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Integrating Writing Support into Final-Year Projects: Student Needs, Usability and Acceptance in Malaysian TVET

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Abstract

Final-year project (FYP) writing requires technical and vocational education and training (TVET) students to transform disciplinary knowledge into coherent, academically appropriate technical texts. Yet writing support is often separated from the technical tasks through which such texts are produced. This study examined student needs, perceived usability and acceptance of an expert-reviewed Cross-Curricular Instructional Model of English Writing Skills (C-IMEWS) prototype designed to embed writing support within authentic FYP activity. A cross-sectional questionnaire was completed by 218 students from seven faculties at a Malaysian technical university. Because the instrument originated before the study was narrowed to writing, two legacy speaking-focused items were excluded from the publication analysis. Four writing-relevant composite measures demonstrated high internal consistency (Cronbach's alpha = .929-.970; omega = .947-.974). Students reported strong perceived value/integration (M = 4.13, SD = 0.55), writing/research capability (M = 4.17, SD = 0.58), usability/implementation (M = 4.14, SD = 0.57), and overall acceptance (M = 4.20, SD = 0.60). Prior experience of writing a technical or project report in English was associated with higher scores across all four constructs (Cohen's d = 0.45-0.58), whereas gender and faculty differences were not statistically significant. A robust multiple regression explained 85.2% of the variance in overall acceptance; perceived usability/implementation showed the strongest unique association (standardised beta = .539, $p < .001$), followed by perceived writing/research capability (beta = .286, $p = .004$). Open-ended responses converged on needs for report organisation, scaffolding, examples/templates, feedback, and digital or AI-supported assistance. The findings provide needs and acceptability evidence for a writing-integrated FYP prototype, but they do not establish causal improvement in writing

performance. Classroom-based trials using direct writing outcomes are required as the next validation stage.
Keywords: Academic Writing, English for Specific Purposes, Tvet, Needs Analysis, Cefr

Introduction

Technical and vocational higher education is expected to produce graduates who can do more than execute specialised technical procedures. Graduates must also communicate ideas, decisions, evidence and solutions in forms that are intelligible to academic, professional and industry audiences. In engineering and related technical disciplines, written communication is therefore not an accessory to disciplinary competence; it is one of the principal means through which disciplinary competence becomes visible. Final-year projects make this relationship especially clear because students must convert a complex technical process into proposals, literature-based arguments, methods, analyses, interpretations and defensible conclusions.

Research in English for Specific Purposes (ESP) and English for Academic Purposes (EAP) has repeatedly shown that engineering students face writing demands that are highly situated. Workplace-oriented needs analyses identify reports and project documents among the written genres expected of engineers, while studies of engineering academic writing show that students may struggle with both local language features and discourse-level organisation (Lin & Morrison, 2021; Nateghian, 2024). The pedagogical implication is that generic English instruction alone is unlikely to address the full rhetorical and disciplinary demands of technical writing.

A growing body of work therefore argues for closer integration between language development and disciplinary activity. Engineering writing interventions have increasingly emphasised authentic genres, contextualised scaffolding, problem-based learning and the transfer of writing practices into disciplinary courses (Hill et al., 2020; Simpson-Smith, 2024; Yung & Fong, 2024). This direction aligns with the Common European Framework of Reference for Languages (CEFR), which provides descriptors that can inform learning objectives while requiring contextual adaptation for specific learner groups and educational purposes (Council of Europe, 2020).

In Malaysian TVET, the challenge is particularly relevant because employability agendas combine advanced technical capability with transferable skills, including communication. However, communication development can remain peripheral when technical curricula, assessment weightings and project supervision prioritise technical outcomes. This creates a curriculum-design and education-management problem: how can writing support be embedded within existing FYP workflows without displacing technical supervision, overloading students or creating a parallel set of language tasks?

Existing research provides substantial support for embedding writing development within engineering and disciplinary learning. Studies have demonstrated the value of authentic genres, contextualised scaffolding, problem-based learning, genre-sensitive pedagogy and closer connections between language instruction and disciplinary tasks (Hill et al., 2020; Simpson-Smith, 2024; Yung & Fong, 2024). However, three gaps remain particularly relevant to the FYP context. First, much of the existing work examines particular courses, genres or

pedagogical interventions rather than an instructional model designed to coordinate writing support across the stages of an authentic final-year technical project. Second, previous studies have paid comparatively less attention to how language-performance expectations, such as CEFR B2 writing descriptors, can be translated into discipline-sensitive support for the specific writing demands of technical FYPs. Third, although embedded-writing approaches demonstrate pedagogical potential, less attention has been given to students' perceptions of whether such support is valuable, manageable and usable within existing FYP workflows before classroom implementation.

C-IMEWS was developed in response to these gaps. In its current post-review form, the Cross-Curricular Instructional Model of English Writing Skills is an expert-reviewed prototype that integrates writing development with authentic FYP activity. It is aligned conceptually with CEFR B2 writing expectations, ESP, Content and Language Integrated Learning principles, and cross-curricular instructional design. Its distinct contribution lies not merely in advocating embedded writing, but in providing a structured mechanism for aligning writing support with authentic FYP requirements while considering the practical conditions under which students are likely to engage with that support.

The present study evaluates these implementation conditions through four related perceptual constructs: value/integration, writing/research capability, usability/implementation, and overall acceptance. These constructs are treated as conceptually related but analytically distinct. Value/integration represents the extent to which students perceive writing support as relevant to and appropriately connected with their FYP activity. Writing/research capability represents students' perceptions that the prototype could support the competencies required to organise, develop and communicate their technical work. Usability/implementation concerns whether the proposed support appears understandable, manageable and feasible within existing FYP processes. Overall acceptance represents students' broader willingness to regard C-IMEWS as an appropriate and potentially useful form of FYP writing support.

Conceptually, the study proposes that students are more likely to accept an instructional prototype when they perceive it as relevant to their disciplinary work, supportive of the capabilities they need, and feasible to use within the conditions in which that work occurs. Value/integration, writing/research capability and usability/implementation are therefore examined as proximal perceptual dimensions associated with overall acceptance. This relationship is not interpreted as a causal model because the present cross-sectional design measures all constructs concurrently. Rather, it provides an implementation-oriented framework for examining which aspects of the prototype are most closely associated with students' overall acceptance and may consequently require particular attention before classroom implementation.

Importantly, the present study does not test whether C-IMEWS improves writing performance. Instead, it examines whether students perceive the expert-reviewed prototype as relevant, supportive and implementable within authentic FYP activity, and identifies the forms of writing support that should be prioritised during subsequent classroom validation.
The study addresses four research questions: (1) How strongly do students perceive the writing-relevant value/integration, writing/research capability, usability/implementation and

overall acceptance of the C-IMEWS prototype? (2) Do these perceptions differ according to prior English technical-report experience, FYP stage, gender or faculty? (3) Which perceived dimensions of value/integration, writing/research capability and usability/implementation are uniquely associated with overall acceptance of C-IMEWS? (4) What forms of support do students identify as most useful for the future implementation of C-IMEWS?

Literature Review

Writing as disciplinary participation in engineering and TVET

Engineering writing is not simply general academic prose populated with technical vocabulary. It is shaped by disciplinary purposes, evidence conventions, rhetorical moves, genre expectations and the relationship between text and technical activity. Genre-based studies demonstrate that engineering students must construct arguments, explain decisions and organise evidence in ways that are recognisable to disciplinary readers (Parkinson et al., 2022, 2023). Consequently, writing development is strongest when students can connect linguistic choices to the purposes of the technical task.

Studies of engineering learners also reveal a persistent mismatch between what students perceive as difficult and what disciplinary faculty value. Lin and Morrison (2021), for example, found that L2 engineering students tended to emphasise sentence-level problems while faculty placed greater weight on discourse-level concerns. This distinction matters for FYP writing because grammatical accuracy alone cannot compensate for weak problem framing, incoherent argumentation, poorly connected objectives and methods, or unsupported interpretation of findings.

Needs analysis remains central to ESP because it connects curriculum decisions with the communicative practices learners are expected to perform. Recent civil-engineering research has similarly found discrepancies between university language provision and workplace-specific English demands, reinforcing the case for needs-based and discipline-sensitive course design (Nateghian, 2024).

Embedded and cross-curricular writing support

Separating language instruction from disciplinary activity can make transfer uncertain. Hill et al. (2020) showed that some engineering ESAP learning outcomes transferred to disciplinary assignments, but transfer was not uniform. This suggests that explicit bridges between language learning and authentic disciplinary writing are needed. More recent curriculum work has likewise argued for embedding literacy pedagogy within engineering education rather than treating writing as a remedial add-on (Simpson-Smith, 2024).

Problem-based and contextualised ESAP redesigns also emphasise collaboration between language and disciplinary learning. Yung and Fong (2024) describe pedagogical innovation that aligns academic communication with disciplinary learning, while Birhan and Nurie (2024) show that contextualised writing pedagogy can strengthen engagement among engineering students. Together, these studies support an instructional-design logic in which writing is developed through the same tasks that require students to reason technically.

CEFR-informed writing and contextual adaptation

The CEFR Companion Volume provides an extended set of descriptors for communicative language activity and positions learners as social agents performing purposeful tasks (Council of Europe, 2020). At B2, the framework supports expectations for clear, detailed written production, reasoned development of ideas, and the synthesis of information from sources. These capabilities are relevant to FYP genres, but the CEFR is not a ready-made engineering curriculum. Its descriptors must be contextualised to local tasks, genres and assessment practices.

For C-IMEWS, CEFR alignment therefore functions as a language-performance reference rather than as a claim that the prototype itself constitutes a CEFR assessment. The cross-curricular design problem is to translate broad communicative descriptors into support for proposal writing, technical reporting, organisation and coherence, academic style, synthesis and evidence-based interpretation.

Perceived value, capability, usability and acceptance as implementation evidence

Before a curriculum prototype is trialled at scale, student perceptions can provide implementation evidence about whether its design appears relevant, supportive, understandable and manageable. Such evidence is important because theoretically sound interventions may still encounter resistance or limited uptake when learners perceive them as burdensome, disconnected from disciplinary needs or difficult to integrate into existing academic work. In the present study, value/integration, writing/research capability and usability/implementation therefore represent three complementary dimensions through which students evaluate the proposed writing support.

Perceived value/integration concerns the relevance of C-IMEWS to authentic FYP activity and the extent to which writing development is seen as meaningfully connected to technical work. Perceived writing/research capability concerns whether students believe the prototype can support the competencies needed to organise ideas, develop technical reports and undertake the research-related writing demands of the FYP. Perceived usability/implementation addresses the practical dimension: whether the support appears sufficiently clear, manageable and compatible with existing FYP processes. Overall acceptance represents the broader evaluation that emerges alongside these perceptions of relevance, capability support and implementability.

The relationship among these constructs is treated as implementation-oriented rather than causal. Conceptually, students should be more likely to accept a curriculum innovation when they recognise its value for the work they must perform, perceive that it supports capabilities they need, and judge that it can be used without creating excessive complexity or workload. This reasoning provides the basis for examining value/integration, writing/research capability and usability/implementation as perceptual dimensions associated with overall acceptance. It also provides a theoretical rationale for the regression analysis used to identify which dimensions retain unique associations with acceptance when their shared variance is considered.

Nevertheless, acceptance is not equivalent to effectiveness. Positive perceptions can indicate readiness, relevance and implementation fit, but they cannot demonstrate learning gains. A

student may anticipate that a model will improve writing without any measurable improvement occurring. The present study therefore treats student perceptions as supplementary needs-analysis and implementation evidence that can refine the expert-reviewed C-IMEWS prototype before classroom-based validation using direct measures of writing performance.

Methodology

Design and context

The study employed a cross-sectional quantitative survey with supplementary qualitative open-ended responses. It was conducted at a Malaysian technical university across seven faculties representing computing/artificial intelligence, electrical/electronic, electrical, manufacturing/industrial, mechanical, technology management and related technical disciplines. The questionnaire formed a supplementary post-review needs-analysis stage for C-IMEWS rather than an intervention trial.

Participants

The dataset contained 218 student responses. The sample comprised 146 male students (67.0%) and 72 female students (33.0%). Faculty representation ranged from 25 to 42 respondents: FAIX (n = 25), FTKEK (n = 27), FTMK (n = 32), FTKE (n = 29), FTKIP (n = 34), FPTT (n = 29), and FTKM (n = 42). Most respondents were in FYP 1 (n = 126), followed by students not yet enrolled in FYP (n = 69) and FYP 2 (n = 22). One respondent selected both 'not yet enrolled' and 'FYP 1' and was excluded only from stage-based inferential comparisons. Prior English technical/project-report experience was almost evenly divided: 106 respondents reported prior experience and 112 reported none.

Instrument and publication-focused item selection

The questionnaire used five-point Likert-type items (1 = lowest agreement; 5 = highest agreement) organised around perceived value/reflection, writing and research capability, usability/implementation, and overall perception. The instrument had originally been developed when C-IMEWS included both writing and speaking. After the research focus was narrowed to writing, legacy speaking-oriented wording remained in two B-section items (reflection on speaking performance and confidence in presenting technical information). To maintain construct alignment in the present writing-focused article, these items were excluded from the publication analysis. Two additional broad communication items in the same section were not used in the reduced value/integration composite. The resulting writing-focused composites were: value/integration (6 items: B1, B2, B5, B6, B8, B10), writing/research capability (10 items: C1-C10), usability/implementation (10 items: D1-D10), and overall acceptance (5 items: E1-E5). This transparent post hoc restriction avoids allowing legacy speaking content to inflate or distort conclusions about a writing-only prototype.

Data integrity and analysis

All 218 records were retained for analysis. A data-integrity issue was identified because 108 records were submitted through one shared email account that functioned as a common data-entry account. The researcher understood these records to represent different students; however, the dataset did not contain an objective unique identifier that could independently verify respondent uniqueness for those records. Email addresses were therefore treated as administrative rather than respondent identifiers. This limitation is reported transparently

and should be addressed in future data collection through unique anonymous participant codes or another non-identifying verification procedure.

Analysis proceeded in five stages. First, frequencies, means, standard deviations and the proportion of ratings at 4 or 5 were calculated. Second, internal consistency was assessed using Cronbach's alpha and McDonald's omega. Third, Welch independent-samples tests examined prior-report-experience and gender differences, while one-way ANOVA examined faculty and FYP-stage differences; effect sizes were reported using Cohen's d or eta squared. Fourth, Pearson correlations and heteroscedasticity-consistent (HC3) multiple regression were used to examine associations with overall acceptance. Because the three predictor constructs were strongly correlated, variance inflation factors (VIFs) were inspected and regression coefficients were interpreted as unique associations rather than causal effects. Fifth, the first author conducted inductive descriptive content coding of the open-ended responses to identify recurring implementation needs. No second independent coder was used; consequently, inter-coder reliability was not estimated and the qualitative findings are interpreted as descriptive implementation signals rather than a fully validated qualitative analysis. Percentages in Table 5 use substantive responses to each question as the denominator; because a response could receive more than one code, percentages are not mutually exclusive.

Results

Construct-level perceptions and reliability

Perceptions were consistently positive across the four writing-focused constructs. Overall acceptance produced the highest mean (M = 4.20, SD = 0.60), followed by writing/research capability (M = 4.17, SD = 0.58), usability/implementation (M = 4.14, SD = 0.57), and value/integration (M = 4.13, SD = 0.55). Across constructs, 85.8%-90.0% of item responses were ratings of 4 or 5. Reliability was high to very high (alpha = .929-.970; omega = .947-.974). The very high coefficients for three scales also indicate substantial item overlap, which should be examined during future instrument refinement rather than interpreted only as a strength.

Table 1
Descriptive statistics and internal consistency of writing-focused composites

Construct	k	M	SD	Ratings 4-5 (%)	Cronbach's α	McDonald's ω
Value/integration	6	4.13	0.55	86.3	.929	.947
Writing/research capability	10	4.17	0.58	88.1	.970	.974
Usability/implementation	10	4.14	0.57	85.8	.965	.971
Overall acceptance	5	4.20	0.60	90.0	.964	.972

At item level, the strongest endorsements concerned organising ideas effectively in academic writing (C2, M = 4.24), confidence in writing technical reports (C1, M = 4.23), usefulness for completing FYP tasks (B8, M = 4.23), logical organisation of the prototype (D2, M = 4.22), sufficient guidance for FYP activity (D4, M = 4.22), and improved technical writing for the FYP report (E2, M = 4.22). The lowest writing-focused item mean concerned understanding the relationship between technical content and communication skills (B1, M = 3.95). Workload appropriateness (D7, M = 4.02) and manageability within the semester (D6, M = 4.02) were also relatively lower, although still positive. These lower-scoring items are practically

important because they identify implementation risks that would be hidden by the high overall mean.

Prior technical-report experience as the clearest subgroup difference

Students with prior experience writing a technical or project report in English reported significantly higher scores on all four constructs. The largest difference occurred for value/integration (M = 4.28 vs. 3.97, d = 0.58), followed by overall acceptance (M = 4.34 vs. 4.07, d = 0.46), writing/research capability (M = 4.30 vs. 4.04, d = 0.46), and usability/implementation (M = 4.27 vs. 4.02, d = 0.45). The effect sizes were small-to-moderate to moderate. This pattern suggests that students who have already encountered authentic technical-report demands may more readily recognise the value of embedded writing support.

Table 2
Differences by prior English technical/project-report experience

Construct	Experienced n=106 M (SD)	No experience n=112 M (SD)	Welch p	Cohen's d
Value/integration	4.28 (0.63)	3.97 (0.42)	< .001	0.58
Writing/research capability	4.30 (0.66)	4.04 (0.44)	.001	0.46
Usability/implementation	4.27 (0.66)	4.02 (0.45)	.001	0.45
Overall acceptance	4.34 (0.70)	4.07 (0.45)	.001	0.46

Gender, faculty and FYP-stage comparisons

No statistically significant gender differences were found for any construct (all p >= .686), and no faculty differences reached the .05 threshold (all p >= .068). For FYP stage, the omnibus ANOVA for value/integration was statistically significant, F(2, 214) = 3.31, p = .038, eta squared = .030, but Tukey-adjusted pairwise comparisons were not significant. The remaining constructs showed no stage differences (all p >= .508). Accordingly, the data do not support strong claims of systematic perception differences by gender, faculty or FYP stage.

Correlations and predictors of overall acceptance

The constructs were strongly intercorrelated (r = .85-.91). Overall acceptance correlated most strongly with usability/implementation (r = .907), followed by writing/research capability (r = .880) and value/integration (r = .848). These coefficients indicate that the dimensions are closely related and may partly reflect a broad positive evaluation of the prototype.

Table 3
Pearson correlations among composite measures

Measure	1	2	3	4
1. Value/integration	1.000	.871	.866	.848
2. Writing/research capability	.871	1.000	.888	.880
3. Usability/implementation	.866	.888	1.000	.907
4. Overall acceptance	.848	.880	.907	1.000

A multiple regression with HC3 robust standard errors explained 85.2% of variance in overall acceptance (adjusted R^2 = .850). Usability/implementation had the strongest unique association (standardised beta = .539, 95% CI [.343, .734], p < .001), followed by writing/research capability (beta = .286, 95% CI [.090, .483], p = .004). Value/integration did

not retain a statistically significant unique association once the other two predictors were included (beta = .132, p = .144). Predictor VIFs ranged from 4.98 to 5.89, indicating notable multicollinearity; therefore, the relative coefficients should be interpreted cautiously. The defensible conclusion is not that usability causes acceptance, but that perceived implementability is especially closely associated with students' overall evaluation when overlapping dimensions are considered simultaneously.

Table 4
Robust multiple regression predicting overall acceptance

Predictor	B	Standardised β	95% CI for β	p	VIF
Value/integration	0.143	.132	[-.045, .309]	.144	4.98
Writing/research capability	0.298	.286	[.090, .483]	.004	5.89
Usability/implementation	0.562	.539	[.343, .734]	< .001	5.70

Model R^2 = .852; adjusted R^2 = .850; N = 218. HC3 heteroscedasticity-robust standard errors.

Open-ended implementation priorities

The open-ended data reinforced the quantitative pattern but added practical specificity. Among 186 substantive responses to the question about helpful aspects, the most recurrent writing-related theme was report structure and organisation (30.1%), followed by guidance, feedback and scaffolding (20.4%). Students also referred to academic language/grammar/clarity and the integration of technical content with writing. For future implementation, 103 substantive responses most often requested digital, AI or interactive support (31.1%), examples/templates/guidance (27.2%), simplification or clearer explanation of the framework (16.5%), practical activities/workshops (14.6%), and feedback/consultation support (9.7%). Among 196 substantive responses about anticipated influence on FYP writing, 52.0% explicitly referred to better writing/report quality or performance, while recurring themes included clarity/coherence (17.3%), grammar/language/academic style (15.8%), and organisation/structure (15.3%). Because responses could contain more than one theme, percentages are not mutually exclusive.

Table 5
Descriptive content coding of open-ended responses

Question/theme	n	% of substantive responses
Helpful: report structure & organisation	56	30.1
Helpful: guidance, feedback & scaffolding	38	20.4
Improvement: digital/AI/interactive support	32	31.1
Improvement: examples/templates/guidance	28	27.2
Improvement: simplify/clarify framework	17	16.5
Influence: better report quality/performance	102	52.0

Influence: greater clarity/coherence	34	17.3
Influence: grammar/language/academic style	31	15.8
Influence: organisation/structure	30	15.3

Discussion

The central finding is not simply that students 'liked' C-IMEWS. More importantly, the data reveal a coherent implementation pattern: students valued writing support when it was perceived as usable, closely connected to FYP tasks, and capable of strengthening the writing/research work they must already perform. This shifts the interpretation from generic satisfaction to curriculum fit.

The strongest unique association with overall acceptance was usability/implementation. From a curriculum-management perspective, this finding suggests that perceived implementability is central to student acceptance: administrators and programme teams may need to prioritise low-friction integration with existing FYP milestones rather than comprehensive but burdensome coverage. Cross-curricular innovation can fail when it adds conceptual complexity or workload to an already demanding technical project. The relatively lower item means for workload appropriateness and semester manageability reinforce the same point. Students appear receptive to embedded writing support, but implementation should be economical, clearly sequenced and integrated with existing FYP supervision and assessment rather than added as a parallel language course.

The open-ended responses sharpen this implication. Students repeatedly asked for report structures, examples, templates, feedback and digital support. These requests align with research showing that engineering writers benefit from explicit models and context-sensitive writing interventions (Lin & Morrison, 2021). They also resonate with genre-oriented work demonstrating that successful engineering writing depends on recognisable rhetorical organisation rather than grammatical correctness alone (Parkinson et al., 2022, 2023). C-IMEWS should therefore operationalise support at the level of authentic FYP sections and decisions: framing the problem, aligning objectives and methods, synthesising literature, reporting findings and building evidence-based discussion.

The prior-experience effect is theoretically useful. Students who had already written technical or project reports in English rated the prototype more positively across all constructs. A plausible interpretation is that authentic writing experience makes the difficulty and disciplinary specificity of technical reporting more visible. Students without such experience may not yet recognise the value of scaffolding because they have not encountered the full writing problem. This is an association, not proof of a developmental sequence, but it suggests that early exposure to authentic technical genres may increase readiness to use cross-curricular writing support.

The absence of strong faculty and gender differences is also noteworthy. It suggests that the perceived need for writing support is not confined to one disciplinary subgroup in this sample. However, the near-threshold faculty result for usability and the unequal faculty sample sizes argue against claiming complete disciplinary uniformity. Future trials should examine whether

the same C-IMEWS core can be retained while examples, genres and disciplinary language are adapted by faculty.

The very high internal-consistency coefficients and strong inter-construct correlations require a critical reading. They indicate reliable response patterns, but they also raise the possibility that some items are semantically redundant or that a general positive-evaluation factor influences responses. For a publication-quality instrument, future refinement should reduce overlapping items and test the measurement structure using an independent sample. Confirmatory factor analysis, composite reliability and discriminant-validity evidence would be appropriate once the item set is stabilised.

These results support a cautious implementation claim: C-IMEWS has strong student-perceived relevance and acceptability as an expert-reviewed writing prototype. They do not support a learning-effectiveness claim. Perceived improvement, confidence and usefulness are anticipatory self-reports. Demonstrating effectiveness requires classroom implementation with direct writing evidence, such as blind-rated FYP texts using a CEFR-informed analytic rubric, pre/post or repeated measures, inter-rater reliability, and where feasible a comparison condition.

Pedagogical and Design Implications

First, writing support should be embedded at the point of disciplinary need. Rather than scheduling generic language input independently of FYP progress, C-IMEWS activities should correspond to proposal development, literature synthesis, method justification, results reporting and discussion writing.

Second, scaffolding should be visible and concrete. Students' requests for templates, examples and guidance indicate a preference for resources that translate abstract expectations into observable textual choices. Annotated exemplars, section-level checklists, guided revision prompts and short genre-focused micro-lessons are therefore likely to be more usable than long decontextualised language modules.

Third, digital and AI-supported tools should be framed as feedback and revision aids rather than substitutes for disciplinary reasoning. Students explicitly requested AI/checker functionality. A responsible implementation can use such tools to prompt attention to clarity, coherence and language accuracy while requiring students to justify technical content, source use and rhetorical decisions.

Fourth, implementation load must be controlled. The lower relative scores for workload and manageability suggest that the model should reuse existing FYP artefacts wherever possible. A cross-curricular model is most defensible when the writing activity advances the technical project rather than creating a second set of assignments.

Finally, students with no prior technical-report experience may require an orientation stage that makes the hidden demands of FYP writing visible. Early diagnostic tasks, annotated report excerpts and short comparisons between weak and effective technical writing could help students understand why the support is relevant before they begin full FYP writing.

Limitations and Future Research

This study has several limitations. First of all, it was conducted at a single Malaysian technical university, so the findings should not be generalised automatically to other TVET systems. Second, the design is cross-sectional and perception-based; it cannot establish causal effects on writing performance. Third, the questionnaire was inherited from an earlier writing-and-speaking version of C-IMEWS. Although legacy speaking items were transparently excluded from the writing-focused composites, the instrument should now be fully rewritten and revalidated as a writing-only measure. Fourth, all principal constructs were measured through a single self-report instrument at one time point, creating a risk of common method variance. No dedicated statistical diagnostic such as Harman's single-factor test was conducted in the present analysis, so the magnitude of this threat cannot be quantified. The high inter-construct correlations may partly reflect this shared-method influence. Future validation should incorporate independent outcome measures such as blind-rated writing samples and supervisor assessments. Fifth, 108 records were submitted through a shared email account. Although these were treated as different student responses, the absence of an objective unique identifier introduces ambiguity about response independence; future data collection should use unique anonymous participant codes. Sixth, the qualitative component consisted of short survey responses rather than interviews or focus groups, and coding was conducted by one researcher without an independent second coder. The content coding therefore provides descriptive implementation signals rather than deep qualitative explanation or evidence of coding reliability.

The next research stage should therefore use a revised writing-only instrument and direct performance evidence. A multi-phase validation could combine cognitive interviews and expert content validation, pilot psychometrics, confirmatory factor analysis in a new sample, and a classroom trial using FYP writing artefacts. Longitudinal analysis across FYP 1 and FYP 2 would be especially valuable because it could test whether perceived usefulness translates into sustained changes in organisation, coherence, academic style, synthesis and technical reporting.

Conclusion

This study provides student-based needs and acceptability evidence for an expert-reviewed cross-curricular prototype designed to support English writing within technical FYP activity. Across 218 respondents, perceived value, writing/research capability support, usability and overall acceptance were high. The clearest subgroup pattern was prior experience with English technical-report writing, while gender, faculty and FYP-stage differences were limited. Most importantly, overall acceptance was closely associated with perceived usability and implementation fit. Students' qualitative responses translated this finding into concrete design requirements: structure, examples, templates, feedback, practical guidance and carefully governed digital or AI support. For education and curriculum managers, the contribution is student-based evidence that cross-curricular writing support is most acceptable when it is embedded within existing FYP workflows and kept manageable rather than introduced as an additional parallel burden. The contribution remains developmental rather than causal: the findings identify implementation conditions for a writing-integrated FYP prototype and provide a basis for classroom validation using direct evidence of writing performance.

Article Contribution to the Related Field of Study

The study contributes to TVET curriculum development and education management by translating student perceptions into practical implementation criteria for cross-curricular writing support. Rather than treating writing as a separate remedial activity, the findings indicate how programme teams can align support with existing FYP milestones, manage student workload, provide visible scaffolding and plan digital or AI-supported feedback. The evidence is particularly relevant to curriculum managers, FYP coordinators and language-technical teaching teams considering integrated writing provision in technically intensive programmes. Because the prototype has not yet been classroom-tested, the study's contribution is to implementation planning and prototype refinement, not to claims of improved writing performance.

Declarations

Ethics approval and consent to participate: REAA/2026/08-03

Consent for publication: Not applicable unless required by the target journal.

Data availability: De-identified data may be made available subject to institutional ethics and data-governance requirements.

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