

The Study targeted the 2016 admission cohort of selected national polytechnic graduates, pursuing modular and non-modular programs. Stratified sampling and simple random sampling techniques were used to get the sample population. A sample size of 1834 respondents was sampled from a target population of 21151. The study utilized multinomial logistic regression to analyze the factors influencing employment outcomes among graduates. This statistical method was chosen due to its ability to handle multiple categorical dependent variables, allowing for a comprehensive assessment of how various factors, including the nature of educational programs, affected employment status.

3.0 Results & Discussion

3.1 Employment Status by Program Type

Table 1 gives the distribution in percentages employment by category for modular and non- modular programs.

Table 1: Descriptive Statistics

Employment Status	% Modular	% Non-Modular	% Total
Employed in a different field of study	5.77	3.39	9.16
Employed in my field of study	14.46	8.08	22.54
In Training	1.22	0.95	2.17
Self-employed in different fields of study	8.83	4.75	13.58
Self-employed in same field of study	5.97	3.6	9.57
Unemployed	23.42	19.55	42.97
Total	59.67	40.33	100



Table 1 provides information about the employment status of respondents, categorized by program type-modular or non-modular. Of the total respondents, 59.67% pursued modular programs, while 40.33% pursued non-modular programs. 14.46 of modular program graduates were employed in their field of study compared to non-modular graduates with 8.08%. Further, 3.39% of non-modular graduates were employed in a different field of study compared to 5.77% for modular programs. It was also observed that 5.97% graduates were in self-employment in the same field compared to 3.6% for non-modular programs. Finally, the data revealed that the overall unemployment rate was 42.97% with 23.42% who had pursued modular programs and 19.55% pursuing non-modular programs. The results revealed that while modular programs offered better alignment with field-specific employment, they also showed a slightly higher rate of unemployment compared to non-modular programs.

An analysis of variance was performed to find out if the differences in the nature of the course (modular vs. non-modular) on the employment status were significant.

3.2 Bivariate Analysis-ANOVA

Table 2: Analysis of Variance of Nature of Academic Program

Analysis of Variance					
Source	SS	df	MS	F	Prob > F
Between groups	3.23	1	3.23	13.14	0.00
Within groups	361.55	1473	.25		
Total	364.78	1472		0.25	
Bartlett's equal-variances test:	chi2(1) = 0.1706		Prob>chi2 = 0.680		
Bonferroni post hoc test	f -0.095448		P = 0.000.		

Table 2 presents the results of a one-way analysis of variance (ANOVA) to determine the effect of the nature of the course (modular vs. non-modular) on the employment status of individuals. The "Between groups" values indicate that the sum of squares was 3.3 with 1 degree of freedom and a mean square of 3.23. The "Within groups" values for sum of squares was 361.55 with 1471 degrees of freedom and a mean square of 0.25. The results showed a significant difference between the modular and non-modular course groups regarding employment status ($F(1, 1472) = 13.14, p = 0.0003$). The Bartlett's test for equal variances was not statistically indicating that the assumption of equal variances was not violated ($\chi^2(1, N=1473) = 0.1706, p = 0.680$). Additionally, the Bonferroni post hoc test showed a significant mean difference between the non-modular and modular course groups ($MD = -0.095448, p = 0.000$). This indicated that individuals who took non-modular courses had slightly lower employment rates compared to those who took modular courses, and this difference was statistically significant. These results confirm with the findings of Gayan (2018) who argued that individuals who pursued non-modular courses exhibited slightly lower employment rates compared to those who pursue modular courses. The significance of this difference underscores the potential influence of course structure on labour market outcomes, suggesting that modular programs may offer advantages in facilitating employment opportunities for TVET students. These findings provide empirical evidence supporting the association between course type and employment rates, informing discussions on the effectiveness of different instructional approaches in preparing students for the workforce. A further analysis was performed through a multinomial logistic model to establish which variables influenced the employment category.

3.3 Multivariate Analysis- Multinomial Logistic Regression

A multinomial logistic regression analysis with relative risk ratio (RRR) provided insights into how the nature of academic programs and other control variables influenced the likelihood of employment in different employment categories.



Table 3: Multinomial Logistic Regression

EmployCat	Employed_Diff Field		Employed_Own Field		Self-Employed_Diff Field		Self-Employed_Own Field	
	RRR	P>z	RRR	P>z	RRR	P>z	RRR	P>z
Nature of Course	0.4967	0.039	0.4815	0.015	0.5743	0.083	0.5272	0.052
Spell Duration	1.0946	0.000	1.1091	0.000	1.1225	0.000	1.1116	0.000
Application8WKS	1.1492	0.033	1.2743	0.000	1.2793	0.000	1.3351	0.000
Migration_TO	1.7028	0.025	1.8473	0.005	1.4345	0.116	1.5834	0.048
Reservation Wage	1.0004	0.000	1.0004	0.000	1.0004	0.000	1.0004	0.000
Job search Intensity	1.9438	0.000	1.3969	0.043	1.8952	0.000	1.3177	0.128
Gender	1.4212	0.274	1.6915	0.069	1.4432	0.230	1.8728	0.050
Course Duration	0.9733	0.084	0.9627	0.003	0.9882	0.399	0.9830	0.216
Academic Qualification	1.1206	0.588	1.5206	0.028	1.0498	0.811	1.1031	0.636
cons	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 3 shows a multinomial logistic regression conducted with 1473 observations to examine the factors influencing employment status. The model was statistically significant, ($\chi^2(75, N=1472) = 280.08, p = 0.000$). This showed that the predictors collectively had a significant effect on employment category status. The results indicate that the type of course- Modular or non-modular significantly affected employment category status even when controlling for reservation wage, number of job applications, migration patterns, and job search intensity.

In the category of "Employed in a Different Field of Study," several variables were significant. The variable "Nature of Course" had a RRR of 0.4967 and was statistically significant ($p = 0.039$). The results showed that respondents who pursued non-modular programs had a 50.5% lower relative risk of being employed in a different field of study compared with those who were unemployed. For each additional year of unemployment (Spell Duration), there was a 9% higher chance in the likelihood of finding employment in a different field compared with those who were unemployed (RRR = 1.0946, $P = 0.000$). Further, by increasing the number of applications (Application8WKS), by one the relative risk for finding employment in own field of study to unemployment increased by 27.43% other variables held constant (RRR= 1.1492, $P = 0.000$). Respondents who migrated(migration_TO) relative to those who did not had a 70.28% higher chance of finding employment in a different field of study compared with those who were unemployed (RRR= 1.7028, $p = 0.025$). Similarly, respondents who had high job search intensity relative to those who had low job search intensity had 94.38% higher chance of finding employment in a different field of study compared to those unemployed. Reservation wage(reservation_wage2) had a marginal influence on employment in a different field of study compared to those who were unemployed (RRR= 1.0004, $p = 0.000$).

For the "Employed in my Field of Study" category, the nature of the course was statistically significant (RRR=0.4815, $P = 0.015$)- non-modular programmes relative to modular programmes, the relative risk for finding employment in own field of study to unemployment decreased by a factor of 0.4815 given the other variables in the model are held constant. In addition, if respondents were to increase the spell duration (Spell Duration) by one month, the relative risk for finding employment in their own field to unemployment would be expected to increase by a factor of 1.1091 given the other variables in the model are held constant. The number of applications (Application8WKS) was statistically significant (RRR= 1.2743, $p = 0.000$). Increasing the number of applications by one, the relative risk for finding employment in own field of study to unemployment would increase by 27.43% other variables held constant. For respondents who migrated relative to those who did not migrate, the relative risk for finding employment in their own field of study to unemployment increased by 84.73% (RRR= 1.8473, $p = 0.000$). Further, an increase in the reservation wage by one unit, the relative risk for finding employment in one's own field of study to unemployment was statistically significant but very marginal (RRR= 1.0004, $p = 0.000$). The job search intensity significantly affected employment in one's own field (RRR=1.1369, $p = 0.043$). For high job search intensity relative to low job search intensity, the relative risk for finding employment in own field of study to unemployment increased by 39.69 % given the other variables in the model were held constant (RRR=1.3969, $p = 0.043$). On the course duration, a one-year increase in the course duration, the relative risk for finding employment in one's field of study to unemployment



decreased by 3.7%. (RRR= 0.9627, $p = 0.003$). Academic qualifications significantly affected employment in one's field of study (RRR= 1.5201, $p = 0.028$). For respondents who had higher academic qualifications relative to artisan qualifications, the relative risk for finding employment in one's own field of study to unemployment increased by 52.01% other variables held constant. Other variables such as gender, marital status, age, education sponsor, and exam grade did not influence one's probability of being employed in one's field of study.

For the "Self-Employed in a Different Field of study" category, "Spell duration" was statistically significant (RRR=1.1225, $p=0.000$). By Increasing the spell duration by one month, the relative risk for finding self-employment in own field of study to unemployment increased by 12.25%, other variables remained constant. Additionally, increasing the number of applications by 1, the relative risk for finding employment in one's own field to unemployment increased 27.93%, given the other variables in the model were held constant. Reservation wage had a minimal effect on the likelihood of employment in a different field of study compared to being unemployed although this was statistically significant (RRR= 1.0004, $p = 0.000$). Finally, high job search intensity relative to low job search intensity had a relative risk of finding a job in a different field of study compared to unemployed of 89.52%. the other variables were not significant determinants of employment in this category.

In the "Self-Employed in Field of Study" category, the nature of the course was statistically significant (RRR= 0.5272, $P= 0.052$)- non-modular programmes relative to modular programmes, the relative risk for finding employment in own field of study to unemployment decreased by a factor of 0.0.5272 given the other variables in the model were held constant. In addition, increasing the spell duration (Spell Duration) by one month, the relative risk for finding employment in their own field to unemployment increased by 11.16%, other variables in the model are held constant. The number of applications (Application8WKS) was statistically significant (RRR= 1.3351, $p= 0.000$). Increasing the number of applications by one, the relative risk for finding employment in own field of study to unemployment increased by 33.51% other variables held constant. Also, migration (migration to) was statistically significant (RRR=1.5834, $p= 0.048$). The relative risk of finding self-employment in own field of study to unemployment increased by 58.34%, other variables held constant. "Gender" was another significant variable (RRR= 1.8728, $p= 0.50$) indicating that being male increased the likelihood of self-employment in the one's field by 87.28, other variables held constant. Reservation wage had a marginal effect on employment status in self-employment in one's field.

4.0 Conclusion

In conclusion, the observed differences in course structure and labour market outcomes suggest that modular programs could play a crucial role in improving employment opportunities for TVET students. The empirical evidence underscores the importance of course type in influencing employment rates, emphasizing the need for further exploration of different instructional methods to effectively prepare students for successful careers in the workforce. In contrast, non-modular courses might provide a more general education but can sometimes result in longer unemployment durations or employment in fields different from the graduate's area of study (Kayere, Moritz, & Paquin, 2019; Musyimi, 2021). Self-employment outcomes can also vary, with modular courses potentially offering better preparation for entrepreneurial ventures in one's field of study. Thus, the choice between modular and non-modular education can significantly influence an individual's employment trajectory and success.

Additionally, the analysis highlighted several significant factors that influence different employment outcomes compared to being unemployed. Migration patterns increased the probability of finding employment. Respondents who migrated showed positive employment outcomes compared with those who did not. Additionally, job search intensity was a significant determinant of employment outcome. Respondents with a higher job search intensity showed higher employment outcomes. TVET graduates should consider making more job applications to find job placements. The minimum wage rate acceptable for one to take up a job offer had a marginal effect across the four types of job statuses. Other variables did not indicate significant determinants of employment status. These included gender and academic qualification.

5. Recommendations

The paper recommends that training institutions should implement modular structures to enhance job readiness and reduce unemployment durations by providing targeted, practical skills. Additionally, non-modular programs should integrate more practical and career-focused elements to better prepare students for the job market and reduce employment gaps.



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