From Language Support to Disciplinary Practice: Embedding Academic Writing in Malaysian TVET Final-Year Projects

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DOI: https://doi.org/10.47772/IJRISS.2026.101000433

Received: 20 October 2026; Accepted: 25 October 2026; Published: 04 November 2026

ABSTRACT

Final-year projects (FYPs) require technical and vocational education and training (TVET) students to convert disciplinary knowledge into sustained academic and technical writing. Yet language support is often positioned outside the project processes in which such writing is produced. This developmental study examines student perceptions and implementation priorities for embedded FYP writing support through the expert-reviewed Cross-Curricular Instructional Model of English Writing Skills (C-IMEWS). A cross-sectional questionnaire was completed by 218 students from seven faculties at a Malaysian technical university. Because 108 records were submitted through one shared data-entry email account and respondent uniqueness could not be independently verified, the analysis was revised to distinguish full-sample descriptive findings from a sensitivity sample excluding those records (n = 110). Full-sample ratings were positive across four provisional writing-focused composites (M = 4.13–4.20). Sensitivity-sample means remained positive and were slightly higher (M = 4.21–4.28), indicating that the broad descriptive pattern was retained. However, very high internal consistency (α = .929–.970 in the full sample), strong inter-composite correlations (r = .85–.91), and VIFs of 4.98–5.89 indicate substantial construct overlap. In the sensitivity sample, correlations and VIFs were even higher. Consequently, the composites are treated as provisional analytical groupings rather than validated latent scales, and the regression is retained only as an exploratory analysis. Full-sample differences associated with prior technical-report experience did not remain statistically significant in the reduced sample, which was highly unbalanced for that comparison (99 experienced; 11 inexperienced); subgroup claims are therefore not treated as robust findings. Open-ended responses prioritised report organisation, scaffolding, exemplars, feedback, and carefully governed digital or AI-supported assistance. The study contributes pre-implementation evidence for refining C-IMEWS, but it does not establish writing improvement, instrument validity, or causal relationships among the measured perceptions.

Keywords: academic writing; embedded writing support; final-year project; student perceptions; implementation priorities; technical writing; TVET; C-IMEWS

INTRODUCTION

Technical and vocational higher education is expected to prepare graduates who can communicate technical knowledge as well as produce it. In engineering and related disciplines, written communication is one of the principal means through which technical competence becomes visible to supervisors, examiners, employers and professional audiences. This relationship is especially evident in the final-year project (FYP), where students must transform an extended technical process into a proposal, literature-based rationale,

methodology, results, interpretation and defensible conclusion. FYP writing is therefore not an additional language exercise attached to technical work. It is part of the disciplinary work itself.

Research in English for Specific Purposes (ESP) and English for Academic Purposes (EAP) has long shown that technical writing is situated within disciplinary purposes, genres and evidence practices. Engineering students may experience sentence-level language difficulties, but disciplinary readers also expect coherent problem framing, appropriate rhetorical organisation, alignment between objectives and methods, synthesis of sources and evidence-based interpretation (Lin & Morrison, 2021; Parkinson et al., 2022, 2023). These demands limit the value of treating writing support as generic language remediation separated from the contexts in which students must actually write.

Recent writing pedagogy has consequently moved towards embedded, genre-sensitive and context-responsive support. Studies in engineering and other professional disciplines show the value of connecting writing instruction to authentic assignments, disciplinary genres and immediate points of need (Hill et al., 2020; Simpson-Smith, 2024; Yung & Fong, 2024). More recent work likewise demonstrates continuing interest in embedded genre pedagogy and short curriculum-integrated writing support rather than stand-alone remediation (Lu, 2025; Johnson et al., 2026). The central design issue is no longer simply whether writing should be supported, but how that support can be integrated without creating a second curriculum alongside already demanding disciplinary work.

This issue is particularly relevant to Malaysian TVET, where programmes must balance specialised technical competence with transferable communication skills. In an FYP, technical supervisors already manage disciplinary milestones, students face substantial project workloads, and language specialists may have limited access to the disciplinary writing process. An embedded approach must therefore be pedagogically useful and operationally feasible. A model that is theoretically comprehensive but difficult to understand, time-consuming to use or poorly aligned with existing FYP milestones is unlikely to be sustained.

Three gaps motivate the present study. First, much existing research evaluates particular writing courses, genres or interventions rather than an instructional model intended to coordinate writing support across the stages of an authentic technical FYP. Second, relatively little work has examined how broad language-performance expectations such as CEFR B2 descriptors can be translated into discipline-sensitive support for technical project writing. Third, before a new cross-curricular model is implemented, less is known about the conditions under which students themselves regard embedded support as relevant, manageable and worth using. This third gap is an implementation question rather than an effectiveness question.

C-IMEWS, the Cross-Curricular Instructional Model of English Writing Skills, was developed to address these concerns. In its current form, it is an expert-reviewed prototype that aligns writing development with authentic FYP requirements and draws conceptually on CEFR B2 writing expectations, ESP, Content and Language Integrated Learning (CLIL), and cross-curricular instructional design. The present article does not test whether C-IMEWS improves writing performance. Instead, it examines student needs and implementation readiness before classroom validation.

The questionnaire addresses four related areas: value/integration, writing/research capability, usability/implementation and overall acceptance. In the present study, these are treated as provisional analytical groupings rather than established latent constructs. This distinction is important because the instrument was inherited from an earlier writing-and-speaking version of C-IMEWS and has not yet undergone full writing-only psychometric revalidation. The analysis therefore uses the groupings to organise student perceptions while avoiding claims that they represent empirically distinct dimensions.

Accordingly, the contribution of this study is developmental. It examines whether students generally perceive embedded FYP writing support positively, tests how stable that descriptive pattern is under a sensitivity analysis prompted by a data-integrity concern, and identifies practical priorities for subsequent implementation. The study does not evaluate the effectiveness of C-IMEWS or validate a measurement model.

Research Questions

RQ1. What do students' responses indicate about the perceived value, capability support, usability and overall acceptance of embedded FYP writing support through C-IMEWS?

RQ2. How stable are the principal descriptive and associational patterns when records submitted through the shared data-entry email account are excluded?

RQ3. What exploratory associations are observed among the provisional perception groupings, and what measurement cautions do these associations raise?

RQ4. What forms of support do students identify as priorities for future implementation?

LITERATURE REVIEW

Writing as Disciplinary Participation in Technical Education

Engineering writing cannot be reduced to general academic prose containing specialised vocabulary. Technical texts are shaped by disciplinary purposes, evidence conventions, genre expectations and relationships between written claims and technical activity. Students must learn not only how to produce accurate sentences but also how to construct arguments, justify decisions, organise evidence and position interpretations for disciplinary readers. Parkinson et al. (2022, 2023), for example, demonstrate that quality differences in engineering writing are visible in rhetorical organisation and argument construction. Lin and Morrison (2021) similarly found a mismatch between the sentence-level difficulties emphasised by L2 engineering students and the broader discourse-level concerns valued by faculty.

The FYP intensifies these demands because students must sustain writing across interconnected sections over an extended period. Weakness in problem framing can affect the literature review; weak alignment between objectives and methods can weaken the report's logic; and weak synthesis can make technically sound work difficult to evaluate. Writing development in this context is therefore best understood as participation in disciplinary knowledge-making rather than correction of isolated language errors.

From Stand-Alone Language Support to Embedded Writing Pedagogy

The separation of language teaching from disciplinary activity creates a transfer problem. Hill et al. (2020) found evidence that ESAP writing skills could transfer to disciplinary assignments, but the transfer was not uniform. This supports the need for explicit bridges between language learning and the texts students are expected to produce in their disciplines. Simpson-Smith (2024) similarly argues for recontextualising literacy pedagogy within engineering education rather than positioning writing as a remedial add-on.

Contextualised and genre-based approaches offer one response. Yung and Fong (2024) describe an ESAP redesign linked to problem-based learning, while Birhan and Nurie (2024) show how contextualised writing pedagogy can strengthen engineering students' engagement. Lu (2025) reports a genre-based EAP approach in which explicit instruction, collaboration and authentic writing tasks were combined. Outside engineering, Johnson et al. (2026) describe an embedded 'microboost' model that integrates brief writing support directly with ongoing disciplinary assignments. Although these studies differ in population and design, they converge on a useful principle: writing support is more likely to be meaningful when it is attached to the work students already need to complete.

For FYP contexts, this principle implies that support should be synchronised with proposal development, literature synthesis, method justification, results reporting and discussion writing. The challenge is to provide sufficient scaffolding without creating a parallel language course that competes with project completion.

CEFR-Informed Writing as a Contextualised Performance Reference

The CEFR Companion Volume positions learners as social agents who use language to accomplish purposeful tasks (Council of Europe, 2020). At B2, relevant written-production expectations include producing clear and detailed texts, developing ideas with supporting detail, and synthesising information from sources. These expectations correspond broadly with important FYP writing demands, particularly coherence, reasoned development, synthesis and academically appropriate expression.

However, CEFR descriptors are not an engineering curriculum and should not be treated as a ready-made technical-writing assessment. Their value in C-IMEWS is as a language-performance reference that can be contextualised against authentic FYP genres and institutional expectations. The instructional design task is therefore to translate broad descriptors into visible support for disciplinary activities such as framing a research problem, connecting objectives and methods, synthesising literature, explaining results and constructing evidence-based discussion.

Student Perceptions as Pre-Implementation Evidence

A curriculum innovation can be pedagogically sound yet difficult to implement when students perceive it as burdensome, unclear or disconnected from immediate academic needs. For a prototype that has not yet been classroom-tested, student perceptions can therefore provide useful pre-implementation evidence about relevance, manageability and fit with existing work. Such evidence should not, however, be equated with validated implementation readiness or with demonstrated learning gains.

In this study, value/integration, writing/research capability, usability/implementation and overall acceptance provide an organising framework for examining student responses. Because these groupings were derived from an inherited instrument and were measured concurrently through the same self-report questionnaire, their relationships are interpreted cautiously. High correlations may reflect genuine conceptual relatedness, but they may also indicate item redundancy, common method influence or a broader general-positive-evaluation factor.

This framing also clarifies the limits of the evidence. Positive perceptions cannot establish that students' writing will improve. Recent publications cited in this article were checked against publisher or bibliographic records before revision, including Lu (2025), Zdravkova and Ilijoski (2025), Farrokhnia et al. (2026), and Johnson et al. (2026). The present study therefore remains a developmental, pre-implementation investigation rather than an effectiveness trial.

METHODOLOGY

Research Design and Context

The study employed a cross-sectional quantitative survey supplemented by 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 survey constituted a supplementary post-review needs-analysis stage for C-IMEWS. It was not an intervention trial, and students were not asked to demonstrate writing improvement after using the model.

Participants

The dataset contained 218 student responses: 146 male students (67.0%) and 72 female students (33.0%). Faculty participation 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

experience of writing a technical or project report in English was almost evenly divided: 106 students reported prior experience and 112 reported none.

Instrument and Writing-Focused Item Selection

The questionnaire used five-point Likert-type items organised around perceived value/reflection, writing and research capability, usability/implementation and overall perception. It had originally been developed when C-IMEWS included both writing and speaking. Following the narrowing of C-IMEWS to writing, two legacy speaking-focused items and two broad communication items were excluded from the publication-focused value/integration grouping. The resulting writing-focused groupings 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). Because this was a post hoc writing-focused restriction and no independent writing-only validation sample was available, these composites are explicitly treated as provisional analytical groupings, not validated scales.

Data Integrity and Analysis

The analysis was revised in response to a data-integrity concern. Of the 218 records, 108 were submitted through one shared email account used for data entry. The researcher understood these records as representing different students, but the dataset contains no independent identifier that can verify respondent uniqueness. The primary analysis therefore reports full-sample descriptive results alongside a sensitivity analysis that excludes all 108 shared-account records, leaving n = 110. The sensitivity sample should not be interpreted as a superior representative sample; it is used only to test whether the broad pattern of findings depends on the records with uncertain independence.

Descriptive statistics were calculated for the provisional groupings, followed by Cronbach's alpha and inter-item/inter-grouping correlations as diagnostic information. Very high reliability was interpreted as a possible sign of redundancy rather than automatically as measurement strength. Pearson correlations and HC3 robust regression were retained only as exploratory diagnostics because the predictors were strongly correlated. Variance inflation factors (VIFs) were examined in both samples. Inferential FYP-stage comparisons were removed because the FYP2 subgroup was small (n = 22). Prior-report-experience comparisons were examined only as a sensitivity check and are not treated as robust subgroup evidence because excluding the shared-account records produced a highly unbalanced comparison (99 experienced; 11 inexperienced). Open-ended responses were coded descriptively by the first author; because there was no second independent coder, these findings are presented as supplementary implementation signals rather than validated qualitative themes.

RESULTS

Construct-Level Perceptions and Internal Consistency

In the full sample, students reported positive perceptions across the four provisional writing-focused groupings. Overall acceptance had 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). Internal consistency was very high (α = .929–.970; ω = .947–.974). These coefficients are not interpreted simply as evidence of excellent reliability. Fourteen item pairs within writing/research capability, 11 within usability/implementation and nine within overall acceptance correlated at r ≥ .80, indicating substantial item redundancy and limited separation among some statements.

Grouping	k	Full sample M (SD)	Sensitivity n=110 M (SD)	Full α	Sensitivity α
Value/integration	6	4.13 (0.55)	4.25 (0.65)	.929	.934

Writing/research capability	10	4.17 (0.58)	4.25 (0.68)	.970	.969
Usability/implementation	10	4.14 (0.57)	4.21 (0.68)	.965	.967
Overall acceptance	5	4.20 (0.60)	4.28 (0.72)	.964	.954

At item level, the strongest endorsements concerned organising ideas effectively in academic writing (M = 4.24), confidence in writing technical reports (M = 4.23), usefulness for completing FYP tasks (M = 4.23), logical organisation of the prototype (M = 4.22), sufficient guidance for FYP activity (M = 4.22) and improved technical writing for the FYP report (M = 4.22). The comparatively lower means for workload appropriateness and semester manageability (both M = 4.02) are particularly important because they reveal implementation risks that are obscured by high overall averages.

Sensitivity Analysis for the Shared-Account Records

Excluding all 108 records submitted through the shared data-entry email account left a sensitivity sample of 110 records. The broad descriptive pattern remained positive: value/integration M = 4.25 (SD = 0.65), writing/research capability M = 4.25 (SD = 0.68), usability/implementation M = 4.21 (SD = 0.68), and overall acceptance M = 4.28 (SD = 0.72). These means were slightly higher than the full-sample means. Direct comparison also showed that the shared-account group had lower mean scores for value/integration, writing/research capability and overall acceptance, with a smaller non-significant difference for usability/implementation. This indicates that the shared-account records were not analytically neutral and confirms the need for caution with full-sample inferential claims.

Grouping	**Full sample p**	**Sensitivity p**	**Sensitivity group sizes**	**Interpretation**
Value/integration	< .001	.314	99 Yes / 11 No	Not robust
Writing/research capability	.001	.166	99 Yes / 11 No	Not robust
Usability/implementation	.001	.168	99 Yes / 11 No	Not robust
Overall acceptance	.001	.325	99 Yes / 11 No	Not robust

Subgroup Comparisons after Sensitivity Analysis

In the full sample, prior technical/project-report experience was associated with higher scores across all four provisional groupings. This pattern did not remain statistically significant after the 108 shared-account records were excluded. The sensitivity sample contained 99 students with prior report-writing experience but only 11 without such experience; Welch tests were non-significant across value/integration (p = .314), writing/research capability (p = .166), usability/implementation (p = .168) and overall acceptance (p = .325). Because the sensitivity comparison is severely unbalanced and the full-sample finding may be influenced by the uncertain-independence records, prior experience is not retained as a robust inferential finding. FYP-stage inferential testing was also removed because the FYP2 subgroup contained only 22 respondents. Gender and faculty comparisons are not emphasised because the central purpose of the revised analysis is descriptive and developmental rather than subgroup hypothesis testing.

Exploratory Associations and Measurement Diagnostics

In the full sample, the provisional groupings were strongly intercorrelated (r = .85–.91). Overall acceptance correlated with usability/implementation at r = .907, writing/research capability at r = .880 and

value/integration at r = .848. The HC3 exploratory regression produced R^2 = .852, but VIFs ranged from 4.98 to 5.89. In the sensitivity sample, overlap increased further: correlations among the four groupings ranged from .89 to .95, the exploratory regression produced R^2 = .919, and VIFs increased to 6.22–7.15. Although usability/implementation and writing/research capability retained positive coefficients in both analyses, the combination of very high correlations, high reliability and increasing VIFs indicates that a stable hierarchy of independent predictors cannot be defended. The regression is therefore interpreted only as evidence that the provisional groupings largely move together as part of a broad positive evaluation of the proposed support.

Diagnostic	**Full sample**	**Sensitivity sample**	**Interpretive implication**	**Status**
Inter-grouping correlations	r = .85–.91	r = .89–.95	Very strong overlap	Caution
VIF range	4.98–5.89	6.22–7.15	Unstable unique coefficients	Caution
Regression R^2	.852	.919	Likely reflects overlapping self-report content	Exploratory

Exploratory full-sample model: R^2 = .852, adjusted R^2 = .850, N = 218. Sensitivity model excluding shared-account records: R^2 = .919, adjusted R^2 = .917, n = 110. HC3 robust standard errors were used. Coefficients should not be interpreted causally or as evidence of distinct predictive constructs.

Student-identified implementation priorities

Open-ended responses added practical detail to the quantitative pattern. Among 186 substantive responses concerning helpful aspects, report structure and organisation was the most recurrent writing-related theme (30.1%), followed by guidance, feedback and scaffolding (20.4%). Among 103 substantive responses about improvements, students most often requested digital, AI or interactive support (31.1%), examples/templates/guidance (27.2%), clearer or simpler explanation of the framework (16.5%), practical activities/workshops (14.6%) and feedback/consultation support (9.7%). Among 196 substantive responses about anticipated influence, 52.0% explicitly referred to better report quality or writing performance, with additional references to clarity/coherence (17.3%), grammar/language/academic style (15.8%) and organisation/structure (15.3%). These responses represent anticipated benefits rather than measured learning gains.

DISCUSSION

The revised analysis changes the emphasis of the study. The principal finding is not that one C-IMEWS dimension predicts another, nor that particular student groups are more ready for the model. The defensible finding is that students generally expressed positive views of embedded FYP writing support, and this broad descriptive pattern remained positive when the 108 shared-account records were excluded. At the same time, the sensitivity analysis shows that some inferential conclusions are not robust and that the measurement groupings overlap substantially. The contribution is therefore best understood as pre-implementation evidence and design guidance rather than model validation.

The sensitivity analysis is particularly important. Removing the 108 records with uncertain independence did not reverse the positive descriptive pattern, but it did alter the subgroup structure and increased already strong correlations among the provisional groupings. The earlier full-sample association between prior technical-report experience and the four perception scores cannot therefore be treated as a stable finding.

This result demonstrates why the data-integrity issue cannot be addressed only as a limitation; it materially changes how the evidence should be interpreted.

This interpretation is consistent with the broader movement towards embedded and genre-sensitive writing pedagogy. Hill et al. (2020) showed that transfer from ESAP instruction to disciplinary writing is possible but uneven, suggesting that links between language support and disciplinary tasks need to be explicit. Simpson-Smith (2024) similarly locates literacy development within engineering learning. More recent embedded approaches continue this direction by integrating writing instruction with authentic assignments and disciplinary genres (Lu, 2025; Johnson et al., 2026). The present findings extend that discussion by showing that students' willingness to accept embedded support is closely tied to whether they can see how it will function within their existing project workflow.

The open-ended responses clarify what 'usable' support may look like. Students asked for report structures, examples, templates, feedback and practical guidance. These are not requests for generic grammar instruction. They point towards visible scaffolding at the level of FYP genres and decisions: framing the problem, aligning objectives with methods, synthesising literature, reporting results and developing evidence-based discussion. This pattern is consistent with research showing that engineering writing quality depends on rhetorical organisation and disciplinary argumentation as well as linguistic accuracy (Parkinson et al., 2022, 2023).

Prior technical-report experience may still be pedagogically relevant, but the present dataset cannot establish a reliable subgroup effect. In the sensitivity sample, only 11 respondents reported no prior experience, compared with 99 who reported prior experience. Rather than claiming that prior experience increases acceptance, future research should deliberately recruit balanced groups and examine whether authentic report-writing exposure changes students' recognition of writing-support needs.

The absence of strong faculty and gender differences suggests that the perceived need for support was not confined to one subgroup in this sample. This does not mean that disciplinary writing is uniform across faculties. Rather, it supports a core-plus-adaptation approach: C-IMEWS may retain common principles of organisation, coherence, synthesis and academic style while examples, terminology, genre conventions and feedback are adapted to disciplinary contexts.

Students' interest in digital and AI-supported assistance also requires careful interpretation. Verified recent research confirms growing attention to GenAI-supported writing and feedback, while also showing that more or higher-quality AI feedback does not automatically translate into stronger revision outcomes (Farrokhnia et al., 2026; Zdravkova & Ilijoski, 2025). For C-IMEWS, digital tools should therefore function as guided feedback and revision aids rather than substitutes for technical reasoning or authorship.

The measurement pattern is a central finding rather than a minor statistical footnote. Very high alpha and omega coefficients, numerous item-pair correlations above .80, inter-grouping correlations above .85, and VIFs that rose above 6 in the sensitivity sample suggest substantial redundancy and weak discriminant separation. The current questionnaire should therefore not be presented as a validated four-construct instrument. Future writing-only redevelopment should begin with construct definition and item reduction, followed by expert content review, cognitive interviewing, pilot testing and confirmatory factor analysis in an independent sample.

Most importantly, positive perception is not writing effectiveness. Students anticipated improvements in report quality, confidence and organisation, but these remain expectations. The present study supports decisions about what to refine before implementation; it cannot show that C-IMEWS improves FYP writing. A subsequent classroom trial should use direct student writing, blind rating with an analytic rubric, inter-rater reliability, and repeated or pre/post measures. Where feasible, a comparison condition would strengthen effectiveness claims.

Pedagogical and Design Implications

First of all, writing support should be delivered at the point of disciplinary need. Activities should be aligned with FYP milestones such as proposal writing, literature synthesis, method justification, results reporting and discussion rather than scheduled as decontextualised language lessons.

Second, scaffolding should make tacit expectations visible. Annotated exemplars, section-level checklists, guided revision prompts, model paragraphs and short genre-focused micro-lessons can translate broad standards into observable writing decisions. Such resources are also compatible with the students' preference for examples and templates.

Third, implementation load should be controlled. Wherever possible, C-IMEWS activities should reuse students' actual FYP artefacts. The strongest form of cross-curricular integration is one in which improving the writing simultaneously advances the technical project.

Fourth, digital and AI-supported feedback should be governed pedagogically. Tools may assist with clarity, coherence, language accuracy and revision prompts, but students should be required to verify technical claims, evaluate suggestions and retain responsibility for source use and disciplinary reasoning.

Last but not least, readiness may need to be developed rather than assumed. Students without prior technical-report experience could begin with diagnostic tasks, annotated FYP excerpts and comparisons between weaker and stronger technical writing. This would make the purpose of embedded support visible before students undertake sustained report writing.

LIMITATIONS AND FUTURE RESEARCH

Several limitations define the boundaries of the findings. First, respondent independence cannot be verified for 108 records submitted through a shared data-entry email account. The sensitivity analysis shows that the broad positive descriptive pattern remains, but some inferential conclusions, particularly the prior-experience comparison, are not robust. Second, the questionnaire was inherited from an earlier writing-and-speaking version of C-IMEWS and has not undergone full writing-only revalidation. The very high reliability coefficients, item-level correlations, inter-grouping correlations and VIFs suggest redundancy and weak discriminant separation. Third, the FYP2 subgroup was small ($n = 22$), so stage-based inferential comparisons are not warranted. Fourth, all principal measures were collected through one self-report instrument at one time point, creating substantial common-method risk. Fifth, the open-ended responses were coded by one researcher without independent coding, so they provide descriptive implementation signals rather than validated qualitative themes. Finally, the cross-sectional perception-only design cannot establish improvement in writing performance or causal effects of C-IMEWS.

Future research should first redevelop the questionnaire as a writing-only instrument. This should include construct clarification, removal of semantically redundant items, expert content validation, cognitive interviewing and pilot testing before confirmatory factor analysis in an independent sample. Data collection should use anonymous unique participant codes so that response independence can be verified. Subsequent implementation research should recruit sufficiently sized and balanced FYP-stage and experience groups, incorporate supervisor or language-specialist perspectives, and combine perception data with direct writing outcomes. A longitudinal classroom trial across FYP 1 and FYP 2 would then allow the study to test whether the refined C-IMEWS produces measurable changes in organisation, coherence, synthesis, academic style and technical reporting.

CONCLUSION

This study provides developmental evidence about how Malaysian TVET students perceive embedded academic-writing support in the FYP and what they prioritise for implementation. Across the full dataset, responses were generally positive, and the broad descriptive pattern remained positive in a sensitivity sample that excluded the 108 records submitted through a shared data-entry account. However, the

sensitivity analysis also shows why stronger inferential claims are not warranted: the prior-report-experience finding was not robust, the measurement groupings were highly overlapping, and the inherited questionnaire requires full writing-only revalidation. The most useful contribution of the present study is therefore practical rather than causal. Students consistently pointed towards manageable, FYP-linked support built around organisation, exemplars, scaffolding, feedback and carefully governed digital assistance. These findings can guide refinement of C-IMEWS before a properly identified, psychometrically validated and classroom-tested study evaluates its effect on actual FYP writing.

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.

Conflict of interest: The authors declare no conflict of interest.

Funding: PJP/2025/PPB/PERSPEKTIF/SA0064.

ACKNOWLEDGEMENT

The authors express their appreciation to the School of International Studies and Global Languages and the Centre for Research and Innovation Management (CRIM), Universiti Teknikal Malaysia Melaka (UTeM), for supporting this research. Appreciation is also extended to the Centre for Technopreneurship Development (C-TeD) and the Sustainable Industrial Community (S-iCOMM) research group for their encouragement and support.

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