Evaluating Webinar-Based Environmental Impact Assessment Learning among Civil Engineering Students: Evidence from an IDP Talk Series

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ABSTRACT

Environmental Impact Assessment (EIA) is an important component of civil engineering education because it exposes students to environmental compliance, impact prediction, mitigation planning, regulatory procedures, and EIA report preparation. This study evaluates the effectiveness of the IDP Talk Webinar Series 2026 on Environmental Impact Assessment in enhancing students' awareness and technical understanding of EIA processes. A quantitative survey design was employed. Data were collected from 99 webinar participants using a structured questionnaire measuring three constructs: EIA awareness, technical understanding, and perceived webinar effectiveness. The data were analysed using SPSS through descriptive statistics, reliability analysis, exploratory factor analysis, Pearson correlation, and multiple regression analysis. The findings revealed high levels of EIA awareness, technical understanding, and perceived webinar effectiveness. The reliability results showed excellent internal consistency for all constructs, with Cronbach's alpha values ranging from .938 to .956. The factor analysis supported a three-factor structure, while correlation analysis showed significant positive relationships among EIA awareness, technical understanding, and webinar effectiveness. Regression analysis further indicated that both EIA awareness and technical understanding significantly predicted perceived webinar effectiveness. The study contributes to civil engineering education by demonstrating that industry-oriented webinar activities can strengthen students' environmental literacy, procedural understanding, and professional readiness. It also provides useful evidence for improving future IDP activities by integrating practical EIA case studies, report review tasks, and expert-led professional sharing sessions.

Keywords: Environmental Impact Assessment; Civil Engineering Education; Webinar-Based Learning; Environmental Literacy; Technical Understanding

INTRODUCTION

Environmental Impact Assessment, commonly known as EIA, is an important environmental management and decision-making tool used to identify, predict, evaluate, and mitigate the potential environmental consequences of development projects before they are implemented. In civil engineering, EIA is particularly significant because infrastructure projects such as roads, bridges, drainage systems, buildings, industrial facilities, reclamation works, and transportation networks often involve land disturbance, resource use, waste generation, and possible impacts on surrounding communities and ecosystems. Therefore, EIA is not merely an administrative requirement; it is a professional mechanism that helps engineers make more responsible, transparent, and sustainable decisions during project planning and implementation. The International Association for Impact Assessment describes EIA as a best-practice process that supports better decision-making by integrating environmental concerns, minimising harm, and promoting sustainability before major decisions are made(Senécal et al., 2006).

In Malaysia, EIA is closely connected to environmental governance and development control. The Department of Environment Malaysia explains that EIA functions to develop, review, and analyse documents, reports, and programmes related to environmental quality during project planning and implementation, especially for prescribed activities. The Environmental Impact Assessment Guideline in Malaysia further outlines the need for proper EIA report preparation, review procedures, mitigation planning, and compliance responsibilities before development activities are approved and implemented. For civil engineering students, this means that understanding EIA should go beyond knowing its definition. Students need to be exposed to how EIA operates in practice, including screening, scoping, baseline studies, impact prediction, mitigation measures, report submission, technical review, approval conditions, and monitoring requirements (Kementerian Sumber Asli dan Alam Sekitar, 2015)(Department of Environment, 2020).

Civil engineering education today is increasingly expected to prepare students not only as technical problem-solvers but also as future professionals who understand sustainability, environmental ethics, regulatory compliance, and social responsibility. Recent discussions in engineering education emphasise that sustainability should be embedded meaningfully into engineering curricula because future engineers are expected to address environmental, social, and economic challenges through professional practice. In this context, EIA learning becomes highly relevant because it connects classroom knowledge with real project requirements. It helps students recognise that engineering decisions are not limited to structural safety, cost, and constructability, but also include environmental protection, stakeholder concerns, legal obligations, and long-term sustainability outcomes(Sabri, 2025).

However, one common challenge in teaching EIA is that students may understand the concept at a theoretical level but have limited exposure to the actual professional process. EIA involves multiple stages, technical documentation, regulatory review, and professional judgement, which may be difficult for students to fully appreciate through textbook-based learning alone. Studies on sustainability and engineering education have highlighted the importance of contextualised and practice-oriented learning opportunities because students need to connect technical knowledge with real-world professional situations(Gutierrez-Bucheli et al., 2022). Therefore, learning activities that involve industry talks, expert sharing, case-based discussions, and professional webinars can help bridge the gap between academic learning and workplace expectations (Gutierrez-Bucheli et al., 2025).

Webinar-based learning has become a useful mode of professional exposure in higher education because it allows students to access expert knowledge, current industry practices, and applied examples beyond the traditional classroom setting. Unlike ordinary lectures, webinars can bring practitioners, academics, and students into a shared learning space where professional procedures and real project experiences can be explained more directly.

Recent studies on online and synchronous e-learning indicate that students' learning effectiveness can be influenced by perceived usefulness, engagement, flexibility, motivation, and the relevance of the learning content to their academic and professional needs. In engineering education, this is especially important because students benefit from learning experiences that make technical knowledge more visible, practical, and connected to industry realities (Carmi, 2024)(Bashir & Lapshun, 2025).

The IDP Talk Webinar Series 2026 on Environmental Impact Assessment, held on April 2026, was organised to expose civil engineering students to the practical aspects of EIA. The webinar introduced students to important areas such as legal requirements, baseline environmental studies, impact prediction, mitigation measures, EIA report preparation, submission procedures, and review processes. Such exposure is important because EIA is a professional practice that requires both conceptual awareness and procedural understanding. Students need to know why EIA matters, how EIA reports are prepared, what information is normally required, how the review process is conducted, and how mitigation measures are connected to project approval and environmental compliance.

Despite the increasing use of webinars in higher education, there remains a need to evaluate whether webinar-based professional learning actually improves students' awareness and understanding of specialised civil engineering topics such as EIA. Many webinar evaluations tend to focus on satisfaction or attendance, but fewer studies examine whether students perceive improvements in specific learning areas such as technical understanding, professional procedures, and regulatory awareness. This creates a useful research gap for the present study. Evaluating students' awareness of EIA, their technical understanding of report preparation and review procedures, and their perceived effectiveness of the webinar can provide evidence on whether professional webinars serve as meaningful learning interventions in civil engineering education.

Therefore, this study, aims to examine how civil engineering students perceived their learning after attending the EIA webinar. Specifically, the study focuses on three key learning dimensions: EIA awareness, technical understanding of EIA procedures, and perceived webinar effectiveness. It also investigates the relationship between these dimensions to determine whether students with higher awareness and stronger technical understanding are more likely to perceive the webinar as effective. By doing so, the study contributes to the discussion on how webinar-based learning can support professional exposure, sustainability education, and practice-oriented learning in civil engineering programmes.

In practical terms, the findings of this study may benefit lecturers, programme coordinators, curriculum designers, and webinar organisers who seek to strengthen students' exposure to environmental compliance and professional engineering practice. If the webinar is found to be effective, it may support the continued use of expert-led webinars as a complementary learning strategy in civil engineering education. If gaps are identified, the findings can guide improvements in future webinar design, such as including more case studies, interactive activities, report examples, regulatory flowcharts, or assessment-based learning tasks. More importantly, the study positions EIA learning as an essential part of preparing civil engineering students to become environmentally responsible graduates who are able to understand the consequences of development decisions before those decisions are translated into physical projects.

LITERATURE REVIEW

Environmental Impact Assessment in Civil Engineering Education

Environmental Impact Assessment, or EIA, is a central environmental management process used to identify the possible consequences of proposed development projects before major decisions are made. In civil engineering, this process is especially important because infrastructure projects often involve land clearing, earthworks, construction waste, water discharge, traffic generation, noise, dust, biodiversity disturbance, and possible impacts on surrounding communities. The International Association for Impact Assessment explains impact assessment as a decision-support process that evaluates future environmental, social, health, and economic consequences before decisions are finalised. In this sense, EIA is not simply a documentation exercise; it is a professional tool that helps engineers consider environmental protection, regulatory compliance, public interest, and sustainable development before a project proceeds (Lud, 2023). For civil engineering students, EIA knowledge is important because future engineers are expected to understand how technical design decisions interact with environmental regulations and project approval processes. In Malaysia, the Department of Environment describes EIA as part of development control, where documents, reports, and programmes are reviewed and analysed to enhance environmental quality during the planning and implementation stages of prescribed activities. This makes EIA directly relevant to civil engineering education, particularly for students who may later work in construction, infrastructure planning, environmental consultancy, project management, or regulatory compliance. Without sufficient exposure to EIA, students may understand how to design and construct a project, but may not fully appreciate how that project must be environmentally justified, reviewed, approved, mitigated, and monitored(Department of Environment, 2020). Recent discussions in engineering education also emphasise that sustainability should be embedded more strongly into civil engineering curricula. Kordi et al. highlight that embedding Sustainable Development Goals into civil engineering education can equip future engineers with the knowledge, skills, and attitudes required to respond to environmental, social, and economic challenges. This is closely related to EIA because EIA provides a practical route through which sustainability principles are translated into real project decisions. Therefore, EIA learning can help students

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move from general environmental awareness to a more applied understanding of professional responsibility in engineering practice (Kordi et al., 2025).

Technical Knowledge Required in EIA Practice

EIA practice requires a combination of regulatory knowledge, technical analysis, professional judgement, and clear reporting. In Malaysia, the Environmental Impact Assessment Guideline provides guidance on the preparation, submission, and review of EIA reports, including procedures for different categories of prescribed activities. The guideline states that First Schedule EIA reports are generally submitted to the relevant State Offices of the Department of Environment, while Second Schedule EIA reports are submitted to DOE Headquarters for review and approval. This distinction is important for students because it shows that EIA is governed by formal administrative procedures and cannot be treated as a generic environmental report. One of the first areas of technical understanding in EIA is legal and regulatory compliance. Students need to understand that EIA requirements are linked to prescribed activities, project scale, project location, environmental sensitivity, and approval authorities. This includes understanding whether a project requires a Preliminary EIA, Detailed EIA, or other supporting environmental documentation. Malaysia's investor guide explains that two EIA procedures are adopted in Malaysia: Preliminary EIA and Detailed EIA. Such knowledge is important because engineering decisions must be aligned with environmental approval requirements before construction begins(Department of Environment, 2020). Another key component is environmental baseline study. Baseline studies describe the existing environmental conditions of the project area before development takes place. These may include air quality, water quality, soil condition, noise level, ecology, land use, hydrology, traffic conditions, and socio-economic characteristics. The purpose of baseline data is to provide a reference point for predicting how a project may change the surrounding environment. The Sabah EIA Handbook, for example, identifies scoping, baseline studies, impact prediction and evaluation, mitigation measures, monitoring programme development, and report preparation as important parts of EIA practice. For civil engineering students, this is significant because it connects environmental investigation with project planning and design decisions((EPD), 2022). Impact prediction is another core technical component. It requires the assessment team to estimate the likely effects of a proposed project during construction, operation, and sometimes decommissioning. These impacts may be direct, indirect, cumulative, short-term, long-term, reversible, or irreversible. In civil engineering projects, impact prediction may involve estimating sedimentation from earthworks, flood risk due to drainage modification, traffic congestion caused by construction activities, or noise exposure affecting nearby communities. The value of this process is that it allows potential environmental problems to be anticipated before they become actual project failures.

Mitigation measures are then proposed to reduce, avoid, or manage the predicted impacts. These may include erosion and sediment control plans, waste management plans, noise barriers, traffic management measures, buffer zones, water treatment systems, dust suppression methods, or biodiversity protection measures. A strong EIA report should not merely list possible impacts; it should also demonstrate how those impacts will be controlled through practical and enforceable mitigation actions. This is where civil engineering students need to see the connection between environmental assessment and engineering solutions. Environmental monitoring and follow-up are also essential because EIA does not end once approval is granted. IAIA defines EIA follow-up as the monitoring and evaluation of project impacts after assessment, with the purpose of managing and communicating the environmental performance of a project. This highlights an important professional lesson for students: environmental responsibility continues during implementation. Monitoring helps determine whether predicted impacts were accurate, whether mitigation measures are working, and whether additional corrective action is needed. Finally, EIA report preparation and review procedures require students to understand how technical information is organised, justified, submitted, reviewed, and revised. A good EIA report usually includes project description, legal context, baseline conditions, impact assessment, mitigation measures, environmental management plans, monitoring requirements, and conclusions for decision-making. The review process evaluates whether the report is technically adequate and whether the proposed mitigation measures are acceptable. Therefore, technical understanding of EIA requires more than knowing environmental concepts; it requires students to understand documentation, evidence, regulatory expectations, and professional accountability.

Webinar-Based Learning in Higher Education

Webinar-based learning has become increasingly important in higher education because it provides flexible access to expert knowledge, professional discussion, and current industry practices. Unlike conventional classroom lectures, webinars can connect students with external speakers, industry practitioners, regulators, consultants, and researchers regardless of location. This is particularly useful for specialised topics such as EIA, where practical knowledge may come from professionals who have direct experience in preparing reports, responding to regulatory comments, conducting baseline studies, or managing project compliance. Recent research on online learning suggests that synchronous online learning can support both cognitive and affective outcomes when it is well designed. A 2026 study on synchronous online learning reports that synchronous formats can improve learners' affective outcomes and learning performance, with particularly strong effects on learners' self-efficacy beliefs. This is relevant to the present study because an EIA webinar may not only increase factual knowledge, but also improve students' confidence in understanding professional EIA procedures (Gegenfurtner et al., 2026). However, webinar effectiveness depends on more than the use of technology. Students are more likely to benefit when the webinar content is relevant, structured, interactive, professionally grounded, and connected to their programme of study. A 2024 study comparing synchronous and asynchronous online teaching found that both formats can improve learning outcomes and student satisfaction, suggesting that online delivery can be educationally valuable when the learning design supports engagement and comprehension. For EIA learning, this means the webinar should not only define EIA, but should also explain report preparation, submission pathways, review procedures, and real examples from professional practice(Hung et al., 2024). Webinars also support flexible learning because students can access knowledge beyond the normal classroom timetable and institutional setting. This is especially useful for civil engineering students who may not yet have internship experience or direct exposure to environmental consultancy practice. Through webinars, students can hear how professionals explain real procedures, common mistakes in EIA reports, expectations from reviewing authorities, and the practical importance of mitigation and monitoring. In this way, webinar-based learning becomes a bridge between academic content and professional application.

Industry-Oriented Learning and Professional Readiness

Industry-oriented learning is important in engineering education because it helps students understand how classroom knowledge is applied in real professional settings. Engineering students may learn theories, calculations, design principles, and environmental concepts in class, but they also need opportunities to see how these ideas are used in project approval, consultancy work, documentation, stakeholder communication, and regulatory compliance. Work-integrated learning literature describes this as the integration of classroom learning with practical experience. A recent systematic review explains that work-integrated learning is a pedagogical approach that combines academic learning with practical experience and has become increasingly important in undergraduate engineering education(Hwang et al., 2026). Although webinars are not the same as formal industrial training, they can function as a form of non-placement professional exposure. This is useful when students cannot yet participate directly in industry projects but can still learn from practitioners through expert talks, case sharing, and guided professional discussion. Research on non-placement work-integrated learning shows that authentic industry-related learning can help students connect theoretical knowledge with practical skills even without a traditional work placement. In the context of EIA, a webinar can expose students to the real expectations of environmental consultants, project proponents, engineers, and approving authorities(Yong et al., 2024). Professional readiness in civil engineering should include not only technical ability, but also awareness of ethical, environmental, legal, and sustainability responsibilities. For EIA-related learning, professional readiness means students can recognise why environmental assessment is required, identify the main components of an EIA report, understand the submission and review process, and appreciate how environmental decisions affect project implementation. This type of readiness cannot be developed through theoretical explanation alone. It requires repeated exposure to authentic professional contexts, including expert-led webinars, industrial talks, case studies, site examples, and problem-based learning. Therefore, the IDP Talk Webinar Series 2026 on Environmental Impact Assessment can be understood as an industry-oriented learning activity that supports students' professional exposure. By introducing students to legal requirements, baseline studies, impact prediction, mitigation measures, report preparation, and review procedures, the webinar provides a learning experience that connects civil engineering education with environmental practice. Its effectiveness, however, needs to be evaluated empirically. This justifies the present study's focus on students' EIA awareness, technical understanding, and perceived webinar effectiveness.

Conceptual Framework

Based on the literature, this study proposes that students' learning from the EIA webinar can be understood through three related constructs: EIA awareness, technical understanding, and perceived webinar effectiveness. EIA awareness refers to students' general recognition of the importance, purpose, and relevance of Environmental Impact Assessment in construction and infrastructure development. Technical understanding refers to students' perceived knowledge of EIA components such as legal requirements, baseline studies, impact prediction, mitigation measures, report preparation, submission, review, and approval procedures. Perceived webinar effectiveness refers to students' views on whether the webinar helped improve their understanding of professional EIA practice. A conceptual framework as follows:

EIA Awareness + Technical Understanding → Perceived Webinar Effectiveness

This model is suitable if the study aims to determine whether both awareness and technical understanding are associated with students' perception of webinar effectiveness. For SPSS analysis, this framework can be examined using descriptive statistics, Pearson correlation, and regression analysis. Descriptive statistics can answer the first three research questions by identifying the level of awareness, technical understanding, and perceived effectiveness. Pearson correlation can determine whether the three constructs are significantly related. Regression analysis can further examine whether EIA awareness and technical understanding significantly predict perceived webinar effectiveness. In this study, the framework is directly supports the research objective: to determine the relationship between EIA awareness, technical understanding, and perceived webinar effectiveness. It also allows the study to move beyond a satisfaction-based evaluation by examining whether students' learning-related perceptions are connected to their judgement of the webinar's effectiveness.

METHODOLOGY

This study employed a quantitative survey research design to evaluate students' learning perceptions after attending the IDP Talk Webinar Series 2026 on Environmental Impact Assessment. A quantitative design was considered appropriate because the study aimed to measure students' level of EIA awareness, technical understanding, and perceived webinar effectiveness using numerical data. Since the research objectives focus on identifying levels, examining relationships, and determining predictive effects among the constructs, the use of survey-based statistical analysis provides a systematic way to describe students' responses and test the relationships between variables. Quantitative survey research is commonly used in educational studies when researchers intend to measure attitudes, perceptions, knowledge, or self-reported learning experiences across a group of respondents using structured questionnaire items. Likert-type scales are also widely used to capture perceptions and levels of agreement because they allow respondents' views to be transformed into measurable data for statistical analysis(Koo & Yang, 2025). The study was conducted after the IDP Talk Webinar Series 2026: "Environmental Impact Assessment," held on April 2026. The webinar was organised by the IDP Team, Civil Engineering Studies, College of Engineering, Universiti Teknologi MARA, Permatang Pauh Campus, Pulau Pinang, Malaysia. The webinar was designed to expose students to the professional and practical dimensions of EIA, particularly in relation to civil engineering projects. The content of the webinar covered issues such as the importance of EIA, legal and regulatory requirements, environmental baseline studies, impact prediction, mitigation measures, EIA report preparation, submission procedures, and review processes. This context is relevant because EIA is not only a theoretical environmental topic but also a regulated professional process used to support project approval, environmental compliance, and sustainable development in construction and infrastructure planning. The Department of Environment Malaysia positions EIA as a formal mechanism for reviewing and analysing environmental documents and reports related to prescribed development activities(IBM Corp., 2019).

The participants of this study were civil engineering students who attended the IDP Talk Webinar Series 2026 on Environmental Impact Assessment. Based on the usable dataset, a total of 99 valid responses were included

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in the analysis. The participants were selected because they had direct exposure to the webinar content and were therefore suitable respondents for evaluating post-webinar awareness, technical understanding, and perceived learning effectiveness. This sampling approach is appropriate for an educational evaluation study because the respondents were drawn from the actual group who experienced the learning intervention being examined. In this study, the unit of analysis was the individual student, and each response represented the student's self-reported perception after participating in the webinar.

Data were collected using a structured questionnaire developed to measure three main constructs: EIA awareness, technical understanding, and perceived webinar effectiveness. The questionnaire items were arranged according to the learning focus of the webinar and the research objectives of the study. Section A measured students' awareness of EIA, Section B measured students' technical understanding of EIA procedures, and Section C measured students' perceived effectiveness of the webinar in improving their understanding of professional EIA practice. The questionnaire structure is presented as follows in Table 1:

Table 1: Research Instrument

Section	**Items**	**Construct**	**Focus**
A	A1–A4	EIA Awareness	Awareness of EIA importance, legal requirement, environmental protection, and project approval
B	B1–B5	Technical Understanding	Understanding of EIA report preparation, ESI/TOR, baseline study, impact assessment, and submission process
C	C1–C4	Webinar Effectiveness	Understanding of consultant roles, review procedures, timeline, and quality of EIA reports

The items were measured using a 5-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. This scale was suitable because the study sought to measure students' level of agreement with statements related to awareness, understanding, and perceived effectiveness. Likert-type instruments are commonly used in educational and behavioural research because they allow attitudes, perceptions, and self-reported learning experiences to be measured in a structured and comparable form(Koo & Yang, 2025).

The data were collected after the completion of the EIA webinar. Students who attended the webinar were invited to respond to the questionnaire based on their learning experience. The timing of the data collection was appropriate because respondents had recently been exposed to the webinar content and could evaluate their awareness, understanding, and perceived learning gains while the experience was still fresh. The questionnaire responses were screened before analysis, and only complete and usable responses were retained. The final dataset consisted of 99 valid responses, which were then coded and analysed using IBM SPSS Statistics.

The collected data were analysed using IBM SPSS Statistics. SPSS was selected because it provides suitable procedures for descriptive analysis, reliability testing, factor analysis, correlation analysis, and regression analysis. These procedures are appropriate for the present study because the research aims to describe students' responses, examine the consistency of the questionnaire items, confirm the grouping of items, and test the relationships between the main constructs.

First, frequency and percentage analysis were used to describe the participants' demographic or profile information, if such information was included in the dataset. This analysis provides a general overview of the respondents and helps readers understand the background of the sample. Frequency analysis is particularly useful for categorical variables such as gender, programme, semester, or previous exposure to EIA.

Second, descriptive statistics were used to determine the mean and standard deviation for each questionnaire item and construct. The mean score was used to indicate the level of agreement among students, while the standard deviation was used to show the degree of variation in their responses. In this study, descriptive statistics were used to answer the first three research questions by identifying the level of students' EIA awareness, technical understanding, and perceived webinar effectiveness after attending the webinar.

Third, reliability analysis was conducted using Cronbach's alpha to examine the internal consistency of the items within each construct. Cronbach's alpha is widely used in survey-based research to determine whether several Likert-scale items consistently measure the same underlying construct. IBM SPSS provides reliability analysis procedures that report the number of cases, number of items, and reliability estimates for scale evaluation. In this study, Cronbach's alpha was calculated separately for EIA Awareness, Technical Understanding, and Webinar Effectiveness. A higher alpha value indicates stronger internal consistency among the items. Recent educational and survey-based research continues to use Cronbach's alpha as an important indicator of internal consistency for Likert-scale instruments (Ahmad et al., 2024).

Fourth, Exploratory Factor Analysis, or Principal Component Analysis, was conducted to examine whether the questionnaire items were grouped according to the proposed constructs of awareness, technical understanding, and webinar effectiveness. Factor analysis is suitable when researchers want to explore the underlying structure of a set of observed questionnaire items. UCLA's statistical guidance explains that factor analysis is a data reduction method that seeks underlying latent variables reflected in observed variables. Similarly, IBM explains that PCA reduces a set of variables into a smaller number of principal components, while factor analysis focuses on underlying latent structures. For this study, the analysis was used to support construct validity by checking whether items A1–A4, B1–B5, and C1–C4 loaded meaningfully under their intended dimensions(Shrestha, 2021).

Fifth, Pearson correlation analysis was conducted to examine the relationships among EIA Awareness, Technical Understanding, and Webinar Effectiveness. Pearson correlation is appropriate when the researcher wants to determine the strength and direction of the linear relationship between variables. IBM SPSS documentation explains that the bivariate correlation procedure computes Pearson's correlation coefficient and its significance level. In this study, Pearson correlation was used to answer the fourth research question by determining whether students with higher EIA awareness also reported stronger technical understanding and higher perceived webinar effectiveness (Wagner, 2015).

Finally, multiple regression analysis was used to determine whether EIA Awareness and Technical Understanding significantly predicted Perceived Webinar Effectiveness. This analysis was suitable because the conceptual framework positions perceived webinar effectiveness as the dependent variable, while EIA awareness and technical understanding are treated as independent variables. Through regression analysis, the study can identify whether students' awareness and technical understanding contribute meaningfully to their perception of the webinar's effectiveness. This allows the study to move beyond simple descriptive reporting and provide stronger empirical evidence about the factors associated with students' perceived learning from the webinar.

The statistical model for this study was guided by the following conceptual relationship:

EIA Awareness + Technical Understanding → Perceived Webinar Effectiveness

In this model, EIA Awareness and Technical Understanding function as the independent variables, while Perceived Webinar Effectiveness functions as the dependent variable. This model is consistent with the study's fourth objective, which aims to determine the relationship between EIA awareness, technical understanding, and perceived webinar effectiveness. The use of correlation analysis allows the study to examine whether the constructs are significantly related, while multiple regression analysis allows the study to determine whether awareness and technical understanding predict students' perception of webinar effectiveness. In summary, this study adopted a quantitative survey research design to evaluate webinar-based Environmental Impact Assessment learning among civil engineering students. The study was conducted after the IDP Talk Webinar Series 2026 on Environmental Impact Assessment, with 99 usable responses included in the analysis. The questionnaire measured three constructs: EIA Awareness, Technical Understanding, and Perceived Webinar Effectiveness. Data were analysed using SPSS through frequency analysis, descriptive statistics, reliability analysis, Exploratory Factor Analysis or Principal Component Analysis, Pearson correlation, and multiple

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regression analysis. This methodological approach provides a systematic basis for evaluating whether the webinar enhanced students' awareness and technical understanding of EIA and whether these constructs were associated with perceived webinar effectiveness.

RESULTS

Respondent Profile

Table 2: Respondent Profile

		Frequency	Percent (%)
Gender	Male	46	46.5
	Female	53	53.5
Group Respondent	Student	95	96.0
	Lecturer	4	4.0
	Total	99	100.0

Table 2 shows the profile of the respondents involved in the study. Of the 99 respondents, 46 were male (46.5%) and 53 were female (53.5%), indicating a fairly balanced gender distribution. In terms of respondent category, the majority were students (n = 95, 96.0%), while lecturers represented only a small proportion of the sample (n = 4, 4.0%). This suggests that the findings mainly represent students' perceptions of webinar-based Environmental Impact Assessment learning.

Descriptive Analysis of EIA Awareness

Table 3: Descriptive Statistics for EIA Awareness

Descriptive Statistics			
Items	N	Mean	Std. Deviation
A1. I am aware that an EIA is a statutory requirement under Section 34A of the Environmental Quality Act (EQA) 1974 for prescribed activities	99	4.26	0.737
A2. I am aware that the primary purpose of an EIA is to identify, predict, evaluate, and communicate environmental impacts before a project is approved and implemented	99	4.30	0.762
A3. I am aware that an EIA study must be conducted by a team of Qualified Persons/Consultants registered with the Department of Environment (DOE)	99	4.39	0.740
A4. I am aware of the typical 10-step EIA methodology, which includes screening, scoping, baseline study, mitigation identification, and impact assessment	99	4.28	0.770
Valid N (listwise)	99		

Table 3 presents the descriptive statistics for students' EIA awareness after attending the webinar. Overall, the mean scores for all four items were high, ranging from 4.26 to 4.39, indicating that respondents generally agreed that they were aware of the key concepts and requirements of Environmental Impact Assessment.

The highest mean score was recorded for A3, with M = 4.39, SD = 0.740. This suggests that respondents demonstrated strong awareness of the professional role of registered EIA consultants in conducting EIA studies. This is an important finding because it shows that the webinar helped students recognise that EIA is not merely an academic concept, but a regulated professional process involving qualified experts.

The second highest mean score was for A2, with M = 4.30, SD = 0.762. This indicates that students understood the fundamental purpose of EIA as a preventive and decision-support tool before project approval and implementation. Meanwhile, A4 recorded a mean score of M = 4.28, SD = 0.770, showing that respondents were also aware of the typical EIA methodology, including screening, scoping, baseline study, mitigation identification, and impact assessment. A1 recorded the lowest mean score, although it remained high, with M = 4.26, SD = 0.737. This suggests that students were aware that EIA is a statutory requirement under Section 34A of the Environmental Quality Act 1974 for prescribed activities, although this item showed slightly lower agreement compared with the other awareness items. In summary, the findings indicate that respondents reported a high level of EIA awareness after attending the webinar. The relatively small standard deviation values, ranging from 0.737 to 0.770, suggest that the responses were fairly consistent across participants. Therefore, the webinar appears to have been effective in strengthening students' awareness of EIA as a statutory, methodological, and professional requirement in civil engineering practice.

Descriptive Analysis of Technical Understanding

Table 4: Descriptive Statistics for Technical Understanding of EIA

Descriptive Statistics			
Items	N	Mean	Std. Deviation
B1. I understand how to prepare the Environmental Scoping Information (ESI) and formulate the Terms of Reference (TOR) to ensure significant environmental issues are assessed	99	4.14	0.756
B2. I understand the requirements for conducting baseline studies to collect data on water, air, noise, flora, and fauna at the project site	99	4.22	0.736
B3. I understand the impact assessment methodologies, such as using specific dispersion models for air quality or assessing worst-case scenarios	99	4.21	0.786
B4. I understand the differences in the submission and review process between First Schedule activities (submitted to DOE State Offices) and Second Schedule activities (submitted to DOE Headquarters)	99	4.19	0.778
B5. I understand the standard format required for the main text of the EIA Report, including chapters like the Statement of Need, Project Options, and Evaluation of Impacts	99	4.22	0.678
Valid N (listwise)	99		

Table 4 presents the descriptive statistics for respondents' technical understanding of Environmental Impact Assessment (EIA). Overall, the mean scores for all five items were high, ranging from 4.14 to 4.22, indicating that respondents generally agreed that they understood the technical procedures involved in EIA practice after attending the webinar. The highest mean scores were recorded for B2 and B5, both with M = 4.22. For B2, the standard deviation was SD = 0.736. This suggests that respondents had a strong understanding of the importance of baseline environmental data in EIA preparation. For B5, the standard deviation was the lowest among the items, SD = 0.678, indicating more consistent responses among participants. This shows that the webinar may have effectively clarified the expected structure and content of an EIA report. Item B3 also recorded a high mean score, M = 4.21, SD = 0.786, suggesting that respondents understood impact assessment methodologies, including the use of specific models and worst-case scenario assessment. Meanwhile, B4 recorded M = 4.19, SD = 0.778, indicating that students generally understood the differences between the submission and review processes for First Schedule and Second Schedule activities. Although the score was high, the slightly larger standard deviation suggests some variation in respondents' understanding of this regulatory procedure. The lowest mean score was recorded for B1, with M = 4.14, SD = 0.756. This item focused on preparing the Environmental Scoping Information (ESI) and formulating the Terms of Reference (TOR). Although the score still indicates a high level of agreement, it suggests that ESI and TOR preparation may be slightly more challenging for students compared with other EIA components. This is reasonable because scoping and TOR formulation require students to understand how significant environmental issues are identified and translated into an assessment framework. In summary, the findings indicate that respondents reported a high level of technical understanding of EIA procedures after attending the webinar. The relatively moderate standard deviation values, ranging from 0.678 to 0.786, show that responses were generally consistent. Overall, the results suggest that the webinar was useful in enhancing students' understanding of key technical aspects of EIA, particularly baseline studies, impact assessment methods, report structure, and submission procedures.

Descriptive Analysis of Webinar Effectiveness

Table 5: Descriptive Statistics for Perceived Webinar Effectiveness

Descriptive Statistics			
Item	N	Mean	Std. Deviation
C1. The briefing clearly explained the core roles and duties of an EIA Consultant in preparing, reviewing, and defending the EIA Report	99	4.29	0.759
C2. The seminar effectively detailed the criteria for the EIA Report Review Process (e.g., Report Adequacy Checks) and why reports might be rejected	99	4.36	0.692
C3. The materials and flowcharts provided effectively illustrated the timeline and steps for both First Schedule (5 weeks) and Second Schedule (12 weeks) reviewing procedures	99	4.32	0.712
C4. Overall, the seminar has significantly improved my ability to prepare a high-quality EIA report that meets the Department of Environment's standards	99	4.34	0.673
Valid N (listwise)	99		

Table 5 presents the descriptive statistics for respondents' perceived webinar effectiveness. Overall, the findings show high mean scores across all four items, ranging from 4.29 to 4.36. This indicates that respondents generally agreed that the webinar was effective in improving their understanding of professional Environmental Impact Assessment (EIA) practice. The highest mean score was recorded for C2, with M = 4.36, SD = 0.692. This suggests that respondents found the explanation of the EIA report review process particularly useful. The result indicates that the webinar helped students understand not only how EIA reports are prepared, but also how they are evaluated by the relevant authority. The second highest mean score was for C4, with M = 4.34, SD = 0.673. This item also recorded the lowest standard deviation, indicating that respondents' answers were relatively consistent. This suggests that participants generally perceived the webinar as helpful in improving their confidence and practical understanding of EIA report preparation. Item C3 recorded a mean score of M = 4.32, SD = 0.712, showing that the materials and flowcharts used in the webinar were perceived as effective in explaining the timeline and steps for First Schedule and Second Schedule review procedures. Meanwhile, C1 recorded the lowest mean score, although it remained high, with M = 4.29, SD = 0.759. This indicates that respondents also agreed that the briefing clearly explained the roles and duties of an EIA consultant in preparing, reviewing, and defending the EIA report. In summary, the results indicate that respondents perceived the webinar as highly effective in enhancing their understanding of professional EIA practices. The relatively small standard deviation values, ranging from 0.673 to 0.759, suggest that respondents' perceptions were generally consistent. Overall, the findings imply that the webinar successfully supported students' learning by clarifying consultant responsibilities, report review criteria, procedural timelines, and the quality expectations required for EIA reports submitted to the Department of Environment.

Reliability Analysis

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Table 6: Reliability Analysis of the Constructs

Construct	N of Items	Cronbach's Alpha
EIA Awareness	4	0.945
Technical Understanding	5	0.956
Webinar Effectiveness	4	0.938

Table 6 presents the reliability analysis for the three constructs used in the study. The results show that all constructs achieved excellent internal consistency, with Cronbach's alpha values exceeding the commonly accepted threshold of .70. Specifically, EIA Awareness recorded an alpha value of $\alpha = .945$, Technical Understanding recorded $\alpha = .956$, and Webinar Effectiveness recorded $\alpha = .938$. These findings indicate that the items within each construct were highly reliable and consistently measured the intended dimensions. Therefore, the questionnaire was considered suitable for further statistical analysis, including descriptive analysis, correlation, and regression.

Exploratory Factor Analysis.

Table 7: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.899
Bartlett's Test of Sphericity	Approx. Chi-Square	1464.094
	df	78
	Sig.	0.000

Table 7 presents the KMO and Bartlett's Test results for assessing the suitability of the data for factor analysis. The Kaiser-Meyer-Olkin value was **.899**, indicating that the sample adequacy was very good and suitable for Exploratory Factor Analysis. Bartlett's Test of Sphericity was also significant, **$\chi^2(78) = 1464.094$, $p < .001$**, showing that the correlation matrix was not an identity matrix and that sufficient relationships existed among the items. Therefore, the data were appropriate for factor analysis.

Table 8: Total Variance Explained

Total Variance Explained							
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.459	65.071	65.071	8.280	63.690	63.690	6.747
2	1.507	11.589	76.660	1.343	10.329	74.019	6.437
3	1.207	9.282	85.942	1.012	7.787	81.806	6.477
4	0.363	2.794	88.735				
5	0.319	2.457	91.193				
6	0.259	1.991	93.183				

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7	0.198	1.524	94.707				
8	0.174	1.335	96.042				
9	0.156	1.198	97.240				
10	0.115	0.885	98.126				
11	0.105	0.806	98.932				
12	0.078	0.602	99.533				
13	0.061	0.467	100.000				
Extraction Method: Principal Axis Factoring.							
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.							

Table 8 presents the total variance explained from the Principal Axis Factoring analysis. The results show that three factors had eigenvalues greater than 1.00, indicating a three-factor structure. Factor 1 recorded the largest eigenvalue (8.459) and explained 65.071% of the variance. Factor 2 had an eigenvalue of 1.507 and explained an additional 11.589%, while Factor 3 had an eigenvalue of 1.207 and explained 9.282% of the variance. After extraction, the three factors explained a cumulative variance of 81.806%, which indicates that the extracted factors accounted for a substantial proportion of the total variance in the questionnaire items. This suggests that the items strongly represented the underlying constructs measured in the study, namely EIA awareness, technical understanding, and perceived webinar effectiveness. Since the factors were treated as correlated, the rotation sums of squared loadings should not be added to obtain a total variance. Overall, the findings support the suitability of a three-factor solution for the instrument.

Table 9: Exploratory Factor Analysis Results

Constructs	Items	Factor Loading	Extraction
EIA Awareness	A1. I am aware that an EIA is a statutory requirement under Section 34A of the Environmental Quality Act (EQA) 1974 for prescribed activities	0.922	0.836
	A2. I am aware that the primary purpose of an EIA is to identify, predict, evaluate, and communicate environmental impacts before a project is approved and implemented	0.907	0.865
	A3. I am aware that an EIA study must be conducted by a team of Qualified Persons/Consultants registered with the Department of Environment (DOE)	0.852	0.823
	A4. I am aware of the typical 10-step EIA methodology, which includes screening, scoping, baseline study, mitigation identification, and impact assessment	0.834	0.753
Technical Understanding	B1. I understand how to prepare the Environmental Scoping Information (ESI) and formulate the Terms of Reference (TOR) to ensure significant environmental issues are assessed	1.027	0.899
	B2. I understand the requirements for conducting baseline studies to collect data on water, air, noise, flora, and fauna at the project site	0.791	0.815
	B3. I understand the impact assessment methodologies, such as using specific dispersion models for air quality or assessing worst-case scenarios	0.852	0.766

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	B4. I understand the differences in the submission and review process between First Schedule activities (submitted to DOE State Offices) and Second Schedule activities (submitted to DOE Headquarters)	0.921	0.862
	B5. I understand the standard format required for the main text of the EIA Report, including chapters like the Statement of Need, Project Options, and Evaluation of Impacts	0.753	0.787
Webinar Effectiveness	C1. The briefing clearly explained the core roles and duties of an EIA Consultant in preparing, reviewing, and defending the EIA Report	0.880	0.783
	C2. The seminar effectively detailed the criteria for the EIA Report Review Process (e.g., Report Adequacy Checks) and why reports might be rejected	0.917	0.909
	C3. The materials and flowcharts provided effectively illustrated the timeline and steps for both First Schedule (5 weeks) and Second Schedule (12 weeks) reviewing procedures	0.816	0.703
	C4. Overall, the seminar has significantly improved my ability to prepare a high-quality EIA report that meets the Department of Environment's standards	0.878	0.833

Table 9 presents the Exploratory Factor Analysis results for EIA Awareness, Technical Understanding, and Webinar Effectiveness. Overall, the factor loadings were strong, ranging from 0.753 to 1.027, while the extraction values ranged from 0.703 to 0.909, indicating that the items explained a substantial proportion of variance within their respective constructs. The EIA Awareness items loaded between 0.834 and 0.922, suggesting that they consistently measured students' awareness of EIA requirements, purpose, consultant involvement, and methodology. The Technical Understanding items also showed strong loadings, ranging from 0.753 to 1.027, reflecting students' understanding of ESI/TOR preparation, baseline studies, impact assessment, submission procedures, and EIA report format. Similarly, the Webinar Effectiveness items loaded between 0.816 and 0.917, indicating that the items adequately captured students' perceptions of the webinar's effectiveness in explaining consultant roles, review criteria, procedural timelines, and report quality expectations.

However, item B1 recorded a loading above 1.00, which should be interpreted cautiously as it may indicate a possible Heywood case. This issue may arise from very high inter-item correlations, sample size limitations, model over-extraction, or estimation problems in factor analysis. In this study, the high loading may reflect conceptual overlap between B1 and other technical understanding items, particularly because ESI/TOR preparation is closely related to baseline studies, impact assessment, and report preparation. Therefore, the value was not treated as substantive evidence of a loading greater than unity, but as a signal that the measurement structure requires further verification. Future studies should examine the correlation matrix, communalities, cross-loadings, extraction method, and sample adequacy, or validate the factor structure using confirmatory factor analysis with a larger sample.

Correlation Analysis

Table 10: Correlation between EIA Awareness, Technical Understanding, and Webinar Effectiveness

Correlations			
	EIA_Awareness	Technical_Understanding	Webinar_Effectiveness

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EIA_Awareness	Pearson Correlation	1	.631**	.651**
	Sig. (2-tailed)		0.000	0.000
	N	99	99	99
Technical_Understanding	Pearson Correlation	.631**	1	.636**
	Sig. (2-tailed)	0.000		0.000
	N	99	99	99
Webinar_Effectiveness	Pearson Correlation	.651**	.636**	1
	Sig. (2-tailed)	0.000	0.000	
	N	99	99	99
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 10 presents the Pearson correlation results between EIA Awareness, Technical Understanding, and Webinar Effectiveness. The findings show that all three constructs were positively and significantly correlated at the 0.01 level. There was a significant positive relationship between EIA Awareness and Technical Understanding, $r(97) = .631$, $p < .001$, indicating that students with higher awareness of EIA also tended to report stronger technical understanding of EIA procedures. Similarly, EIA Awareness was significantly related to Webinar Effectiveness, $r(97) = .651$, $p < .001$, suggesting that students with greater EIA awareness were more likely to perceive the webinar as effective. A significant positive relationship was also found between Technical Understanding and Webinar Effectiveness, $r(97) = .636$, $p < .001$, indicating that students who reported stronger technical understanding also perceived the webinar more favourably. Overall, the results indicate moderate to strong positive relationships among the three constructs. This suggests that awareness, technical understanding, and perceived webinar effectiveness are closely connected in the context of webinar-based EIA learning.

Regression Analysis

Table 11: Regression Analysis Predicting Webinar Effectiveness

Predictor	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	1.173	0.321		3.657	0.000		
EIA_Awareness	0.388	0.086	0.415	4.491	0.000	0.602	1.662
Technical_Understanding	0.354	0.087	0.374	4.054	0.000	0.602	1.662

Table 11 presents the multiple regression analysis predicting Webinar Effectiveness from EIA Awareness and Technical Understanding. The results show that both predictors made significant positive contributions to perceived webinar effectiveness. Specifically, EIA Awareness significantly predicted Webinar Effectiveness, $B = 0.388$, $SE = 0.086$, $\beta = .415$, $t = 4.491$, $p < .001$. This indicates that students with higher awareness of EIA were more likely to perceive the webinar as effective. Similarly, Technical Understanding was also a significant predictor, $B = 0.354$, $SE = 0.087$, $\beta = .374$, $t = 4.054$, $p < .001$, suggesting that students with stronger understanding of EIA report preparation, submission, and review procedures also rated the webinar effectiveness more highly. In terms of relative contribution, EIA Awareness had a slightly stronger predictive effect than Technical Understanding, as shown by its higher beta value. The multicollinearity statistics were acceptable, with Tolerance = 0.602 and VIF = 1.662 for both predictors, indicating that multicollinearity was not a concern. Overall, the findings suggest that students' awareness and technical understanding of EIA significantly contributed to their perceived effectiveness of the webinar.

DISCUSSION

Students' Awareness of Environmental Impact Assessment

The first research objective was to examine students' level of awareness of Environmental Impact Assessment after attending the webinar. The findings show that students demonstrated a high level of EIA awareness, with all awareness items recording mean scores above 4.00. This suggests that the participants generally understood that EIA is not merely an environmental concept, but a statutory and professional requirement in civil engineering and infrastructure development. The highest mean score was recorded for students' awareness that EIA studies must be conducted by qualified persons or consultants registered with the Department of Environment, suggesting that the webinar successfully exposed students to the professional nature of EIA practice. This finding is important because EIA plays a central role in development control and environmental governance. In Malaysia, the Department of Environment states that EIA involves the development, review, and analysis of environmental documents and reports during project planning and implementation for prescribed activities.

This means that civil engineering students need to understand EIA as part of the wider approval and compliance process, not only as a classroom topic. The students' high awareness scores therefore indicate that the webinar helped them recognise EIA as a key regulatory tool that connects project development with environmental protection, sustainable development, and professional accountability. The result also supports the wider direction of civil engineering education, where sustainability and environmental responsibility are increasingly seen as essential graduate attributes. Kordi et al. emphasise that civil engineering education should embed sustainability-related learning because future engineers are expected to contribute to sustainable infrastructure, clean water, resilient cities, and responsible development. In this study, the high level of EIA awareness suggests that the webinar contributed to this educational aim by helping students see how environmental assessment is directly linked to civil engineering practice.

Students' Technical Understanding of EIA

The second research objective was to evaluate students' technical understanding of EIA report preparation, submission, and review procedures. The descriptive results show that students reported a high level of technical understanding, with mean scores ranging from 4.14 to 4.22. This indicates that the webinar helped students understand important technical components of EIA, including Environmental Scoping Information, Terms of Reference, baseline studies, impact assessment methodologies, submission procedures, and the standard structure of EIA reports. The strongest results were recorded for students' understanding of baseline studies and EIA report format. This suggests that the webinar was particularly effective in explaining the practical content required in EIA documentation. This is consistent with the Malaysian EIA Guideline, which outlines the importance of systematic EIA procedures, including scoping, baseline studies, impact prediction, mitigation measures, report preparation, and review. For civil engineering students, this type of knowledge is valuable because it helps them understand how environmental information is collected, organised, analysed, and presented to support decision-making. However, the lowest mean score was recorded for the item related to preparing Environmental Scoping Information and formulating Terms of Reference. Although the score was still high, this suggests that ESI and TOR preparation may be slightly more challenging for students compared with other EIA components. This is reasonable because scoping requires students to identify significant environmental issues, determine assessment boundaries, and translate project risks into a structured assessment framework. In professional EIA practice, this stage requires not only technical knowledge but also judgement, experience, and familiarity with regulatory expectations. Therefore, future webinars or teaching sessions may need to provide more worked examples, templates, or case-based exercises on ESI and TOR preparation. Overall, the findings indicate that the webinar did not only increase general awareness, but also supported students' procedural and technical understanding of EIA. This is meaningful because professional competence in EIA depends on understanding how the process works in practice. The International Association for Impact Assessment explains that impact assessment is intended to support decision-making by identifying the future consequences of current or proposed actions. Therefore, students' technical understanding of EIA procedures is essential if they are to appreciate how assessment findings influence project approval, mitigation planning, and environmental monitoring.

Effectiveness of the Webinar in Bridging Classroom Learning and Professional Practice

The third research objective was to assess the perceived effectiveness of the webinar in enhancing students' understanding of professional EIA practices. The findings show that students perceived the webinar as highly effective, with all effectiveness items recording mean scores above 4.00. The highest mean score was related to the explanation of EIA report review criteria, including report adequacy checks and reasons for report rejection. This suggests that students valued the webinar because it clarified aspects of EIA that are often difficult to understand through classroom teaching alone. This finding is significant because classroom instruction may introduce the definition, purpose, and general stages of EIA, but students may still lack exposure to how EIA is applied in real professional settings. The webinar appears to have helped bridge this gap by explaining consultant roles, review procedures, reporting standards, and timelines for First Schedule and Second Schedule review processes. In this sense, the webinar functioned as a form of industry-oriented learning, where students were able to connect theoretical knowledge with regulatory and professional practice. This result is supported by recent literature on online and webinar-based learning. Studies on synchronous online learning have shown that well-designed online sessions can support learning performance, confidence, and affective outcomes when learners are actively engaged and the content is relevant to their needs. Similarly, research on online teaching in higher education suggests that online formats can improve learning outcomes and student satisfaction when the delivery is structured and meaningful. The present findings are consistent with this view because the students perceived the EIA webinar as useful, especially in explaining professional procedures that are not always visible in normal classroom learning. The finding also supports the importance of professional exposure in engineering education. Recent discussions on engineering education for sustainable development argue that students need practical, interdisciplinary, and professionally relevant learning experiences to prepare them for complex sustainability challenges. In this study, the webinar created a practical learning space where students could better understand how EIA operates in real civil engineering and infrastructure contexts. Therefore, the webinar can be viewed as a useful complementary strategy for strengthening students' professional readiness in environmental compliance and sustainable project planning.

Relationship between Awareness, Technical Understanding, and Webinar Effectiveness

The fourth research objective was to determine the relationship between EIA awareness, technical understanding, and perceived webinar effectiveness. The Pearson correlation results showed significant positive relationships among all three constructs. EIA Awareness was significantly correlated with Technical Understanding, $r(97) = .631$, $p < .001$, indicating that students with higher awareness of EIA also tended to report stronger technical understanding. EIA Awareness was also significantly correlated with Webinar Effectiveness, $r(97) = .651$, $p < .001$, while Technical Understanding was significantly correlated with Webinar Effectiveness, $r(97) = .636$, $p < .001$. These results suggest that awareness, understanding, and perceived effectiveness are closely connected in webinar-based EIA learning. The correlation findings imply that students' perception of webinar effectiveness is not isolated from their learning gains. Students who became more aware of EIA and understood its technical procedures were more likely to evaluate the webinar positively. This is important because it shows that webinar effectiveness should not be measured only through satisfaction or attendance. Instead, effectiveness should also be linked to whether students develop meaningful awareness and practical understanding of the subject matter.

The regression findings provide further support for this argument. Both EIA Awareness and Technical Understanding significantly predicted Webinar Effectiveness. EIA Awareness was a significant predictor, $B = 0.388$, $SE = 0.086$, $\beta = .415$, $t = 4.491$, $p < .001$, while Technical Understanding was also significant, $B = 0.354$, $SE = 0.087$, $\beta = .374$, $t = 4.054$, $p < .001$. Although both predictors were important, EIA Awareness showed a slightly stronger standardised beta value than Technical Understanding. Therefore, in this study, webinar effectiveness was influenced by both students' general awareness of EIA and their technical understanding of EIA procedures, with awareness emerging as the slightly stronger predictor.

This finding suggests that students first need to recognise the importance and relevance of EIA before they can fully appreciate the technical value of the webinar. However, technical understanding remains crucial because the webinar's professional value depends on whether students gain practical knowledge about report preparation, baseline studies, impact assessment, ESI/TOR, submission processes, and review procedures. In other words, awareness may help students understand why EIA matters, while technical understanding helps them understand how EIA is carried out in practice. Both dimensions are necessary for meaningful webinar-based learning. From a pedagogical perspective, this supports the idea that professional webinars should be designed not only to raise awareness, but also to develop procedural knowledge. Engineering education literature increasingly highlights the need to connect academic knowledge with real-world professional practice, especially in sustainability-related areas. Therefore, future EIA webinars should include practical demonstrations, sample report structures, regulatory flowcharts, case examples, and interactive question-and-answer sessions. These elements may help students move beyond general awareness and develop stronger technical confidence in EIA practice.

Overall Discussion

In summary, the findings show that the IDP Talk Webinar Series 2026 on Environmental Impact Assessment was positively received by the respondents and appeared to support students' learning in three important areas: awareness, technical understanding, and professional exposure. The high mean scores across all constructs suggest that the webinar helped students recognise EIA as a statutory and professional requirement, understand key technical procedures, and appreciate the role of EIA in civil engineering project approval and environmental compliance. The study also contributes to the discussion on webinar-based learning in engineering education. Rather than treating the webinar as a simple knowledge-sharing session, the findings suggest that it functioned as a meaningful bridge between classroom learning and professional EIA practice. This is particularly valuable in civil engineering education, where students need to understand not only design and construction processes, but also environmental responsibilities, regulatory procedures, sustainability expectations, and professional documentation requirements. At the same time, the findings indicate that future improvements can be made. Since ESI and TOR preparation recorded the lowest mean score under technical understanding, future sessions could provide more detailed examples of scoping documents, TOR preparation, baseline study planning, and impact assessment matrices. This would help students develop stronger procedural confidence and make the webinar even more aligned with professional EIA practice. In conclusion, the study demonstrates that webinar-based professional learning can play a useful role in strengthening civil engineering students' understanding of Environmental Impact Assessment. The significant correlation and regression results further confirm that students' perceived webinar effectiveness is closely linked to their awareness and technical understanding. Therefore, expert-led webinars should be considered a valuable complementary learning strategy for enhancing environmental compliance knowledge, sustainability awareness, and professional readiness among civil engineering students.

Practical Implications of Webinar-Based EIA Learning

The findings have practical implications for the design of webinar-based Environmental Impact Assessment learning in civil engineering education. The positive relationship between EIA awareness, technical understanding, and perceived webinar effectiveness suggests that expert-led webinars can serve as a useful complementary learning strategy for exposing students to professional EIA procedures, consultant roles, report review criteria, and regulatory timelines. However, the findings should be interpreted as perception-based outcomes because the study measured students' self-reported awareness and understanding after the webinar. Therefore, future EIA webinars should incorporate more direct evidence of learning, such as pre-test and post-test comparisons, short technical quizzes, case-study analysis, EIA scoping exercises, or rubric-based report review tasks. These assessment activities would allow educators to determine whether webinar participation improves not only students' perceived understanding, but also their actual ability to apply EIA concepts in professional and regulatory contexts

CONCLUSION

In conclusion, this study demonstrates that the IDP Talk Webinar Series 2026 on Environmental Impact Assessment provided meaningful support for enhancing students' EIA awareness, technical understanding, and perceived understanding of professional EIA practices. The findings suggest that webinar-based professional learning can help bridge the gap between classroom instruction and real regulatory practice, particularly in areas such as EIA report preparation, baseline studies, impact assessment, submission procedures, and review requirements. Critically, the study shows that students' perceived webinar effectiveness is closely related to both awareness and technical understanding, indicating that successful professional webinars should move beyond general exposure and provide practical procedural knowledge. Although the study is limited by its reliance on self-reported data and responses from a single webinar group, it offers useful evidence for improving future IDP activities and strengthening industry-oriented environmental learning in civil engineering education. Nevertheless, the study is limited by its reliance on perception-based survey data. Future webinar evaluations should include pre-test and post-test comparisons or performance-based assessments, such as EIA report review tasks and case-study exercises, to measure students' actual learning improvement. Comparative studies between webinar-based and traditional classroom-based EIA learning would also provide stronger evidence of the pedagogical value of webinars.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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