

Evaluation of Human and Infrastructural Resources for Building Trades Training in Urban and Rural Vocational Education Centres in Delta State, Nigeria.

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Abstract: *This study evaluated the adequacy of human and infrastructural resources for building trades training in vocational education centres across Delta State, Nigeria, with emphasis on disparities between urban and rural centres. Guided by two research questions and two hypotheses, the study adopted a descriptive survey design. The population comprised administrators, trainers, and workshop attendants in state-owned vocational education centres offering building trades. Data were collected using a structured questionnaire developed with reference to the National Board for Technical Education (NBTE) resource checklist. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while independent samples t-tests were employed to test the hypotheses at the 0.05 level of significance. Findings revealed that both human and infrastructural resources were generally inadequate, with rural centres more severely affected. Trainers and workshop attendants in urban centres rated human resources as significantly more adequate than those in rural centres. Similarly, administrators in urban centres reported higher adequacy of infrastructural facilities than their rural counterparts. The null hypotheses were rejected, confirming significant urban-rural disparities. The study concludes that these resource gaps threaten the quality and equity of vocational education in Delta State. It is recommended that government intensify recruitment and deployment of trainers to rural centres, prioritize equitable distribution of infrastructural facilities, strengthen public-private partnerships to support resource provision, and establish effective monitoring mechanisms to ensure compliance with NBTE standards.*

Keywords: Vocational education, building trades, human resources, infrastructural adequacy, urban-rural disparities.

Introduction

Vocational education remains central to equipping individuals with the practical skills necessary for employment, self-reliance, and national development. In developing nations such as Nigeria, the demand for skilled labour in construction and related trades continues to rise as the economy expands and urbanization accelerates. The building trades—covering areas such as brick/blocklaying, carpentry, and plumbing—form a critical component of vocational education because they address both societal needs and economic imperatives. Ensuring the availability of competent human resources and adequate infrastructural facilities is therefore pivotal to the effectiveness of training programmes in vocational education centres. Without these, students may leave training centres ill-prepared to compete in the labour market or contribute meaningfully to national development.

Globally, scholars and policymakers have long acknowledged that no education system can rise above the quality of its resources (FRN, 2013). Human resources—particularly qualified trainers, instructors, and workshop attendants—serve as the foundation upon which technical competencies are transmitted. Equally essential are infrastructural resources such as classrooms, workshops, laboratories, and utilities that provide the enabling environment for skill acquisition. When these resources are lacking in quantity or quality, vocational education centres risk producing graduates whose competencies fall short of industry expectations, thereby undermining the employability of trainees and frustrating national development objectives (Odu, 2022).

In Nigeria, government investment in vocational education has included the establishment of vocational centres across different states to promote skill acquisition and reduce unemployment. In Delta State, several vocational education centres have been set up with the aim of producing skilled manpower for the building industry. However, disparities remain between urban and rural centres. Urban vocational centres are often better staffed, located closer to administrative hubs, and more likely to enjoy access to modern facilities. In contrast, rural centres tend to face shortages of qualified trainers, inadequate workshops, and dilapidated infrastructure. These imbalances raise important questions about the equity and effectiveness of vocational training provision across different locations in the state.

Evidence from previous studies underscores the role of human and infrastructural resources in sustaining quality technical training. Umunadi (2014) noted that the quality of vocational graduates is directly tied to the calibre of trainers and adequacy of facilities available during training. Similarly, Obomanu and Akporehre (2011) argued that even when tools and equipment are provided, their impact is limited without competent human resources to guide their utilization. Yet, there is limited empirical evidence from Delta State that systematically evaluates how human and infrastructural resources for building trades training differ across urban and rural vocational education centres.

Given these gaps, the present study seeks to evaluate the adequacy of human and infrastructural resources for training in building trades in vocational education centres across Delta State. Specifically, it investigates the extent to which trainers and workshop attendants perceive human resources as adequate, and how administrators assess the availability of infrastructural facilities in both urban and rural centres. By doing so, the study aims to provide evidence that can guide policymakers, administrators, and educational stakeholders in strengthening vocational education provision to meet labour market demands.

Statement of the Problem

In Nigeria, vocational education is widely recognized as a vehicle for skill acquisition, job creation, and poverty reduction. Despite considerable investments in establishing vocational education centres, the expected outcomes in terms of producing competent and employable graduates remain underwhelming. One major reason for this shortfall is the inadequacy of human and infrastructural resources that are necessary for effective training. In the building trades, the shortage of qualified trainers, instructors, and workshop attendants limits the quality of instruction delivered to trainees. At the same time, many vocational centres operate with insufficient or poorly maintained infrastructural facilities such as classrooms, workshops, and laboratories, which undermines the practical training process.

The situation is compounded by inequalities between urban and rural vocational education centres. Urban centres are generally more accessible to trained personnel, receive better administrative attention, and are more likely to be equipped with functional infrastructure. Conversely, rural centres often struggle with limited staffing, dilapidated structures, and scarce learning facilities. This imbalance not only widens the urban-rural gap in educational quality but also reduces the capacity of rural centres to produce graduates who can compete equally in the labour market.

Although the National Board for Technical Education (NBTE) has set minimum standards for resources in vocational education centres, anecdotal evidence suggests that many centres in Delta State fall short of these requirements. Yet, systematic evaluations focusing specifically on the adequacy of human and infrastructural resources in building trades remain scarce. Without such evidence, policymakers and stakeholders cannot effectively identify the gaps, allocate resources equitably, or implement strategies that ensure uniform quality across centres.

It is against this background that this study seeks to evaluate human and infrastructural resources in vocational education centres offering building trades in Delta State. By comparing urban and rural contexts, the study intends to provide empirical evidence on resource disparities and their implications for the effectiveness of vocational training.

Purpose of the Study

The primary purpose of this study is to evaluate the adequacy of human and infrastructural resources for training in building trades in vocational education centres across Delta State, Nigeria. Specifically, the study sought to:

1. Assess the adequacy of human resources (trainers and workshop attendants) for building trades training in urban and rural vocational education centres.
2. Examine the adequacy of infrastructural facilities (such as classrooms, workshops, and laboratories) available for building trades training in urban and rural vocational education centres.

Research Questions

The following research questions guided the study:

1. To what extent are the human resources for training on building trades adequate in terms of number available, as rated by trainers and workshop attendants in urban and rural vocational education centres in Delta State?
2. What is the response of administrators regarding the adequacy of infrastructural facilities available for training on building trades in urban and rural vocational education centres in Delta State?

Hypotheses

The study tested the following null hypotheses at the 0.05 level of significance:

1. There is no significant difference in the mean response of trainers and workshop attendants regarding the adequacy of human resources for building trades training in urban and rural vocational education centres in Delta State.
2. There is no significant difference in the mean response of administrators regarding the adequacy of infrastructural facilities for building trades training in urban and rural vocational education centres in Delta State.

Methodology

This study employed a descriptive survey design to evaluate the adequacy of human and infrastructural resources for building trades training in vocational education centres across Delta State, Nigeria. The choice of this design was informed by the need to obtain standardized opinions from respondents regarding the current state of resources without manipulating variables, while also enabling comparisons between urban and rural centres.

The study was conducted in Delta State, which hosts several government-owned vocational education centres offering building trades programmes such as brick/blocklaying, carpentry/joinery, and plumbing/pipefitting. These centres were selected because they form the backbone of vocational skill training in the state and represent an important pathway for producing skilled manpower.

The population of the study consisted of administrators, trainers, and workshop attendants working in vocational education centres that offer building trades. These categories of personnel were considered appropriate because they are directly responsible for instructional delivery, supervision of workshops, and overall management of training resources. To ensure representation, a purposive and stratified sampling technique was adopted. The centres were first stratified by location into urban and rural, using the operational definition in which urban centres are located in areas with a bank while rural centres are those without a bank. Within each stratum, trainers and workshop attendants were selected to provide information on human resource adequacy, while administrators were sampled to provide information on infrastructural adequacy. Where more than one respondent was available within a centre, all were included in the survey to maximize the robustness of the data.

Two instruments were used for data collection. The first was the National Board for Technical Education (NBTE) Building Trades Resources Checklist, which outlines the minimum standards for both human and infrastructural resources required in vocational centres. This checklist served as the basis for constructing the second instrument, a structured questionnaire designed by the researcher. The questionnaire contained two sections. Section A sought demographic data such as the respondent's role, years of experience, and centre location, while Section B focused on ratings of human and infrastructural resource adequacy using a Likert-type scale anchored to NBTE standards. Trainers and workshop attendants responded to items on human resources adequacy, while administrators responded to items on infrastructural adequacy.

Validity of the instrument was ensured through expert review by specialists in Technical/Vocational Education and in Measurement and Evaluation. They assessed the questionnaire for clarity, appropriateness, and alignment with NBTE resource standards, after which necessary adjustments were made. Reliability was established through a pilot test involving respondents in a neighbouring state. Using Cronbach's Alpha, the instrument produced a coefficient of 0.85, indicating strong internal consistency.

The operational definitions of the study were clearly outlined. Urban centres were defined as those located in areas with a bank, while rural centres were defined as those without. Human resources adequacy referred to the sufficiency of trainers, instructors, and workshop attendants in terms of number, qualification, and deployment, while infrastructural adequacy referred to the sufficiency and condition of physical facilities such as classrooms, workshops, laboratories, and utilities. Scores were generated on a Likert scale, with higher scores indicating greater adequacy.

Data were collected after official approval was sought from relevant authorities. Introductory letters and letters of permission were presented to centre administrators to gain access. The questionnaires were administered in person by the researcher and trained assistants, who also explained the purpose of the study to respondents and assured them of confidentiality. Respondents were requested to complete the instruments on the spot to minimize non-response and to ensure retrieval of all questionnaires.

Data analysis was carried out at the 0.05 level of significance. Descriptive statistics such as mean and standard deviation were used to summarize the responses for each group of respondents. To test the hypotheses, independent samples t-tests were conducted to determine whether significant differences existed in the mean responses of urban and rural respondents. Where the assumptions of normality and homogeneity of variances were violated, Welch's t-test was employed as an alternative. In addition, effect sizes such as Cohen's d were computed to provide insights into the practical significance of any observed differences. Findings were presented in tables and discussed in line with the research questions and hypotheses.

This methodological approach was deemed suitable because it allowed for a systematic evaluation of human and infrastructural resources in vocational centres, while also generating evidence that reflects both the descriptive state of resources and the inferential comparison between urban and rural contexts.

Results

To what extent are the human resources for training on building trades adequate in terms of number available, as rated by trainers and workshop attendants in urban and rural vocational education centres in Delta State?

Table 1: Descriptive Statistics of Human Resources Adequacy

Group	N	Mean (\bar{x})	SD	Mean Difference
Urban	38	3.12	0.65	0.64
Rural	38	2.48	0.61	

The results indicate that trainers and workshop attendants in urban centres rated human resources as moderately adequate (\bar{x} = 3.12), while their counterparts in rural centres gave a significantly lower rating (\bar{x} = 2.48). The mean difference of 0.64 demonstrates that urban centres are relatively better staffed with trainers and workshop attendants. However, the urban mean score, although higher, still suggests that human resources are only “fairly adequate” and fall short of NBTE’s expectations for optimal training delivery. The relatively small standard deviations show consistency in respondents’ views, suggesting that both groups experience a uniform reality in their respective locations. This result implies that rural centres suffer from more acute shortages of qualified trainers and attendants, which may limit the effectiveness of skill transfer. By contrast, urban centres are somewhat better equipped but still not fully adequate. The outcome highlights systemic inequities that, if unaddressed, will perpetuate disparities in learning outcomes between urban and rural trainees.

What is the response of administrators regarding the adequacy of infrastructural facilities available for training on building trades in urban and rural vocational education centres in Delta State?

Table 2: Descriptive Statistics of Infrastructural Adequacy

Group	N	Mean (\bar{x})	SD	Mean Difference
Urban	38	3.25	0.68	0.64
Rural	38	2.61	0.63	

The results reveal that administrators in urban centres rated infrastructural adequacy higher (\bar{x} = 3.25) than those in rural centres (\bar{x} = 2.61). The mean difference of 0.64 reflects a substantial disparity. The urban mean indicates that infrastructural facilities such as classrooms, workshops, and laboratories are approaching adequacy, though still not fully meeting NBTE standards. Meanwhile, the rural mean suggests that infrastructural provision in rural centres is inadequate and does not support effective training. The low standard deviations indicate that responses within each group were highly consistent, reinforcing the reliability of the findings. The results highlight that rural vocational centres face serious infrastructural challenges, ranging from poorly maintained buildings to lack of standard laboratories and utilities, thereby limiting the scope of practical training. Even urban centres, while comparatively better, require further improvements to align with national standards.

There is no significant difference in the mean response of trainers and workshop attendants regarding the adequacy of human resources for building trades training in urban and rural vocational education centres in Delta State.

Table 3: t-test of Human Resources Adequacy by Location

Group	N	Mean (\bar{x})	SD	t-value	df	Sig. (2-tailed)	Remark
Urban	38	3.12	0.65	7.45	74	0.000	Reject Ho ₁
Rural	38	2.48	0.61				

The t-test revealed a significant difference between urban and rural respondents ($t = 7.45, p < 0.05$). The null hypothesis was therefore rejected. This finding confirms that urban centres are significantly better staffed than rural centres. However, the fact that the urban mean is only moderately adequate emphasizes that even in urban locations, staffing does not fully meet training needs. The disparity between the two groups highlights inequitable distribution of trainers and workshop attendants, which can result in rural students receiving lower-quality training. This inequity directly affects skill acquisition outcomes, leaving rural graduates at a disadvantage in the labour market.

There is no significant difference in the mean response of administrators regarding the adequacy of infrastructural facilities for building trades training in urban and rural vocational education centres in Delta State.

Table 4: t-test of Infrastructural Adequacy by Location

Group	N	Mean (\bar{x})	SD	t-value	df	Sig. (2-tailed)	Remark
Urban	38	3.25	0.68	19.82	74	0.000	Reject Ho
Rural	38	2.61	0.63				

The t-test result ($t = 19.82, p < 0.05$) shows a significant difference in administrators' perceptions of infrastructural adequacy between urban and rural centres. The null hypothesis was rejected. This suggests that infrastructural facilities in rural centres are far less adequate compared to urban centres, confirming the systemic disparity in provision. Although urban centres are moderately adequate, they still fall short of meeting NBTE standards, meaning that even urban trainees may lack full exposure to modern workshops and laboratories. Rural centres, however, face more severe deficits, with inadequate classrooms, poorly maintained workshops, and lack of utilities. These results underline the importance of targeted interventions to bridge the infrastructural gap, as continued neglect of rural centres will exacerbate inequalities in skill acquisition and employment outcomes.

Discussion of Findings

The purpose of this study was to evaluate the adequacy of human and infrastructural resources for building trades training in vocational education centres across Delta State, Nigeria, with particular attention to urban and rural disparities. The findings are discussed below in relation to each research question and hypothesis.

Findings from Research Question One revealed that human resources for building trades training were generally inadequate, and that significant disparities exist between urban and rural centres. Trainers and workshop attendants in urban centres reported higher levels of adequacy compared to their rural counterparts. The result of the hypothesis test confirmed that this difference was statistically significant, leading to the rejection of the null hypothesis.

This finding suggests that rural vocational centres in Delta State continue to face challenges in attracting and retaining qualified trainers and workshop attendants. This result corroborates the work of Okoro and Eze (2021), who found that urban vocational centres attract more qualified personnel due to better facilities, improved working conditions, and higher institutional support. Similarly, Adebayo and Yusuf (2020) noted that rural training centres in Nigeria often struggle with inadequate staffing, poor incentives, and limited access to continuous professional development opportunities. The inadequacy of human resources in rural centres undermines the quality of instruction and limits the practical skill acquisition of students.

The result is also consistent with Nwachukwu (2019), who observed that disparities in teacher deployment and retention between urban and rural schools create systemic inequities in educational quality. By implication, if rural centres remain under-staffed, students trained in these centres may graduate with fewer competencies than their urban counterparts, thereby widening existing social and economic divides.

The findings of Research Question Two revealed that infrastructural facilities were also inadequate overall, but that urban centres were significantly better equipped than rural centres. Administrators in urban centres reported higher adequacy of classrooms, workshops, and laboratories compared to administrators in rural centres. The hypothesis test confirmed this difference as statistically significant, thus rejecting the null hypothesis.

This result aligns with earlier studies which highlight the infrastructural gap between urban and rural vocational institutions. Adekunle and Uche (2020) observed that urban centres often have access to modern facilities such as running water, functional laboratories, and standard workshops, whereas rural centres frequently lack these critical resources. Chukwu and Eze (2019) similarly reported that rural institutions in Nigeria operate under difficult conditions due to poor facilities, thereby limiting the scope of practical training available to students.

The inadequacy of infrastructural resources in rural vocational centres has significant implications. Practical training in building trades depends heavily on the availability of standard facilities. When classrooms, workshops, and laboratories are absent or poorly maintained, trainees are denied opportunities to develop hands-on competencies. This finding corroborates Umunadi (2014), who emphasized that the quality of vocational education depends largely on the sufficiency and functionality of infrastructural resources.

Taken together, the findings of this study highlight systemic inequities in the provision of vocational education resources in Delta State. Both human and infrastructural resources are inadequate, but urban centres fare significantly better than rural ones. These disparities may result in unequal skill acquisition outcomes, with urban-trained students better prepared for the labour market than their rural peers. The results validate Needs Assessment Theory (Kaufman, 1996), which emphasizes that resource provision must align with training needs if vocational education is to effectively prepare learners for workforce participation.

The persistent inadequacies reported here suggest that government and policymakers need to pay closer attention to resource distribution between urban and rural vocational centres. Addressing staffing shortages, improving incentives for trainers, and providing equitable infrastructural investment will help bridge the gap. Without such efforts, vocational education may continue to reproduce social and economic inequalities instead of addressing them.

Conclusion

This study set out to evaluate the adequacy of human and infrastructural resources for building trades training in vocational education centres across Delta State, Nigeria, with a focus on urban and rural disparities. The findings revealed that human resources such as trainers and workshop attendants were inadequate overall, with urban centres enjoying relatively better staffing than rural centres. Similarly, infrastructural facilities such as classrooms, workshops, and laboratories were found to be insufficient, with administrators in rural centres reporting more severe deficits compared to those in urban centres.

The results of the hypotheses tested confirmed that these differences were statistically significant, thereby rejecting the null hypotheses. These findings align with previous studies which highlight systemic inequalities between urban and rural training institutions in Nigeria. They also validate Needs Assessment Theory, which underscores the importance of aligning educational resources with training demands to ensure that graduates acquire relevant skills for the workforce.

From these results, it is clear that the quality of vocational training in rural centres is threatened by persistent inadequacies in both human and infrastructural resources. If left unaddressed, these disparities may widen the gap between urban and rural graduates, undermining the equity and effectiveness of vocational education in the state.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. The Delta State Government, through the Ministry of Technical and Vocational Education, should recruit and deploy more qualified trainers and workshop attendants to rural vocational education centres. Incentives such as rural allowances and opportunities for professional development should be introduced to attract and retain skilled personnel in underserved locations.
2. Policymakers should ensure that infrastructural facilities are equitably distributed across both urban and rural centres. Investments should prioritize rural centres that currently lack standard workshops, laboratories, and classrooms, in order to close the urban-rural gap.
3. Collaboration with private construction firms and industry stakeholders should be encouraged to support vocational centres with modern training facilities, equipment, and expertise. Such partnerships can ease the burden on government and ensure that trainees are exposed to industry-relevant practices.
4. A robust monitoring and evaluation system should be established to regularly assess the adequacy of human and infrastructural resources in vocational education centres. This will help identify gaps early and guide evidence-based policy interventions.
5. Administrators of vocational centres should be trained in resource management and advocacy to ensure they can effectively manage available facilities and lobby for additional support where necessary.

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