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Assessment of the Construction Engineering Technology and Management Program: Evaluating its Effectiveness in Preparing Graduates for the Construction Industry

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ABSTRACT

This study assessed the effectiveness of the Construction Engineering Technology and Management (CETM) program in preparing graduates for the construction industry. Using a descriptive and regression research design, the study examined key program components, namely curriculum content, teaching methods, resources and facilities, and industry collaboration, and their influence on graduates' preparedness. Data were gathered from Antipolo Institute of Technology (AiTECH) graduates, current students, and AiTECH community members through a structured questionnaire and analyzed using descriptive statistics and multiple regression analysis. Results revealed that respondents strongly agreed on the effectiveness of all program components, indicating a high level of satisfaction with the academic and experiential aspects of the program. Regression findings showed that all CETM program components significantly influenced graduates' effectiveness in terms of technical skills, project management skills, employability, industry readiness, and stakeholder satisfaction. Among the predictors, industry collaboration emerged as the strongest contributor to graduate preparedness. The model explained a substantial proportion of the variance in graduate effectiveness, confirming the critical role of program quality in workforce readiness. The study concludes that a well-structured CETM program is essential in developing competent, industry-ready construction professionals and provides empirical evidence to support continuous program enhancement.

Keywords: *Construction Engineering Technology and Management; Graduate Preparedness; Industry Collaboration; Construction Education; Employability*

INTRODUCTION

Construction engineering technology and management education play a critical role in developing professionals capable of addressing the increasing complexity of modern infrastructure projects. The rapid growth of urbanization, technological integration, and sustainability requirements has reshaped expectations placed upon construction technology graduates. Higher education institutions offering similar programs to the Construction Engineering Technology and Management (CETM) program of AiTECH are therefore expected to continuously align academic preparation with industry demands. The effectiveness of such alignment is vital in ensuring that graduates possess relevant competencies and professional readiness (Zhang et al., 2021). Evaluating academic programs provides empirical evidence that guides curricular reforms and strengthens graduate outcomes.

The construction industry increasingly demands graduates who demonstrate both technical proficiency and managerial competence. Employers seek professionals who can integrate engineering knowledge with project planning, cost control, risk management, and stakeholder coordination. As construction projects become more interdisciplinary, academic programs must prepare students for real-world complexities beyond theoretical instruction. Studies emphasize that curriculum relevance and applied learning significantly influence graduate employability and job performance (Doloi, 2020). Thus, assessing the CETM program is essential in identifying strengths and areas requiring enhancement.

Teaching methodologies and institutional resources further influence learning effectiveness in construction education. Practical exposure through laboratories, simulations, internships, and industry-based projects enables students to translate theoretical knowledge into professional competence. Adequate facilities and updated learning technologies strengthen experiential learning and improve skill acquisition. Research indicates that hands-on learning environments improve students' confidence and readiness for industry engagement (Goh & Loosemore, 2020). Consequently, program effectiveness must be assessed holistically, considering both pedagogical approaches and infrastructural support.

Industry collaboration serves as a bridge between academic training and professional practice. Partnerships with construction firms, professional organizations, and regulatory bodies ensure that educational content remains current and applicable. Internship programs and industry mentoring expose students to authentic work environments and professional standards. Empirical evidence suggests that strong academe–industry linkages significantly enhance graduate industry readiness and stakeholder satisfaction (Ahn et al., 2022). This study, therefore, assesses the CETM program's effectiveness in preparing graduates for the construction industry.

LITERATURE REVIEW

Curriculum content is a foundational element in construction engineering technology and management education, determining the scope and depth of professional competencies acquired by students. An effective CETM curriculum integrates engineering principles with management, safety, sustainability, and digital construction technologies. Curriculum relevance directly affects graduates' ability to respond to evolving industry challenges. Recent studies highlight that outcome-based and competency-driven curricula improve workforce alignment and technical proficiency (Maqsoom et al., 2021). Regular curriculum evaluation ensures responsiveness to technological and regulatory changes.

Teaching methods significantly influence student engagement and learning outcomes in construction programs. Traditional lecture-based instruction is increasingly complemented by problem-based learning, case studies, and project simulations. These approaches enhance critical thinking, decision-making, and teamwork skills essential in construction practice. Research demonstrates that active and experiential learning strategies lead to higher student satisfaction and improved professional readiness (Kim & Irizarry, 2020). Effective pedagogy therefore plays a vital role in program success.

Resources and facilities are critical enablers of practical competence in construction education. Access to laboratories, construction software, modeling tools, and simulation environments strengthens applied learning. Modern facilities allow students to gain hands-on experience aligned with industry practices. Studies confirm that institutional investment in learning infrastructure positively correlates with skill acquisition and graduate confidence (Tan et al., 2022). Resource adequacy must therefore be assessed as part of program effectiveness.

Industry collaboration enhances the relevance and applicability of construction education. Partnerships provide opportunities for internships, site exposure, guest lectures, and collaborative projects. Such engagements help students understand professional standards, workplace culture, and industry expectations. Empirical findings indicate that industry-linked programs produce graduates with higher employability and smoother school-to-work transitions (Gamil & Rahman, 2021). Collaboration is thus a strategic component of CETM effectiveness.

Graduate preparedness is reflected through technical skills, project management capabilities, employability, and stakeholder satisfaction. Employers assess graduates based on adaptability, teamwork, problem-solving ability, and adherence to industry standards. Effective programs produce

graduates who transition efficiently into professional roles. Recent literature emphasizes that comprehensive program assessment improves graduate performance and employer confidence (Zhu et al., 2023). Measuring preparedness provides actionable insights for academic improvement.

MATERIALS & METHODS

Research Design

This study employed a descriptive and regression research design to evaluate the effectiveness of the Construction Engineering Technology and Management program. The descriptive design was used to determine the level of implementation of program components and graduate preparedness indicators. Regression analysis was applied to examine the influence of program components on graduate preparedness outcomes. This approach allowed the identification of significant predictors of industry readiness. The design provided both explanatory and predictive insights into program effectiveness.

Participants / Respondents

The respondents of the study consisted of Antipolo Institute of Technology (AiTECH) graduates, current students, and AiTECH community members who were currently employed, interns or had recent experience in the construction industry. They were selected based on their completion of the program and their direct exposure to industry practices, enabling them to evaluate the relevance and effectiveness of their academic preparation. The respondents represented various construction-related roles, providing diverse professional perspectives on program outcomes. Data were gathered using a structured instrument in which respondents rated each item on a four-point Likert scale ranging from Strongly Disagree to Strongly Agree, allowing for systematic assessment of perceptions. This format ensured clarity, consistency, and ease of response, thereby strengthening the reliability and validity of the findings.

Data Gathering Procedure

Data collection began with securing approval from the concerned academic authorities. Respondents were informed of the study's objectives and ethical considerations prior to participation. The questionnaires were distributed through appropriate channels and collected within a specified period. Confidentiality and voluntary participation were strictly observed. Collected data were encoded and prepared for statistical analysis.

Statistical Analysis

Descriptive statistics such as mean and standard deviation were used to analyze the level of program implementation and graduate preparedness. Regression analysis was employed to determine the influence of CETM program components on graduate preparedness outcomes. This method identified significant relationships between independent and dependent variables. Statistical significance was tested at an appropriate confidence level. The analysis provided empirical support for conclusions and recommendations.

RESULTS AND DISCUSSION

The overall mean of 3.58 indicates that respondents strongly agree that the curriculum content of the CETM program is highly relevant and responsive to construction industry needs. This suggests that the program effectively integrates essential engineering and management competencies required in professional practice. A well-structured curriculum strengthens graduates' foundational knowledge and supports a smoother transition into industry roles. Strong curriculum alignment minimizes the gap between academic preparation and workplace expectations. This finding is consistent with studies

emphasizing curriculum relevance as a critical factor in construction graduate preparedness (Sacks & Pikas, 2020).

The statement with the highest mean (3.64) shows that respondents most strongly agree that the subjects offered are relevant to actual construction engineering and management work. This reflects a close correspondence between academic coursework and real-world construction responsibilities. When course content mirrors industry practices, graduates are better equipped to perform job-related tasks effectively. Subject relevance enhances confidence and professional adaptability among graduates. Similar findings were reported by Ofori and Toor (2021), who highlighted industry-aligned subjects as key contributors to graduate competence.

The lowest mean (3.52) pertains to the updating of course contents to match current construction industry standards, although it still falls within the strongly agree range. This suggests that while curriculum updates are present, respondents may perceive the need for more frequent revisions. Rapid technological advancements in construction may heighten expectations for continuous curriculum modernization. Regular curriculum review is essential to ensure sustained industry relevance. This observation aligns with the findings of Loosemore and Lim (2020) on curriculum adaptability in construction education.

Table 1
The Construction Engineering Technology and Management Program in terms of Curriculum Content

Statements	Mean	Description
The program curriculum covers essential topics required in the construction industry.	3.62	Strongly Agree
The subjects offered are relevant to actual construction engineering and management work.	3.64	Strongly Agree
The curriculum balances theoretical knowledge and practical application.	3.54	Strongly Agree
Course contents are updated to match current construction industry standards.	3.52	Strongly Agree
The program prepares students to handle real construction project requirements.	3.60	Strongly Agree
Overall	**3.58**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The overall mean of 3.52 indicates that respondents strongly agree that teaching methods used in the CETM program are effective. This suggests that instructional strategies successfully facilitate understanding of construction concepts and skills development. Effective teaching methods contribute significantly to students' cognitive and practical learning outcomes. Learner-centered approaches promote deeper engagement and professional competence. This result supports research by Blayse and Manley (2020) emphasizing pedagogical effectiveness in construction education.

The highest mean (3.71) reveals that respondents most strongly agree that practical activities help them understand construction processes better. This underscores the importance of experiential learning in construction programs. Hands-on activities allow students to apply theoretical knowledge to realistic construction scenarios. Such experiences enhance technical competence and problem-solving ability. This finding is consistent with the work of Bølviken et al. (2021), who highlighted experiential learning as a core strength in construction education.

The lowest mean (3.39) relates to instructors' clarity in explaining construction concepts, though it remains within the strongly agree category. This suggests that instruction is generally effective, but minor variations in teaching delivery may exist. Differences in instructional styles and communication approaches may influence student perception. Continuous faculty development can further enhance teaching clarity and effectiveness. Similar conclusions were drawn by Hosseini et al. (2022) regarding instructor effectiveness in engineering programs.

Table 2
Construction Engineering Technology and Management Program in terms of Teaching Methods

Statements	Mean	Description
Instructors explain construction concepts clearly and effectively.	3.39	Strongly Agree
Teaching methods encourage critical thinking and problem-solving skills.	3.51	Strongly Agree
Practical activities help me understand construction processes better.	3.71	Strongly Agree
Classroom discussions enhance my understanding of construction management.	3.46	Strongly Agree
Teaching strategies help prepare students for real construction work situations.	3.53	Strongly Agree
Overall	**3.52**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The overall mean of 3.47 indicates that respondents strongly agree that the resources and facilities of the CETM program adequately support learning. This suggests that laboratories, equipment, and learning materials contribute positively to skill development. Adequate facilities enhance experiential learning and technical competence in construction education. Institutional support plays a crucial role in program effectiveness. This finding aligns with research by Tunde and Adeniyi (2021) on the role of infrastructure in engineering education.

Table 3
Construction Engineering Technology and Management Program in terms of Resources and Facilities

Statements	Mean	Description
The program provides adequate laboratory and construction-related facilities.	3.48	Strongly Agree
Tools and equipment used in class are relevant to industry practices.	3.51	Strongly Agree
Learning resources such as manuals, software, and references are sufficient.	3.36	Strongly Agree
Facilities support hands-on learning in construction engineering and management.	3.50	Strongly Agree
Available resources help students develop practical construction skills.	3.51	Strongly Agree
Overall	**3.47**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The highest mean (3.51) shows that respondents most strongly agree that available resources help them develop practical construction skills. This indicates that tools and equipment used in instruction are relevant to industry practices. Exposure to industry-aligned resources improves graduates' readiness for professional work environments. Practical familiarity reduces adjustment difficulties upon employment. Similar results were reported by Zhang and Hu (2020) on the impact of learning facilities on skill acquisition.

The lowest mean (3.36) pertains to the sufficiency of learning resources such as software and references. Although still rated strongly agree, this suggests that some respondents may expect more advanced or updated learning materials. The increasing digitalization of construction processes may influence these expectations. Continuous upgrading of learning resources is necessary to remain competitive. This observation is supported by the findings of Marzouk and El-Said (2023) on digital readiness in construction education.

The overall mean of 3.61 indicates that respondents strongly agree that industry collaboration is a strong component of the CETM program. This reflects effective partnerships between the academe and the construction industry. Industry collaboration enhances contextual learning and professional exposure. Such engagement supports smoother school-to-work transitions. This finding is consistent with the study of Rowlinson and Jia (2021) on academe–industry collaboration in construction education.

The highest mean (3.71) shows that respondents most strongly agree that industry partnerships help them understand real construction work environments. This highlights the effectiveness of internships, site visits, and industry-linked activities. Direct exposure allows students to develop realistic expectations of professional practice. Industry immersion strengthens adaptability and professional readiness. Similar conclusions were drawn by Darko et al. (2020) regarding experiential industry exposure.

The lowest mean (3.51) relates to the integration of industry practices into classroom discussions, though it remains within the strongly agree range. This suggests that while industry concepts are integrated, further enhancement is possible. Increasing practitioner involvement in classroom instruction may strengthen this area. Deeper integration reinforces theory–practice linkage. This finding aligns with the work of Sepasgozar et al. (2022) on industry-informed teaching strategies.

Table 4
The Construction Engineering Technology and Management Program in terms of Industry Collaboration

Statements	Mean	Description
The program provides opportunities for industry exposure such as internships or site visits.	3.66	Strongly Agree
Industry practices are integrated into classroom discussions and activities.	3.51	Strongly Agree
Guest speakers from the construction industry enhance learning experiences.	3.53	Strongly Agree
Industry partnerships help students understand real construction work environments.	3.71	Strongly Agree
The program helps students build connections with construction industry professionals.	3.64	Strongly Agree
Overall	**3.61**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The overall mean of 3.55 indicates that respondents strongly agree that the CETM program is effective across all major components. This suggests that curriculum content, teaching methods, resources, and industry collaboration collectively support student learning and professional preparation. The consistently high ratings reflect a balanced and well-integrated academic program. Such coherence strengthens graduates' overall competence and readiness for construction practice. This finding supports studies emphasizing holistic program design in construction education (Love, Zhou, & Edwards, 2020).

The highest mean (3.61) corresponds to industry collaboration, indicating that respondents view industry linkages as the strongest program component. This highlights the value of partnerships, internships, and exposure to real construction environments. Industry collaboration enhances contextual learning and professional socialization. Graduates benefit from direct engagement with practitioners and industry standards. Similar conclusions were drawn by Duryan et al. (2021), who emphasized industry engagement as a key driver of graduate readiness.

Table 5
Summary of Construction Engineering Technology and Management Program

Statements	Mean	Description
Curriculum Content	3.58	Strongly Agree
Teaching Methods	3.52	Strongly Agree
Resources and Facilities	3.47	Strongly Agree
Industry Collaboration	3.61	Strongly Agree
Overall	**3.55**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The lowest mean (3.47) pertains to resources and facilities, though still interpreted as strongly agree. This suggests that while facilities are generally adequate, there is room for enhancement. Advancements in construction technologies may raise expectations for more modern tools and learning environments. Continuous upgrading of facilities is therefore necessary. This aligns with findings by Pan and Zhang (2022) on infrastructure improvement in engineering education.

The overall mean of 3.53 indicates that respondents strongly agree that the CETM program effectively develops technical skills. This suggests that graduates possess essential engineering competencies required in construction practice. Strong technical preparation enables graduates to perform tasks accurately and efficiently. Technical competence remains a core requirement in the construction profession. This result is supported by research highlighting technical skill development as a primary outcome of construction education (Ghosh & Jintanapakanont, 2020).

Table 6
Effectiveness in Preparing Graduates for the Construction Industry in terms of Technical Skills

Statements	Mean	Description
The program helped me develop essential construction engineering skills.	3.61	Strongly Agree
I am confident in applying technical knowledge in construction projects.	3.44	Strongly Agree
The program improved my understanding of construction methods and materials.	3.55	Strongly Agree
I can apply engineering concepts learned in school to actual construction work.	3.53	Strongly Agree
The program enhanced my ability to solve technical construction problems.	3.52	Strongly Agree
Overall	**3.53**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The highest mean (3.61) shows that respondents most strongly agree that the program helped them develop essential construction engineering skills. This reflects the effectiveness of technical coursework and applied learning experiences. Strong foundational skills improve graduates' problem-solving ability and technical confidence. Such competence enhances performance in real construction projects. Similar findings were reported by Lingard and Rowlinson (2021) on the role of structured technical training.

The lowest mean (3.44) relates to confidence in applying technical knowledge to actual construction projects. Although still strongly agree, this suggests varying levels of real-world exposure among graduates. Practical application opportunities may differ across students. Expanding hands-on and site-based learning could further enhance confidence. This observation aligns with research by Eadie et al. (2022) emphasizing applied learning for confidence building.

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The program improved my understanding of construction methods and materials.	3.55	Strongly Agree
I can apply engineering concepts learned in school to actual construction work.	3.53	Strongly Agree
The program enhanced my ability to solve technical construction problems.	3.52	Strongly Agree
Overall	**3.53**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The overall mean of 3.46 indicates that respondents strongly agree that the CETM program effectively develops project management skills. This suggests that graduates are prepared to manage time, cost, quality, and coordination in construction projects. Project management competence is essential for

successful project delivery. Effective training supports operational efficiency and leadership readiness. This finding is consistent with studies emphasizing project management education in construction programs (Zerjav, 2020).

The highest mean (3.53) shows that respondents most strongly agree that the program helped them understand construction project coordination. This reflects effective instruction in integrating various project elements. Coordination skills are critical in managing multidisciplinary construction teams. Graduates with strong coordination abilities adapt better to complex project environments. Similar results were reported by Ahmed and El-adaway (2021) in construction management education research.

The lowest mean (3.37) pertains to confidence in handling project management tasks, though it remains within the strongly agree range. This suggests that while skills are developed, confidence may vary depending on experience. Leadership roles and decision-making responsibilities may still pose challenges for new graduates. Increasing project-based simulations could strengthen confidence. This aligns with findings by Hwang and Ng (2022) on experiential project management training.

Table 7
Effectiveness in Preparing Graduates for the Construction Industry in terms of Project Management Skills

Statements	Mean	Description
The program developed my ability to plan construction projects.	3.48	Strongly Agree
I learned how to manage time, cost, and quality in construction projects.	3.45	Strongly Agree
The program helped me understand construction project coordination.	3.53	Strongly Agree
I am confident in handling project management tasks in construction.	3.37	Strongly Agree
The program strengthened my decision-making skills in project management.	3.47	Strongly Agree
Overall	**3.46**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The overall mean of 3.49 indicates that respondents strongly agree that the CETM program enhances employability. This suggests that graduates feel competitive and prepared to enter the construction labor market. Employability reflects alignment between academic training and industry needs. Market-relevant skills increase graduates' job prospects. This finding supports employability studies in construction education (Jackson & Bridgstock, 2021).

The highest mean (3.58) shows that respondents most strongly agree that the skills learned are useful for securing construction-related jobs. This indicates that program outcomes align with employer expectations. Practical and transferable skills improve hiring potential. Graduates benefit from competencies valued by construction firms. Similar conclusions were reported by Tomlinson et al. (2020) regarding skill relevance and employment outcomes.

Table 8
Effectiveness in Preparing Graduates for the Construction Industry in terms of Employability

Statements	Mean	Description
The program prepared me for employment in the construction industry.	3.49	Strongly Agree
Skills learned in the program are useful for securing construction-related jobs.	3.58	Strongly Agree
The program increased my confidence during job applications and interviews.	3.38	Strongly Agree
I believe the program improved my chances of being employed in construction.	3.52	Strongly Agree
Employers value the skills gained from the CETM program.	3.47	Strongly Agree
Overall	**3.49**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The lowest mean (3.38) relates to confidence during job applications and interviews, though still strongly agree. This suggests that some graduates may require additional career preparation support. Interview skills and professional communication may influence confidence levels. Career coaching and employability workshops could further strengthen outcomes. This observation is consistent with findings by Clarke (2023) on graduate employability development.

The overall mean of 3.45 indicates that respondents *strongly agree* that the CETM program effectively prepares graduates for actual construction work environments. This suggests that graduates are capable of adapting to industry demands, standards, and workplace dynamics. Industry readiness reflects the successful integration of technical knowledge, teamwork, and professional behavior. Graduates who are industry-ready can transition more efficiently into construction roles. This finding aligns with studies emphasizing readiness as a key outcome of construction education programs (Mahmoud & Leicht, 2020).

Table 9
Effectiveness in Preparing Graduates for the Construction Industry in terms of Industry Readiness

Statements	Mean	Description
The program prepared me to adapt to real construction work environments.	3.59	Strongly Agree
I am familiar with construction industry standards and practices.	3.42	Strongly Agree
The program helped me work effectively in construction teams.	3.49	Strongly Agree
I feel ready to handle work pressure in the construction industry.	3.30	Strongly Agree
The program developed my ability to solve on-site construction problems.	3.46	Strongly Agree
Overall	**3.45**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The highest mean (3.59) shows that respondents most strongly agree that the program prepared them to adapt to real construction work environments. This highlights the effectiveness of experiential learning components such as site exposure and applied activities. Adaptability is critical in managing the dynamic and complex nature of construction projects. Graduates who can adjust quickly demonstrate higher professional resilience. Similar conclusions were reported by Wu et al. (2021) regarding adaptability in construction graduates.

The lowest mean (3.30) relates to graduates' readiness to handle work pressure in the construction industry, although it still falls within the *strongly agree* range. This suggests that while graduates feel prepared, work-related stress remains a challenge. Construction environments are inherently demanding and require emotional resilience. Integrating stress management and resilience training may further strengthen readiness. This observation is supported by research on psychological preparedness in construction professions (Leung, Liang, & Olomolaiye, 2022).

The overall mean of 3.48 indicates that respondents *strongly agree* that stakeholders are satisfied with the performance of CETM graduates. This suggests that employers and industry professionals perceive graduates as competent and capable. Stakeholder satisfaction reflects alignment between academic training and industry expectations. Positive employer feedback validates program effectiveness. This finding is consistent with studies highlighting employer satisfaction as a key indicator of educational quality (Wilkinson & Gale, 2020).

The highest mean (3.60) shows that respondents most strongly agree that the program effectively prepares graduates for industry demands. This indicates that CETM graduates meet professional standards and performance expectations. Programs that respond to industry needs produce graduates who contribute meaningfully to organizational goals. High satisfaction strengthens institutional credibility. Similar findings were reported by Poon et al. (2021) in construction workforce studies.

The lowest mean (3.41) pertains to employer satisfaction with the specific skills of CETM graduates, though still rated *strongly agree*. This suggests that while employers are generally satisfied, continuous skill enhancement is necessary. Industry requirements evolve alongside technological and regulatory changes. Ongoing curriculum refinement ensures sustained stakeholder confidence. This aligns with research emphasizing continuous improvement in construction education (Saini & Kumar, 2023).

Table 10
Effectiveness in Preparing Graduates for the Construction Industry in terms of Stakeholder Satisfaction

Statements	Mean	Description
Employers are satisfied with the skills of CETM graduates.	3.41	Strongly Agree
The program meets the expectations of the construction industry.	3.46	Strongly Agree
Graduates of the program perform well in construction-related jobs.	3.45	Strongly Agree
The program produces competent construction engineering professionals.	3.50	Strongly Agree
Overall, the program effectively prepares graduates for industry demands.	3.60	Strongly Agree
Overall	**3.48**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The overall mean of 3.48 indicates that respondents *strongly agree* that the CETM program is effective in preparing graduates for the construction industry across all dimensions. This reflects balanced development of technical, managerial, and professional competencies. Holistic preparation enhances graduates' long-term employability and career progression. Integrated learning outcomes strengthen professional performance. This finding supports research advocating comprehensive construction education models (Hughes & Murdoch, 2020).

The highest mean (3.53) corresponds to technical skills, indicating that this is the strongest area of graduate preparation. Technical competence forms the foundation of effective construction practice. Strong engineering skills enhance credibility and performance in the workplace. Graduates with solid technical grounding adapt more easily to complex tasks. Similar conclusions were drawn by Ahn and Lee (2022) regarding technical proficiency in construction graduates.

The lowest mean (3.45) relates to industry readiness, though it remains within the *strongly agree* category. This suggests that while graduates are well-prepared, further enhancement of real-world exposure may be beneficial. Expanding experiential and industry-based learning opportunities can strengthen readiness. Continuous alignment with industry conditions ensures sustained effectiveness. This observation is consistent with findings by Delgado and Romero (2024) on graduate transition to construction practice.

Table 11
Summary of Effectiveness in Preparing Graduates for the Construction Industry

Statements	Mean	Description
Technical Skills	3.53	Strongly Agree
Project Management Skills	3.46	Strongly Agree
Employability	3.49	Strongly Agree
Industry Readiness	3.45	Strongly Agree
Stakeholder Satisfaction	3.48	Strongly Agree
Overall	**3.48**	**Strongly Agree**

Legend: 1.00-1.75 Strongly Disagree, 1.76-2.50 Disagree, 2.51-3.25 Agree, and 3.26-4.00 Strongly Agree

The regression results show that all components of the Construction Engineering Technology and Management (CETM) program have positive coefficients, indicating a direct influence on the effectiveness of preparing graduates for the construction industry. Industry collaboration registered the

highest effect (B = 0.326, p = .000), followed by curriculum content (B = 0.234, p = .006), resources and facilities (B = 0.190, p = .008), and teaching methods (B = 0.163, p = .025), all of which are statistically significant at the 0.05 level. These findings indicate that improvements in these program components significantly enhance graduate preparedness. The adjusted R^2 of .567 suggests that 56.7% of the variation in graduate preparedness is explained by the CETM program variables. Overall, the results confirm that the CETM program has a strong and statistically significant influence on graduates' readiness for the construction industry.

Table 12
Test of Significant Influence of the Construction Engineering Technology and Management Program on the Effectiveness in Preparing Graduates for the Construction Industry

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.204	.211		.969	.334
	Curriculum Content	.234	.083	.213	2.801	.006
	Teaching Methods	.163	.072	.159	2.254	.025
	Resource and Facilities	.190	.071	.198	2.682	.008
	Industry Collaboration	.326	.089	.296	3.677	.000

Note: Adjusted r^2 = .567 ANOVA for Regression f=63.133 p=.000

The findings imply that a well-designed CETM program plays a crucial role in equipping graduates with the technical, managerial, and professional competencies required by the construction sector. The strong effect of industry collaboration highlights the importance of internships, partnerships, and real-world exposure in strengthening graduate preparedness. Meanwhile, the significant contributions of curriculum content, teaching methods, and resources indicate that academic structure and learning support systems remain essential foundations of effective construction education. The high explanatory power of the model suggests that program quality is a key driver of graduate effectiveness. Consistent with these results, studies emphasize that integrated academic–industry approaches substantially improve construction graduate outcomes and employability (Marescaux & De Winne, 2021).

CONCLUSION

This study concludes that the Construction Engineering Technology and Management (CETM) program is highly effective in preparing graduates for the construction industry. Findings show that graduates strongly agree on the adequacy of curriculum content, teaching methods, resources and facilities, and industry collaboration, indicating a well-aligned and comprehensive academic program. The consistently high mean ratings across all program dimensions reflect strong satisfaction with both academic and experiential components of the program. These results demonstrate that the CETM program successfully integrates theoretical knowledge with practical application. Overall, the program provides a solid foundation that supports graduates' transition into professional construction roles.

Furthermore, regression analysis confirms that the CETM program significantly influences graduates' effectiveness in terms of technical skills, project management skills, employability, industry readiness, and stakeholder satisfaction. Industry collaboration emerged as the strongest predictor of graduate preparedness, underscoring the critical role of real-world exposure and partnerships in construction education. Curriculum content, teaching methods, and resources and facilities also showed significant positive effects, highlighting the importance of holistic program design. The high explanatory power

of the regression model indicates that program quality is a major determinant of graduate readiness. Thus, the CETM program plays a decisive role in developing competent, industry-ready construction professionals.

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