Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3, 1403-1414
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i3.5534

Impact of team role distribution on performance in civil engineering education: A TREO survey analysis

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Abstract: Effective teamwork is essential in civil engineering education, as it mirrors the interdisciplinary collaboration required in professional practice. However, determining the optimal team composition strategy remains challenging due to students' diverse skills and experience levels. This study examines the impact of different role distribution strategies using the Teamwork Reflection and Evaluation Overview (TREO) survey among civil engineering students. Two groups were formed: Group A, with balanced roles (±0.5 deviation from the group average), and Group B, with imbalanced roles. A total of 101 students participated, with 46 from Group A and 44 from Group B responding to the survey. No significant differences in academic performance were found ($t = -0.81$, $p = 0.418$); however, Group A reported higher satisfaction with leadership roles (87%) and a more structured project management approach. The study revealed a predominance of the Doer role, while the Organizer and Connector roles had lower representation. Key challenges included communication, task distribution, and individual commitment. Although role distribution did not directly impact grades, the findings underscore the need for structured team-building interventions to enhance collaboration, accountability, and role effectiveness in engineering education.
Keywords: *Collaborative learning, Engineering education, Team composition, TREO survey, Team dynamics.*

1. Introduction

Collaboration in civil engineering education is critical for preparing students to manage multidisciplinary projects that require technical coordination and adaptive problem-solving. In professional practice, civil engineers must interact with architects, environmental specialists, and project managers to ensure infrastructure projects meet safety and efficiency standards. This ability enables engineers to successfully manage complex projects while adapting to evolving societal demands [1, 2]. Beyond technical expertise, the ability to work effectively in teams is increasingly recognized as a factor that influences project success. Studies have shown that engineers with strong collaboration skills can improve decision-making processes, reduce project delays, and enhance innovation in design and construction [3]. In light of this reality, universities must deliberately design curricula that systematically develop these crucial interpersonal competencies alongside technical knowledge.

The development of effective teamwork skills in higher education has led to several evidence-based methodologies. Collaborative learning approaches have demonstrated consistent success Pakpahan [4] and Jacquez, et al. [5] while structured frameworks such as problem-based learning Scaioni, et al. [6] and Miranda Manzanares, et al. [7] project-based learning Hossain [8]; Mendes, et al. [9] and Semenova [10] and flipped classroom modelsMiner, et al. [11] and Karabulut-Ilgu, et al. [12] provide valuable opportunities for students to tackle authentic challenges through team-based projects. These pedagogical approaches not only enhance students' confidence and practical teamwork abilities but also provide critical experience such as conflict resolution, a skill directly transferable to professional environments [13]. Furthermore, research indicates that strategic training models and carefully

History: Received: 6 January 2025; Revised: 14 March 2025; Accepted: 14 March 2025; Published: 17 March 2025
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structured teamwork activities effectively prepare engineering students for industry realities, heightening their awareness of teamwork as an essential professional competency [1]. In today's increasingly complex engineering landscape, this preparation has become more crucial than ever, with personality assessments and structured team-building exercises emerging as particularly valuable tools.

The formation of effective student teams requires thoughtful consideration of individual strengths and work styles. Researchers have developed various methodologies to optimize team composition and enhance collaborative skills Michalaka and Golub [14] including specialized teamwork skill scales designed to assess and improve critical competencies such as communication, cooperation, and leadership [15, 16]. The identification of specific functional roles within teams has emerged as a particularly significant factor in predicting successful performance [17]. While several instruments exist for role analysis, methodology Belbin [18] remains prominent in both professional and academic contexts, despite limitations including peer evaluation requirements and intellectual property restrictions [19]. The Teamwork Reflection and Evaluation Overview (TREO) survey Mathieu, et al. [20] offers a compelling alternative methodology for identifying individual teamwork roles that enables participants to recognize their unique contributions and potential areas for growth within group dynamics. This tool shows particular promise for engineering education, where team-based approaches to complex technical problems mirror professional practice.

This study examines the application of the TREO survey methodology among Civil Engineering students enrolled in the Construction of Roads I course. The research design involved two distinct student groups (A and B) who completed the TREO survey before being strategically divided into mainly three-person teams tasked with solving comprehensive road engineering projects. Rather than solely focusing on the impact of team composition on project outcomes, this study explores the broader relationship between team dynamics, TREO-defined roles, and academic performance. By investigating how these elements interact, the research aims to provide insights into the extent to which structured role allocation influences collaboration, performance, and learning experiences in civil engineering education. While teamwork assessment tools have been widely studied in general educational contexts, their specific application and effectiveness within civil engineering, particularly road engineering, remains underexplored. Our findings offer valuable insights for engineering educators seeking evidence-based approaches to team composition and may help inform curriculum development that better prepares graduates for the collaborative demands of modern engineering practice.

2. Materials and Methods

2.1. Research Context and Participants

This study was conducted with students enrolled in the Construction of Roads I course at Universidad Técnica Particular de Loja (UTPL) during the October 2024 – February 2025 academic period. Group A consisted of 51 students, while Group B comprised 50 students, all pursuing Civil Engineering degrees. The course curriculum covers traffic analysis, route studies, and horizontal geometric road design, providing a technical context that requires effective teamwork for project completion.

2.2. TREO Survey Implementation

The TREO survey was administered to all participants as the primary assessment tool for identifying teamwork roles. This instrument consists of 48 questions designed to evaluate individuals' tendencies in team settings based on their past experiences. Students rated each statement on a five-point Likert scale, where 1 indicated "does not apply to me" and 5 represented "always applies to me." For example, participants evaluated statements such as "I feel comfortable being critical of my teammates" based on their previous teamwork experiences. Upon completion, the survey generated individual scores across six distinct team roles: Organizer, Doer, Challenger, Innovator, Team Builder, and Connector.

2.3. Team Composition Methodology

To analyze the impact of team composition on project outcomes, a differential team composition strategy was employed. The TREO survey data were processed using Minitab 14 software State College [21] due to its robust clustering algorithms, which enabled precise categorization of students based on their teamwork profiles.

For Group A, teams were formed to create a balanced role distribution. The average scores for each of the six TREO roles across the entire group were calculated. Students were then assigned to teams such that the difference between their individual role values and the group average did not exceed ±0.5 for any role. This resulted in 13 three-member teams and 3 four-member teams, ensuring relatively balanced role distributions.

Conversely, Group B underwent a different team composition process. Although cluster analysis was similarly employed, team assignments were deliberately structured to exceed the ±0.5 difference threshold from the group average. This intentional approach resulted in more imbalanced teams with pronounced strengths in specific roles. Group B was organized into 14 three-member teams and 2 four-member teams. This controlled variation in team composition created a natural experiment to evaluate how team balance influences teamwork dynamics and project outcomes.

2.4. Road Engineering Project Design

Students in both groups were assigned comprehensive road engineering projects that required the application of course concepts, including traffic analysis, route studies, and horizontal geometric design. The project specifications, requirements, and evaluation criteria were standardized across both groups to ensure comparable assessment conditions.

2.5. Data Collection Instruments

To assess team performance and dynamics, a comprehensive end-of-semester survey was conducted, gathering data on various aspects of teamwork. The survey included demographic information, such as the gender of the team coordinator, as well as a self-assessment of overall team performance. It also examined meeting frequency, participation patterns, and task distribution methods. Participants identified significant challenges, evaluated leadership satisfaction regarding team coordination, and provided recommendations for improving teamwork. Additionally, they highlighted positive aspects of their team experience.

Alongside the survey, academic performance metrics were analyzed, including project grades, course completion rates, and overall academic achievement indicators.

2.6. Statistical Analysis Methods

Descriptive statistical methods were employed to analyze the survey data for both experimental groups. Comparative analyses were conducted to identify correlations between team composition strategies and various performance indicators. Graphical representations were generated to visualize the relationship between team balance/imbalance and team functioning.

Academic performance indicators, including passing rates and grade distributions, were analyzed to provide additional quantitative measures of team effectiveness. Statistical significance testing was performed to determine whether the observed differences between the balanced teams (Group A) and the imbalanced teams (Group B) represented meaningful variations in performance and satisfaction.

2.7. Ethical Considerations

All research activities followed UTPL's ethical guidelines for educational research and adhered to the ethical principles established by the Ethics and Human Research Committee of the Universidad Técnica Particular de Loja (CEISH-UTPL). Students gave their verbal consent to participate, and their privacy was protected through data anonymization. The experimental design guaranteed fairness by ensuring that no student was disadvantaged due to their team assignment, as all teams received the same level of instructional support throughout the course.

3. Results

3.1. Team role distribution and composition

The initial analysis of team role distribution revealed distinctive patterns across both groups (Figure 1). Notably, the survey showed peak values for the "Doer" role, with consistently lower scores in the "Organizer" and "Connector" roles. This distribution potentially reflects the characteristic traits of civil engineering students. Group A demonstrated less role dispersion compared to Group B, a direct consequence of the ±0.5 point deviation constraint in team composition.

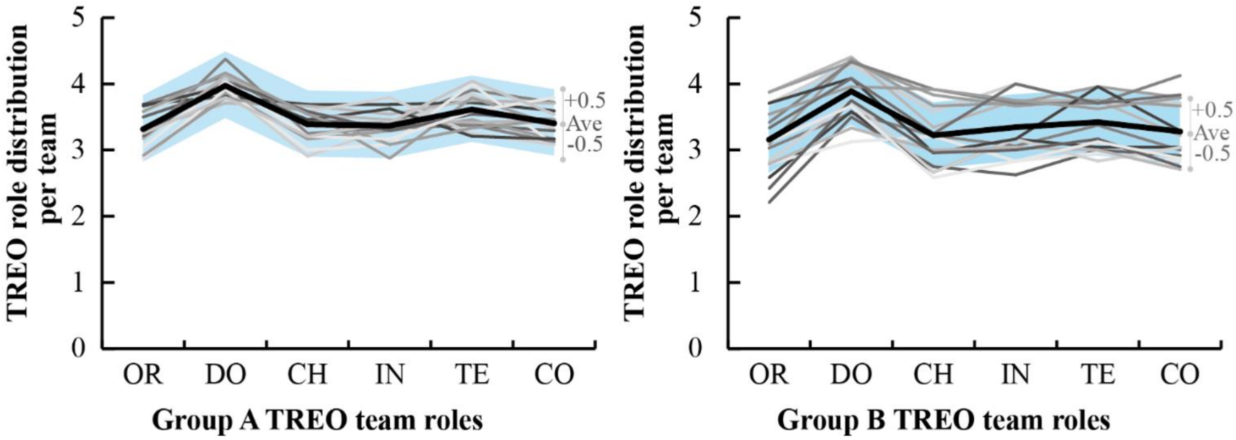

Figure 1.
Distribution of TREO team roles across civil engineering student groups.
Note: OR: Organizer, DO: Doer, CH: Challenger, IN: Innovator, TE:Team builder and CO:Connector.

3.2. Satisfaction and Challenges in Team Dynamics

The survey administered to the students was voluntary, with 46 out of 51 students in Group A and 44 out of 50 students in Group B participating. In Group A, 80% of the team coordinators were male, while in Group B, this figure was 75%, reflecting the still predominant male presence in civil engineering. When asked about their satisfaction with the leadership of the team coordinator, 87% of Group A reported being satisfied or very satisfied, while in Group B, the majority (68%) stated they were only satisfied. The remaining survey results are shown in Figure 2.

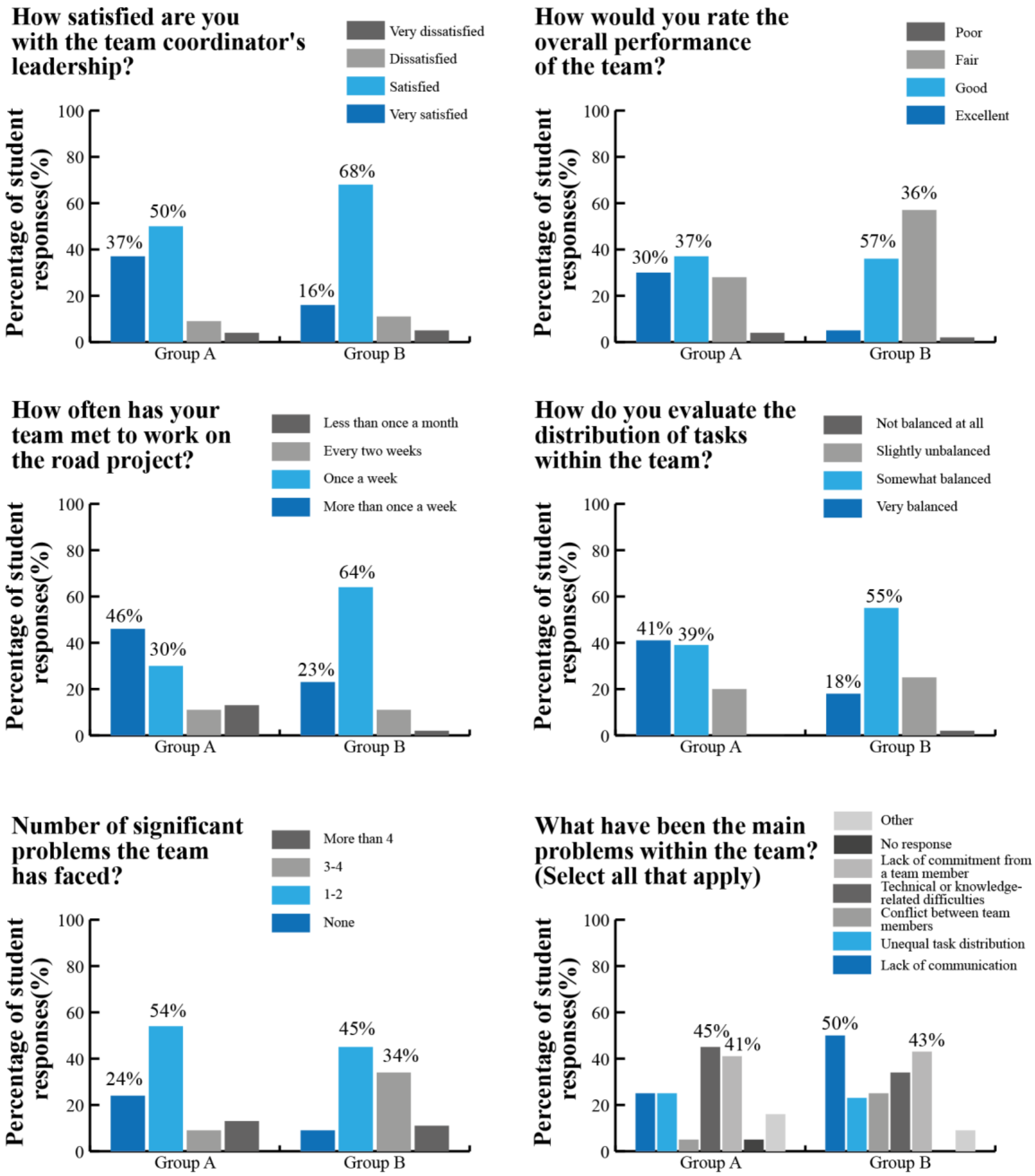

Figure 2.
Survey results: team performance and satisfaction metrics.

Regarding team performance, when asked about their perception, Group A predominantly rated it as "Excellent" to "Good" (67%), while Group B mostly rated it as "Good" to "Fair" (93%), with 57% of Group B selecting the "Fair" rating. When asked about the frequency of team meetings, 46% of Group A reported meeting more than once a week, while 64% of Group B stated they met once a week.

In terms of team distribution, 80% of Group A described the distribution as "somewhat" or "very" balanced, whereas in Group B, 80% described it as "somewhat" or "poorly" balanced. In Group A, 41% considered the distribution "very balanced," while 55% of Group B rated it as "somewhat balanced."

ISSN: 2576-8484
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DOI: 10.55214/25768484.v9i3.5534

When asked about the number of significant issues within the team, 54% of Group A reported experiencing 1 to 2 issues, followed by 24% who reported none. In Group B, 45% reported 1 to 2 issues, and 34% reported 3 to 4 issues. A larger proportion of students in Group B indicated having more than 4 issues compared to Group A.

Regarding the main issues within the teams, Group A identified technical difficulties and lack of commitment from some members, while Group B highlighted lack of communication and lack of commitment from some members.

When asked about aspects of teamwork that worked well in the course, the positive analysis of teamwork revealed that task distribution and communication were key to successful performance in both groups. Coordination and commitment from members facilitated the organization of activities such as presentations, report writing, and regular meetings. However, challenges persisted regarding work distribution equity and individual responsibility, as evidenced by comments about the lack of commitment from some members. While Group A emphasized mutual support and trust, Group B exhibited greater dissatisfaction with the commitment of some members, reflected in statements such as "Teamwork only worked with one other person" or "Some don't keep their word." Penalties were implemented to ensure task completion.

Students were also asked for suggestions to improve teamwork. Both groups agreed that communication and commitment are critical factors for enhancing teamwork. In Group A, several suggestions focused on better organization and task distribution to ensure all members participate equally and avoid last-minute work. They also mentioned the need for more frequent meetings, greater individual responsibility, and more direct contact with the instructor to clarify doubts. Additionally, they suggested working on shared documents from the outset and adapting work schedules considering power outages. In Group B, there was an emphasis on evaluating individual performance within the team, suggesting that grades should reflect each member's contribution. They also proposed allowing teams to form based on affinity, improving organization, and fostering clearer leadership. Furthermore, they highlighted that better coordination and increased active participation in joint work would improve results. In general, both groups agreed that strengthening communication and individual responsibility is essential for better team performance.

3.3. Analysis of Team Grades and TREO Roles Correlation

The average total grade for Group A was 6.49, with a standard deviation of 1.24, while Group B The average total grade for Group A was 6.49, with a standard deviation of 1.24, while Group B had an average grade of 6.67 with a standard deviation of 0.74. Although Group B achieved higher average grades, no statistically significant difference was found (t-value: -0.81, p-value = 0.418) at the 95% confidence level. Additionally, in Group A, 53% of students passed with a grade of at least 6.5, compared to 46% in Group B. Despite Group B's higher average grades, fewer students passed, even though the standard deviation in Group B was lower than in Group A.

A more detailed analysis was conducted using the average grades obtained in team activities and the sum of the values for the six roles of TREO for all team members. A correlation matrix was created with the six roles, team grades, p-values, and the average values for the six roles, as shown in Table 1.

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Table 1.
Correlation matrix of TREO team roles.

	Group A						Group B					
Team role	**Or**	**Do**	**Ch**	**In**	**Te**	**Co**	**Or**	**Do**	**Ch**	**In**	**Te**	**Co**
Do	0.90						0.89					
Ch	0.90	0.77					0.80	0.80				
In	0.94	0.86	0.86				0.87	0.92	0.86			
Te	0.79	0.85	0.72	0.81			0.91	0.95	0.84	0.89		
Co	0.87	0.87	0.87	0.85	0.90		0.80	0.85	0.87	0.91	0.87	
Av	0.96	0.94	0.90	0.95	0.91	0.95	0.94	0.96	0.91	0.96	0.96	0.93

Note: Or: Organizer, Do: Doer, Ch: Challenger, In: Innovator, Te: Team Builder, Co: Connector, Av: average of the TREO team roles, Grade: grades of the team activities.

As shown in Table 1, all roles exhibit strong correlations among the TREO team roles in both Group A and Group B. High correlations are also observed with the average values of the TREO team roles.

Table 2 shows the correlation matrix between team grades and TREO team roles. Group A exhibited higher correlation values (0.16 and -0.18) for the roles of Challenger and Team Builder, although these values are very low and the p-values are high, indicating no statistical relationship. In Group B, the highest correlation values (0.21 and 0.12) were also for the roles of Challenger and Team Builder. However, similar to Group A, the p-values were high, suggesting no significant statistical relationship. This analysis indicates that there is no significant correlation between the TREO team roles and the grades obtained by the teams in their activities.

Table 2.
Correlation matrix of TREO team roles and team activity grades.

	Group A							Group B						
Team role / grade	**Or**	**Do**	**Ch**	**In**	**Te**	**Co**	**Av**	**Or**	**Do**	**Ch**	**In**	**Te**	**Co**	**Av**
Grade	0.12	0.16	0.10	0.03	-0.18	0.08	0.05	0.01	0.01	0.21	0.01	0.12	0.07	0.07
p-value	0.45	0.30	0.53	0.83	0.22	0.61	0.77	0.97	0.93	0.18	0.96	0.43	0.63	0.64

Note: Or: Organizer, Do: Doer, Ch: Challenger, In: Innovator, Te: Team Builder, Co: Connector, Av: average of the TREO team roles, Grade: grades of the team activities.

3.4. Analysis of Top-Performing and Low-Performing Teams Based on TREO Roles

To conduct a more detailed analysis of the roles in relation to grades, the four highest-scoring teams and the four lowest-scoring teams were selected. The TREO scores for each team were averaged and compared with those of other teams in both the high and low grading groups. A radar chart representing these values is shown in Figure 3. In this figure, the TREO role thresholds are also included for comparison.

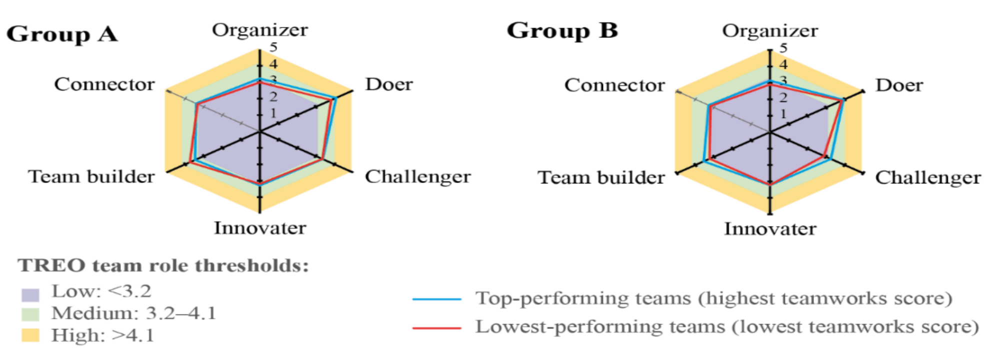

Figure 3.
Comparative TREO Role Profiles of Top and Low-Performing Teams.

For Group A, the lowest-scoring teams had grades ranging from 3.3 to 5.5, while the highest-scoring teams achieved grades between 7.2 and 8.4. In Group B, the four lowest-scoring teams had grades between 4.5 and 5.3, while the highest-scoring teams ranged from 6.7 to 7.6.

As seen in Figure 3, the teams with higher grades had higher ratings in almost all TREO roles compared to the teams with lower grades. The only exception was in the Team Builder role for Group A, where the ratings of the lowest-performing teams were higher than those of the top-performing teams. The highest ratings in both groups were in the Organizer and Doer roles for both the low- and top-performing teams.

The largest differences for Group A were found in the Doer role (+0.27 higher for the low-performing teams compared to the top-performing teams) and in the Team Builder role (-0.28 lower for the low-performing teams). The smallest difference was in the Challenger role (+0.02). For Group B, the greatest differences were in the Challenger role (+0.37) and Team Builder role (+0.34), while the smallest difference was in the Doer role. Overall, Group B exhibited larger differences compared to Group A.

In conclusion, higher grades are associated with teams scoring higher across all TREO roles. The maximum score in the Doer role and the lower score in the Organizer role seem to reflect a characteristic of civil engineering students, which may warrant further study. No clear trend emerged between low- and top-performing teams. Generally, top-performing teams rated their roles at least at the "medium" threshold (3.2–4.1), while low-performing teams ranged from "low" to "medium." Moreover, the results for the low-performing teams suggested that a lack of commitment and a disparity in team dynamics were significant factors contributing to lower grades.

3.5. Team Submission Challenges

During the first bimester, several teams struggled to meet deadlines and submit complete work. In Group A, Team 9 failed to submit their video due to excessive length, while Team 10 submitted theirs after the deadline. In Group B, five teams (7, 8, 9, 13, and 14) missed the submission deadline, and Team 2 submitted an incomplete video. The most commonly reported issue was a team member failing to contribute their assigned portion.

Additionally, in Group A, three teams (10, 11, and 16) missed the deadline, while in Group B, only Team 7 faced the same issue. Some teams also reported grade discrepancies, referring to inconsistencies in the assigned grades, likely because students were allowed to evaluate their teammates' performance. These discrepancies may reflect differences in team member engagement, reinforcing previous findings that teams with higher participation across all roles, such as "Doer" and "Organizer," tended to perform better overall, as noted in the comparative analysis of high- and low-performing teams.

In the second bimester, Group B faced further challenges, with one team failing to submit their bimester assignment on time. Only one team reported differentiated grades within the group. In Group A, one team submitted work that belonged to a different semester, which resulted in no grade being assigned. Three teams in Group A also reported discrepancies in their internal grading. These findings reinforce the importance of accountability and collaboration within teams, as outlined in the analysis of the TREO roles and their correlation with performance. The issues of late submissions and incomplete work reflect a lack of coordination and commitment, which can affect overall performance and the accurate assessment of individual contributions within the team.

4. Discussion

The results indicate that while team roles influence collaboration dynamics, their direct impact on academic performance remains inconclusive in Civil Engineering. For instance, students in balanced teams (Group A) reported greater role clarity, which facilitated structured task distribution. However, their grades did not significantly differ from those in imbalanced teams (Group B), suggesting that additional factors such as leadership style and time management may play a more substantial role.

Several key findings emerged from the analysis, which can help us understand the factors influencing student performance and offer opportunities for improving team-based learning strategies.

The findings show that Group A had a lower average score (6.49) than Group B (6.67), despite Group A exhibiting a higher standard deviation (1.24 vs. 0.74). This suggests that while Group B had higher average scores, Group A experienced greater variability in performance. This variance in performance could be attributed to differences in individual student engagement Reeve, et al. [22] the quality of teamwork Planas-Lladó [23] or the varying levels of understanding of the tasks at hand [24]. The lack of a statistically significant difference (p-value = 0.418) between the groups indicates that these variations in scores are not statistically meaningful, which may point to other influencing factors such as the teaching methodology or task complexity.

The correlation matrix showed strong associations between TREO roles, particularly Organizer and Doer, in both groups. However, the lack of statistically significant links between roles and team performance suggests that factors like communication, leadership, or conflict resolution may be more influential. Although team-building interventions alone may not guarantee higher academic outcomes, role clarification activities have demonstrated benefits in structured teamwork environments. For example, prior research Salas, et al. [25] found that assigning clear leadership roles within student teams improved project efficiency by 15%, and smaller teams of three to four members showed a 20% increase in reported engagement [26]. Future research should explore teamwork dynamics beyond role allocation, with the TREO behavior observation tool offering a bridge between survey data and observable behaviors to improve team performance [27].

A comparative analysis between the top-performing and low-performing teams highlighted that teams with higher scores generally exhibited stronger performances across most of the TREO roles. However, the only exception to this trend was observed in the Team Builder role for Group A, where low-performing teams rated higher. This anomaly suggests that the Team Builder role, typically associated with fostering collaboration and managing group dynamics, may have been less impactful in the higher-performing teams in this particular group. It is also noteworthy that the differences between roles in high-performing teams were generally more pronounced in Group B, where roles such as Challenger and Team Builder showed significant differences (+0.37 and +0.34). While team role balance does not significantly impact overall team performance, individual roles can have a positive or negative effect on outcomes [28]. Additionally, previous studies indicate that team roles are only minimally predictive of performance, as seen in a spaceship simulation where they accounted for just 52.5% of performance variance, highlighting the need for further research [29]. These findings raise important questions about the extent to which specific roles, such as the Challenger role, contribute to improved performance in some contexts while being less influential in others.

The issues regarding the late submission of assignments and incomplete videos, particularly in the first half of the semester, emphasize the challenges teams face in managing time and coordinating tasks. The primary reason cited for late submissions was the failure of individual members to complete their respective parts of the video, highlighting potential problems with task allocation, individual accountability, and team communication. Some teams in Group A met deadlines, while others struggled with uneven performance and team dynamics. Group B showed similar issues, with late or incomplete submissions. These challenges align with previous findings that faculty and students perceive late assignment submissions differently, with variations in the reasons cited for delays and the impact of late submission policies on student success rates, satisfaction, and persistence [30]. Additionally, research suggests that implementing a flexible late submission policy in STEM higher education can support student learning and align with newer learning theories such as cognitivism, constructivism, and humanism [31]. Moreover, individual time urgency and time perspective have been shown to influence team performance by shaping members' perceptions and behaviors toward meeting deadlines [32]. Addressing these factors by improving team communication, setting clear expectations for individual contributions, and offering additional support or structure for managing deadlines could enhance overall performance.

The findings suggest that while the TREO roles can provide a framework for understanding team dynamics, they do not fully explain variations in team performance. This highlights the need for more comprehensive approaches to teaching teamwork in engineering education. Incorporating strategies to enhance communication, conflict resolution, and leadership within teams could help foster better collaboration and ultimately improve academic outcomes. Furthermore, it may be worthwhile to consider how the specific characteristics of engineering students—such as problem-solving skills, analytical thinking, and a preference for individual work—interact with team roles and impact team performance.

This study has several limitations. The sample size was relatively small, with only two groups of students from a single course, which may limit the generalizability of the findings. Additionally, the use of a single instrument, the TREO survey, to assess team roles may not capture all the factors influencing team dynamics. The study also focused on a specific academic context (engineering education), and the results may not apply to other disciplines or team settings. Moreover, the study did not account for factors such as prior teamwork experience or individual student motivation, which could affect team performance. Despite these limitations, the study provides valuable insights into team dynamics and performance in an engineering education context. Future studies could investigate the impact of additional factors, such as communication styles, leadership development, or the role of peer evaluations, on team performance. Furthermore, research could explore the long-term effects of different team composition strategies and the development of teamwork skills throughout a student's academic journey.

In future studies, it would be beneficial to explore the influence of different team dynamics and role distribution strategies on both academic performance and interpersonal relationships within engineering teams. Given the findings that certain roles, such as Doer and Organizer, were more prominent in both high- and low-performing teams, future research could investigate whether specific interventions designed to enhance these roles could lead to improved overall performance. Additionally, focusing on the effectiveness of team leadership, communication strategies, and conflict resolution mechanisms could provide valuable insights into optimizing team-based learning in engineering education. Furthermore, examining the impact of varying group sizes on collaboration and performance may shed light on whether smaller, more intimate teams can enhance student engagement and reduce the issues of uneven participation. By understanding the nuanced effects of these factors, educational strategies can be tailored to better support students' academic success and teamwork skills in civil engineering programs.

5. Conclusion

This study explores the relationship between team dynamics, the roles within the TREO model, and academic performance in Civil Engineering education. While higher-performing teams generally score better in most TREO roles, no statistically significant correlation between these roles and overall academic success was found. The research highlights the need for a holistic approach to team development in engineering education, where effective collaboration goes beyond simple role allocation. Civil engineering students tend to favor practical roles, such as Doer, while showing less engagement in organizational and connective roles. This finding emphasizes the importance of integrating soft skills development and team management with technical competencies. The findings suggest that successful team performance in civil engineering education depends on multiple factors, including role distribution, communication effectiveness, and individual accountability. While the TREO survey proved useful for identifying team dynamics, it should be complemented with additional interventions, such as leadership training and conflict resolution workshops, to maximize its impact on student performance. The TREO survey proves to be a valuable tool for diagnosing team dynamics, but it also points to the need for more flexible, context-aware methods of team composition. This study contributes to engineering education by offering empirical evidence on role distribution strategies in teamwork-based learning. Future research should focus on longitudinal studies tracking students beyond the classroom to determine how these team dynamics translate into professional engineering environments.

Transparency:
The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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