INTEGRATING APPRENTICESHIP PROGRAMMES IN BUILDING CONSTRUCTION SKILLS ACQUISITION AMONG TECHNICAL COLLEGE STUDENTS IN ENUGU STATE

Chukwu, D. U. & Aniebonam, V. C.
Department of Industrial Technical Education, University of Nigeria, Nsukka
Correspondence: chukwu.daniel@unn.edu.ng; +234803 632 4455

Abstract
This study explored the perception of some stakeholders on integrating apprenticeship programmes in building construction skill acquisition among technical college students in Enugu State. The study adopted a descriptive survey research design. Population for the study comprised technical college teachers, construction site supervisors/managers and site workers, and building construction students, drawn using accidental and snowball sampling techniques. Data collection was done using an instrument titled Apprenticeship and Technical College Programme Questionnaire (ATCPQ). The questionnaire was face-validated by three experts and tested for internal consistency using Cronbach alpha. An overall reliability coefficient of 0.90 was obtained. The instrument was administered directly to the respondents, and data collected were analyzed using Mean statistics and Analysis of Variance (ANOVA). Results show that respondents are aware of apprenticeship programmes' viability in imparting building construction skills to technical college students, including technical skills for block/brick laying, draughtsmanship, blueprint reading, masonry and concreting etc. Beyond technical skills, respondents believe that apprenticeship programmes facilitate the acquisition of complementary skills such as communication, teamwork, time management, and creativity. The one-way ANOVA results indicate statistically significant differences between groups in terms of perception, acquirable building construction skills, and challenges, while relevance was not significant. These findings suggest that respondents' views on the importance and effectiveness of apprenticeship programmes, the specific skills they believe can be acquired, and the challenges faced in implementing these programmes vary significantly across different groups. Thus, it was recommended among others that technical colleges should offer personalized support and mentorship to cater to the diverse needs and expectations of students.
Keywords: Apprenticeship Programmes, Building Construction, Skill Acquisition, Technical Colleges

Introduction

Technical colleges are secondary institutions that provide technical and vocational education through classroom instruction and practical workshops. A technical college is an educational institution that focuses on providing specialized training and education in practical skills and applied sciences, preparing students for specific careers or industries. The curriculum is specialized and designed to build job-ready skills and applied competencies. In Nigeria, technical colleges offer 1–3-year programmes to train skilled labour and craftspeople for the industries. Graduates of technical colleges are awarded the National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) (Federal Republic of Nigeria [FRN], 2013). Following the provision of the national policy on Education, technical colleges provide career-focused training and education programmes across a range of technical and occupational fields such as engineering, information technology, business, healthcare, electronics, and building construction among others. In justifying the importance of the institution, the National Board for Technical Education [NBTE] (2001) reports that technical colleges play vital roles in skills training and workforce development for Nigeria's construction industry. Thus, technical colleges, being skill acquisition and certification institutions, are expected to train and turn out graduates who are job-ready with the necessary skills and competencies. Hence, graduates of building construction from technical colleges are expected to fit into the labour market with sufficient skills required in masonry, plumbing, painting and decorating, and block/bricklaying among others (Chukwu et al., 2020).

Building construction is one of the domains of civil engineering focused on the science, trade and work involved in developing infrastructural facilities. Building construction encompasses the on-site trades, processes, and activities involved in erecting, extending, or modifying buildings. It encompasses the planning, designing, building, maintenance and renovation of structures including houses, office

blocks, schools, hospitals, bridges, roads, dams and other projects (Allen & Iano, 2019). Moreover, building in construction refers to the structures and facilities constructed using inputs from diverse fields including building trades' men and women, engineers, architects, surveyors etc. The building construction workforce fabricates, assembles, installs, and repairs structural and technical components like steel, wood, and concrete materials to complete residential, commercial, and industrial buildings (Allen & Iano, 2019). Every aspect of the jobs in carrying out key activities in the building construction sector requires skills.

Skills refer to the set of learned abilities and competencies required to proficiently execute the tasks and technical processes associated with an occupation or trade. (Ohagwu et al., (2021) defined skills as an outcome of a proper skill acquisition programme with which recipients improve their economic standards and earn a living. According to Dörnyei, (2019), skill acquisition is the process of learning and mastering specific competencies required for successful performance in a particular domain. Skill acquisition emphasizes the role of motivation, self-regulation, and social interaction in facilitating skill development. Optimizing skills development requires combining theoretical foundations with extensive applied practice. Onugha (2012) added that skill is knowledge that is put into practical use, one that is translated into activity. Therefore, a skill training institution like the technical college is supposed to be up-to-date with tools and equipment, laboratories, classrooms and other facilities to aid effective teaching and learning, targeted at putting knowledge into practical use.

However, it has been observed that skill acquisition through technical colleges faces a lot of challenges such as inadequate laboratories and workshops, lack of entrepreneurship teachers, inadequate time allotted for practical, inadequate tools and equipment etc. (Okolie et al., 2019). Other challenges are funding shortages for facilities, equipment, and materials, which constrain practical opportunities; more qualified instructors are needed, curriculum requires updating to close skill gaps, and lack of qualified instructors with industry experience also constrains effectiveness (Okoye & Arimonu, 2016). As a result of the lapses in technical colleges' skill acquisition programme implementations, theorizing and certifications without saleable skills have become the norm, making the graduates face unemployment as they are classified as half-baked (Chukwu et al., 2020; Ohagwu et al., 2021). In seeking solutions, the literature suggests that increased funding, public-private collaborations, curriculum revisions focused on job needs, and instructor development can enhance skill acquisition efforts of the institutions, even in building construction (Chukwu et al., 2024). We, therefore, argue that to augment the lapses in facilities, tools and equipment required for students' skill acquisition, non-availability or deplorable workshops, and teachers' inability to teach skills, apprenticeship programmes should be integrated and encouraged among students of building construction trades in technical colleges.

An apprenticeship programme is an informal learning system and a traditional way of learning skills through hands-on experience and mentorship, without the structure and certification of a formal programme. These programmes are a traditional pathway for developing skilled workers in construction and other manual trades (Crosley, 2021). Apprenticeships which provide extensive opportunities for trainees to develop hands-on skills under the guidance of experienced workers are a key pathway for skill acquisition. The ultimate aim is for the apprenticeship programme enrollees also called apprentices to acquire industry-relevant skills to work as craftsmen, bricklayers, draftsmen, painters, decorators etc., for gainful employment. Thus, an apprentice refers to someone who works for a skilled or qualified person to learn a trade or profession, especially for a recognized period. Apprenticeship programmes enable apprentices to acquire hands-on competencies, problem-solving abilities, and work habits in an authentic skill-building environment to become job-ready.

Job readiness in building construction depends on manual trade abilities and broader competencies like teamwork, safety knowledge, work ethic, and reliability. Employers highly value graduates who require little supervision upon hiring and can immediately contribute to productivity (Dantani et al., 2018). This necessitates training approaches that develop in addition to technical skills, workplace behaviours. As technical colleges have declined to impart the expected skills due to its numerous challenges, construction apprenticeships are rapidly expanding to help fill urgent demands for skilled labour in the sector. The effectiveness of skill acquisition through the collaborative harnessing of these technical colleges and the apprenticeship schemes is vital to ensure graduates are work-ready. According to Gafoor (2012), awareness can be defined as the state or

capacity to see, feel, or be aware of occasions, objects, or tactile patterns. Awareness allows individuals to observe their thoughts, feelings, and sensations without judgment, leading to greater clarity and insight into their inner experiences (Brown & Ryan, 2015). We argue again that technical college students may not be aware of the possibility of exploring apprenticeship while in school, and those who are aware may lack the needed support to turn awareness into action.

It is expected that technical colleges should provide an accessible pathway to gain industry-relevant skills in addition to certification, as an advantage over those lacking opportunities to enter formal skill acquisition institutions like the technical college. However, the reverse seems the case, as the apprenticeship programmes in building construction trades produce more skilled individuals for the industry than the technical colleges. Many technical college students and graduates lack mastery of critical building construction skills expected from their training and are usually forced to learn practical skills from the apprentices after graduation or as an interns on the job. This skill gap makes it difficult for students of technical colleges to meet industry standards or work efficiently. The resulting incompetence leads to shoddy workmanship, material wastage, project delays, and accidents on construction sites. Ultimately, this skill deficit undermines the employability and productivity of technical college students trained under ineffective skill acquisition programmes/arrangements.

Although this is not peculiar to the building construction students in technical colleges in Enugu State, the housing needs of the nation at large require that attention be given to achieving worthwhile synergy in skill acquisition using apprenticeship opportunities among building construction students. Meanwhile, Nigeria faces a major housing deficit, with 17 million more residential units needed to meet demand. The commercial building market is also expanding with urbanization and economic growth (Bapp-Eze, 2017). Developing a skilled workforce such as builders, masons, carpenters, and plumbers is essential to executing planned building projects. It is equally noteworthy that in Nigeria's construction sector apprenticeships have traditionally been a primary pathway for training manual skilled workers like carpenters, plumbers, masons, and electricians. therefore, an integrated training system blending extended work experience with rigorous technical education can maximize skills acquisition (Ayentimi et al., 2018). This balanced approach is intended to prepare graduates for gainful employment in today's building construction sector.

So, there is a need to evaluate the effectiveness of apprenticeship programmes in Enugu State technical colleges concerning building construction skill acquisition. This study aims to assess the perception, acquirable skills, relevance and challenges of integrating apprenticeship programmes in technical colleges. By diagnosing factors impeding skills development using both classroom and apprenticeship routes and highlighting solutions, this study intends to inform interventions and policies to enhance the quality and impact of apprenticeship training programmes among the students of building construction trades in technical colleges. Robust apprenticeships that impart comprehensive construction skills will enable technical college graduates to work professionally, safely and profitably within Enugu State and Nigeria's building industry.

Research Questions

1. What is the respondents' perception of apprenticeship programmes as viable means of skill acquisition in building construction trades?
2. What building construction skills can be acquired through apprenticeship programmes?
3. What is the importance of integrating apprenticeship programmes in building construction skill acquisition?
4. What are the challenges of integrating apprenticeship programmes in building construction trades in technical colleges?
5. What significant differences exist among the respondents based on their perception, acquirable building construction skills, importance and challenges of integrating apprenticeship programmes in building construction trades in technical colleges?

Methodology

The study adopted a descriptive survey research design. According to Nworgu (2006), survey research design involves studying a group of people or items by collecting and analyzing data from only a few people or items considered to be representative of the entire group. This design was adopted for the study as the study sought data concerning the integration of apprenticeship programmes to enhance building construction skill acquisition among technical college students in Enugu state. The total population for the study was 113 which comprises 25 teachers of building

construction in 5 technical colleges that offer building construction trades, 25 supervisors/senior craftsmen in 13 registered building construction industries, 23 artisans who could read and write, and 37 students in building construction in various understudied colleges. The sample was raised using both accidental and snowball sampling techniques. Accidental sampling allowed us to draw people at every point we met them, while the snowball sampling technique gave us the privilege of using referrals from participants.

The instrument for data collection was a structured questionnaire titled Apprenticeship and Technical College Programme Questionnaire (ATCPQ). The questionnaire consists of two parts namely Part 1 and Part 2. Part 1 encompassed items designed to obtain the demographic information of correspondents such as status. The status item in Part 1 have boxes where the respondent is expected to check his or her appropriate status (teacher, student, supervisor, artisan) and blank spaces where respondents would write the name of the institution/industry. Part 2 was sub-divided into 4 sections - A, B, C, and D - for research questions 1 – 4 respectively. Section 'A' had 8 items that centered on awareness of apprenticeship programmes as a viable means of skill acquisition among technical college students. Section 'B' with 12 items dwelt on building construction skills that can be acquired through apprenticeship programmes; Section 'C' contained 12 close-ended items and one open-ended question "others", aimed at finding out the relevance/perceived importance of apprenticeship programmes on building construction skill acquisition and Section 'D' contained 12 items that ascertained the challenges of integrating apprenticeship programmes, among building construction students in technical colleges. The questionnaire items were formulated based on a five-point Likert scale, with responses ranging from *Strongly Disagree (SD) = 1* to *Strongly Agree (SA) = 5*. The respondents were required to check (√) against the response category that best represented their opinion.

The instrument was face-validated by three experts in the Department of Industrial Technical Education, University of Nigeria, Nsukka. Each expert was served with a copy of the instrument for validation, with the purpose of the study, research questions and hypotheses to crosscheck any irrelevant or wrongly written statements. They were also requested to proffer suggestions for improving the instrument to meet the purpose of the study. Corrections and suggestions made by the experts were integrated into the modified copy of the instrument, which was used for data collection. This approach aligned with Uzoagulu (2011) who pointed out that face validation helps to ascertain the appropriateness of questionnaire items. Cronbach's alpha was used in determining the reliability of the instrument. An overall reliability index of 0.90 was obtained.

Data collection was by direct administration of the instrument to the respondents by the researchers, with the help of three research assistants. The research assistants were guided on how to distribute the instrument and ensure appropriate response, safe handling and return of the instrument. The data generated were analyzed using Mean and standard deviation, while Analysis of Variance (ANOVA) was used to test the null hypotheses at a 0.05 significance level, in SPSS 26.

Results

Table 1: Mean and Standard Deviation of the Responses on Perception of Technical College Students on Apprenticeship Programmes as Viable Means of Skill Acquisition in Building Construction Trades

N =113

S/N	Items	Mean	SD	Remarks
1	Apprenticeship offers a better pathway to acquiring building construction skills when compared to technical college curricula	3.61	0.90	Agreed
2	Participating in an apprenticeship programme could enhance career prospects in building construction	3.78	0.86	Agreed
3	I am aware that technical college students can also participate in apprenticeship programmes to enhance skill acquisition	3.63	1.01	Agreed
4	I have considered/suggested participating in an apprenticeship programme to enhance students' skill acquisition	3.50	1.20	Agreed
5	Apprenticeship programmes are more effective for building construction skill development compared to traditional academic education.	4.01	0.60	Strongly Agreed

6	I am aware of building construction students who combine apprenticeship and academic works	3.91	0.82	Agreed
7	The apprenticeship programme in building construction is only for those who could not enter formal education	3.81	0.93	Agreed
8	Apprenticeship programmes should be an integral part of building construction academic curricula	3.71	0.99	Agreed

Table 1 shows the respondents' perception of apprenticeship programmes as viable means of skill acquisition in building construction among technical college students. The Mean values range from 3.50 to 4.01 indicating that the respondents are aware of apprenticeship programmes' viability in imparting building construction skills to students. Also, concerning item 5, the mean value of 4.01 shows that apprenticeship is perceived to be more effective for building construction skill development when compared to traditional academic education.

Table 2: Mean and Standard Deviation of the Responses on Building Construction Skills that can be Acquired Through Apprenticeship Programmes

N = 113

S/N	Item	Mean	SD	Remarks
1	Block/bricklaying	4.01	0.60	Strong Agreed
2	Draftsmanship or building drawing	3.91	0.82	Agreed
3	Dry and wet plastering techniques	3.81	0.93	Agreed
4	Floor screeding	3.71	0.99	Agreed
5	Tiling	3.52	1.11	Agreed
6	Plumbing and pipe fittings	3.38	1.21	Agreed
7	Blueprint reading/building drawing interpretation	3.90	0.82	Agreed
8	Setting out	3.69	0.94	Agreed
9	Masonry and concreting	3.73	0.93	Agreed
10	Safety and use of PPEs	3.72	1.10	Agreed
11	Scaffolding	3.87	0.81	Agreed
12	Painting and decoration	3.84	0.87	Agreed
13	Others e.g. **communication, teamwork, time management, and creativity.**			

Table 2 highlights that all 12 skill areas in building construction can be effectively acquired through apprenticeship programmes. Notably, Block/Bricklaying stands out with the highest mean value, signifying a strong consensus among respondents on the necessity of apprenticeship programmes for developing and maintaining this all-important building construction skill. Additionally, Table 2 reveals that respondents believe apprenticeship programmes can facilitate the acquisition of soft skills such as communication, teamwork, time management, and creativity, alongside the technical construction skills.

Table 3: Mean and Standard Deviation of the Responses on Relevance of Apprenticeship Programmes in Building Construction Skill Acquisition Among Technical College Students

N = 113

S/N	Items	Mean	SD	Remarks
1	Apprenticeship programmes provide hands-on experience that is crucial for mastering building construction skills.	3.92	0.64	Agreed
2	Practical exposure through apprenticeships enhances the learning process better than theoretical classroom instruction alone.	3.79	0.97	Agreed
3	The materials and resources available in apprenticeship programmes are up-to-date and relevant to current industry practices.	3.89	0.72	Agreed
4	The training approaches employed in apprenticeship programmes effectively simulate real-world construction scenarios.	3.64	1.07	Agreed
5	The full focus of instructions on practical hands-on experience in	3.90	0.78	Agreed

	apprenticeship programmes is optimal for skill acquisition.			
6	The accessibility of instructors and mentors in apprenticeship enables apprentices to learn and refine their craft under the guidance of experienced professionals.	3.59	1.15	Agreed
7	Apprenticeship programmes prepare individuals to meet the demands and standards of the building construction industry.	3.66	1.10	Agreed
8	Graduates of apprenticeship programmes are more likely to be job-ready and meet employer expectations.	3.55	1.30	Agreed
9	Employers prefer hiring individuals who have undergone apprenticeship training due to their practical experience and demonstrated skills.	3.59	1.23	Agreed
10	Apprenticeship programmes help individuals develop important soft skills such as communication, teamwork, time management, and creativity.	3.31	1.30	Neutral
11	Apprenticeship programmes help in standardizing the skills and competencies required in the building construction industry.	2.78	1.39	Disagreed
12	Individuals who complete apprenticeship programmes are more likely to remain in the building construction industry.	2.84	1.42	Disagreed
13	Apprenticeship programmes allow apprentices to build a network of contacts within the industry, which can be valuable for future career growth.	3.59	1.15	Agreed

The data in Table 3 show the relevance or importance of the apprenticeship programmes, for which they are recommended for the technical colleges. In Table 3, results show that respondents agreed with items 1 – 9 and 13, disagreed with items 11 – 12, and were neutral for item 10, about apprenticeship programmes helping in the acquisition of soft skills such as communication, teamwork etc. This mix is interesting as the respondents showed knowledge of the role of apprenticeship – such as apprenticeship programmes helping in standardizing the skills and competencies required in the building construction industry. Again, the high standard deviation including that of 1.42 indicates a moderate level of variability in the responses. This suggests that while some respondents had similar views, there was a notable spread in the opinions regarding the items in question.

Table 4: Mean and Standard Deviation of the Responses on the Challenges of Integrating Apprenticeship Programmes in Building Construction Trades in Technical Colleges

N = 113

S/N	Items	Mean	SD	Remarks
1	Construction companies may be hesitant to invest time and resources in training apprentices, especially for smaller projects with tight deadlines.	3.96	0.90	Agreed
2	Coordinating class schedules with apprenticeship work hours can be difficult for both students and employers.	3.60	1.12	Agreed
3	Insufficient time allocated for hands-on training and practical experience	4.01	0.78	Strongly Agreed
4	Integrating apprentices into potentially dangerous construction sites requires additional safety training and supervision	3.56	1.27	Agreed
5	Construction work sites can be located far from colleges, making it difficult for students to commute, especially if public transportation options are limited.	3.75	1.02	Agreed
6	Lack of apprenticeship opportunities available to meet student demand.	3.50	1.25	Agreed
7	Irrelevance of some theoretical knowledge gained in the classroom to real-world construction scenarios	3.56	1.15	Agreed
8	Financial constraints, including low wages or lack of financial support from employers during apprenticeship programmes	3.30	1.29	Agreed
9	Apprenticeship programmes may vary in quality and structure across different companies and regions.	3.27	1.30	Agreed

10	Lack of apprenticeship placement locations within the preferred geographical location	2.90	1.38	Disagreed
11	Inadequate communication and collaboration among institutions and industry	3.51	1.18	Agreed
12	Construction sites might be located far from the technical colleges, making it difficult for students to commute, especially if public transportation options are limited.	3.55	1.16	Agreed

Table 4 outlines the challenges associated with integrating apprenticeship programmes in building construction trades at technical colleges. The respondents agreed with 11 of the listed items but disagreed with item 10, which states a "lack of apprenticeship placement locations within the preferred geographical location." This disagreement indicates that locations for practical experience and apprenticeships are accessible within the vicinity of the institutions. Additionally, Table 4 reveals that item 3, "insufficient time allocated for hands-on training and practical experience," is perceived as the most significant challenge, having the highest mean value of 4.01. The variation in standard deviations suggests a moderate level of variability in the responses, indicating that while there is some consensus among respondents, there is also a considerable range of opinions regarding the challenges.

Table 5: ANOVA of the Mean Responses of the Four Groups of Respondents on the Perception, Building Construction Skills, Relevance and Challenges of Integrating Apprenticeship in Building Construction Trades in Technical Colleges.

Variables		Sum of Squares	Df	Mean Square	F	Sig.	Remark
Perception	Between Groups	3.158	3	1.053	3.035	.032	Significant
	Within Groups	37.808	109	.347			
	Total	40.967	112				
Building Construction Skills	Between Groups	3.861	3	1.287	3.608	.016	Significant
	Within Groups	38.883	109	.357			
	Total	42.744	112				
Relevance	Between Groups	1.837	3	.612	1.654	.181	Not Significant
	Within Groups	40.335	109	.370			
	Total	42.172	112				
Challenges	Between Groups	11.142	3	3.714	6.279	.001	Significant
	Within Groups	64.471	109	.591			
	Total	75.613	112				

Data in Table 5 show there were statistically significant differences between groups as determined by the one-way ANOVA for perception, building construction skills and challenges at F(3,109) = 3.035, 3.608, and 6.279 respectively. Accordingly, the *p*-values were below 0.05 level of significance. Table 5 also shows that there was no significant difference among the groups concerning the relevance of integrating apprenticeship programmes in building construction skill acquisition in technical colleges. Thus, there is no significant difference among the group of respondents on the relevance of apprenticeship programmes in building construction skill acquisition in technical colleges. However, significant differences exist among the groups in their perception of apprenticeship, acquirable building construction skills and the challenges in the part of integrating apprenticeship in building construction trade areas.

Discussion

The respondents perceive apprenticeship programmes as an effective method for acquiring building construction skills among technical college students. The mean values indicate a strong awareness and positive perception among respondents regarding the effectiveness of apprenticeship programmes in developing building construction skills compared to traditional academic education. This finding suggests a consensus that apprenticeship programmes could be beneficial for technical college students. Kashefpakdel and Rehill (2018) found that teenagers are aware of apprenticeship programmes but have issues with putting their awareness into action. Thus, to go beyond awareness and perception, technical college teachers need support to help them gain a deeper understanding of apprenticeships (Langer, 2015). This

will boost the confidence of school staff in advising interested students about the various apprenticeship frameworks and levels available, as well as guiding them through application and recruitment processes. Additionally, the number and variety of apprenticeship events involving employers need to increase, where technical colleges invite current or former apprentices to speak to students. Sharing experiences from partakers and employers would show what skills are possibly gathered through apprenticeship programmes.

This study identified 12 building construction skills that can be acquired through the apprenticeship programmes by technical college students. This indicates that apprenticeship programmes are versatile and capable of providing comprehensive training across various aspects of the construction industry. The broad range of skills covered suggests that apprenticeships offer a well-rounded education that equips students with the necessary technical expertise. Among the skills, block/bricklaying has the highest mean value, indicating a particularly strong consensus among respondents on the importance of apprenticeships for developing this specific skill. This could be due to the fundamental nature of block/bricklaying in construction projects, where precision and expertise are critical. Also, beyond technical skills, respondents believe that apprenticeship programmes facilitate the acquisition of complementary skills such as communication, teamwork, time management, and creativity. Lerman et al., (2020) stressed that these soft skills are crucial for overall professional development and are often best learned through real-world practice. The ability to work effectively in teams, manage time efficiently, communicate clearly, and think creatively are all enhanced in the dynamic environment of an apprenticeship.

On the aspects of relevance, the findings demonstrate a clear recognition of the importance of apprenticeship programmes, with recommendations for their integration into technical colleges. However, Table 3 shows a mixed perspective on the effectiveness of apprenticeship programmes. Respondents agreed with items which likely pertain to the direct benefits of apprenticeship programmes, such as hands-on training, industry-specific skills, and job preparedness, but disagreed with items which may involve aspects that respondents feel are not adequately addressed by the current apprenticeship programmes. On the other hand, neutrality on Item 10 relates to the acquisition of soft skills like communication and teamwork. This suggests that while some respondents recognize the potential for apprenticeships to develop these skills, others may not see them as a primary benefit or may feel that current programmes do not effectively facilitate this. In supporting these outcomes, a study by St. Martin's Group (2020) found that people engage in apprenticeship to gain new skills relevant to their careers, including skills for sustaining jobs and achieving promotion. There is evidence that there are diverse expectations from apprenticeship programmes, and as such efforts must be made to match experience with expectations (Dagsland et al., 2011), by reducing the obvious challenges.

On the challenges of integrating apprenticeship programmes in building construction trades in technical colleges, the one-way ANOVA results indicate statistically significant differences between groups in terms of perception, building construction skills, and challenges. This is evidenced by the F-values of 3.035, 3.608, and 6.279 respectively, all with p-values below the 0.05 significance level. These findings suggest that respondents' views on the importance and effectiveness of apprenticeship programmes, the specific skills they believe can be acquired, and the challenges faced in implementing these programmes vary significantly across different groups (Dagsland et al., 2011; St. Martins Group, 2020). The significant differences in perception, skills, and challenges imply that tailored interventions may be necessary to address the specific needs and concerns of different groups. For example, targeted training or awareness campaigns could help align the perceptions and expectations of various stakeholders. The variability in perceived acquirable skills indicates that different groups may prioritize different skill sets. This suggests a need for flexible apprenticeship programmes that can cater to the diverse skill requirements of different stakeholders (St. Martins Group, 2020). In other words, the variability could be due to differences in individual experiences, the quality of apprenticeship placements, or varying expectations, which do not sufficiently impede the move for integrating apprenticeship programmes in building construction trades in technical colleges.

Conclusion

The findings of this study reveal a strong positive perception of apprenticeship programmes among respondents, highlighting their value in building

construction skill acquisition. With results suggesting greater effectiveness of the apprenticeship programmes compared to traditional education, technical colleges are encouraged to further integrate and prioritize apprenticeship programmes within their curricula to better prepare students for the demands of the construction industry. By addressing any areas of variability and continually enhancing the quality of these programmes, technical colleges can ensure that their students receive the most relevant and impactful training possible.

Recommendations

1. Policymakers should take these findings into account when designing regulations and standards for apprenticeship programmes. Ensuring that sufficient time and resources are allocated for practical training will be crucial in developing a skilled workforce in the building construction sector.
2. Technical colleges should offer personalized support and mentorship to cater to students' diverse needs and expectations. This could help bridge the gaps in perception, foster engagement and ensure a more uniform experience.
3. Technical colleges should allocate sufficient resources to apprenticeship programmes, including time, funding, and instructional support. This investment will help maintain high standards and ensure that all 12 skill areas, particularly those with high consensus like block/bricklaying, are adequately covered.
4. Policymakers and curriculum developers should consider these findings to design more effective apprenticeship programmes. Understanding the specific challenges and varying perceptions can help create more widely accepted and effective programmes in skill acquisition.
5. Given the significant differences in challenges perceived, ongoing evaluation and feedback mechanisms should be established to continuously improve the apprenticeship programmes. This will ensure that the programmes remain relevant and effectively address the needs of all stakeholders

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