Advances in Vocational and Technical Education (2026)
Clausius Scientific Press, Canada

DOI: 10.23977/avte.2026.080215
ISSN 2523-5834 Vol. 8 Num. 2

Student-Led Human and AI Collaboration in Vocational Information Technology through Long Document Formatting

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Keywords: Vocational Education; Human–AI Collaboration; Information Technology; Document Formatting; Evaluative Judgement

Abstract: Generative artificial intelligence can produce attractive documents without the structural functions needed for reliable editing. This paper presents a student-led approach to human–AI collaboration in vocational Information Technology: an initial AI-assisted attempt, targeted instruction, renewed collaboration and independent verification. A retrospective case examines submissions from 40 students in six groups at a Chinese vocational university: six presentations, six final documents and two supplementary screenshots. Stated requirements and retained process evidence were compared with artifact properties. Structural inspection and a controlled heading-change test were conducted on four available Word files. All four contained responsive tables of contents; three used second-level heading styles, three contained PAGE fields, and none contained a STYLEREF field. Three contrasting cases showed how attention to appearance, detailed requests and visible revisions could coexist with structural or pagination problems. These observations inform a teaching sequence linking formatting concepts to explicit requirements and student-performed acceptance checks, with group presentations and individual demonstrations providing distinct assessment evidence. The findings concern artifact-level accomplishments and verification gaps; they do not establish individual learning gains or causal effects.

1. Introduction

Long-document formatting involves visible presentation and structures that support later editing. A convincing heading may be absent from the navigation hierarchy; a contents page may fail to update. China's 2021 curriculum standards for higher vocational Information Technology include styles, tables of contents, section breaks, headers and footers, practical tasks and process assessment [1]. These requirements remain relevant when generative artificial intelligence (AI) produces the initial file.

Zhang [2] discusses integrating AI-generated content into vocational Information Technology projects, resources and assessment. This study examines an observable classroom task: expressing requirements for an AI-generated Word file and verifying whether it meets them. It connects

formatting knowledge, specification and acceptance.

UNESCO emphasizes human agency, pedagogical validation [3] and a human-centred mindset [4]. Here, students decide what to delegate, inspect and accept. Assisted production also differs from independent competence: in high-school mathematics, Bastani et al. [5] found that better AI-assisted practice performance did not necessarily improve unassisted performance. This motivates separate assessment of product quality and individual capability, without transferring their measured effects to vocational document work.

The sequence is summarized as "try first, supplement knowledge, then collaborate again." The study asks how groups' requirements, reported revisions and verified document properties relate, and how these observations can inform instruction and acceptance checks. It contributes a teaching design, an artifact-inspection procedure and contrasting group cases.

2. Teaching Design

2.1. Student Responsibility and the Role of Foundational Knowledge

Students lead by articulating requirements, judging outputs, revising artifacts and accepting responsibility for submission. The teacher diagnoses difficulties, supplies knowledge and guides feedback; AI assists with generation, problem analysis and suggestions. Figure 1 locates these roles within the learning cycle. Leadership concerns responsibility for decisions, not the volume of tool use.

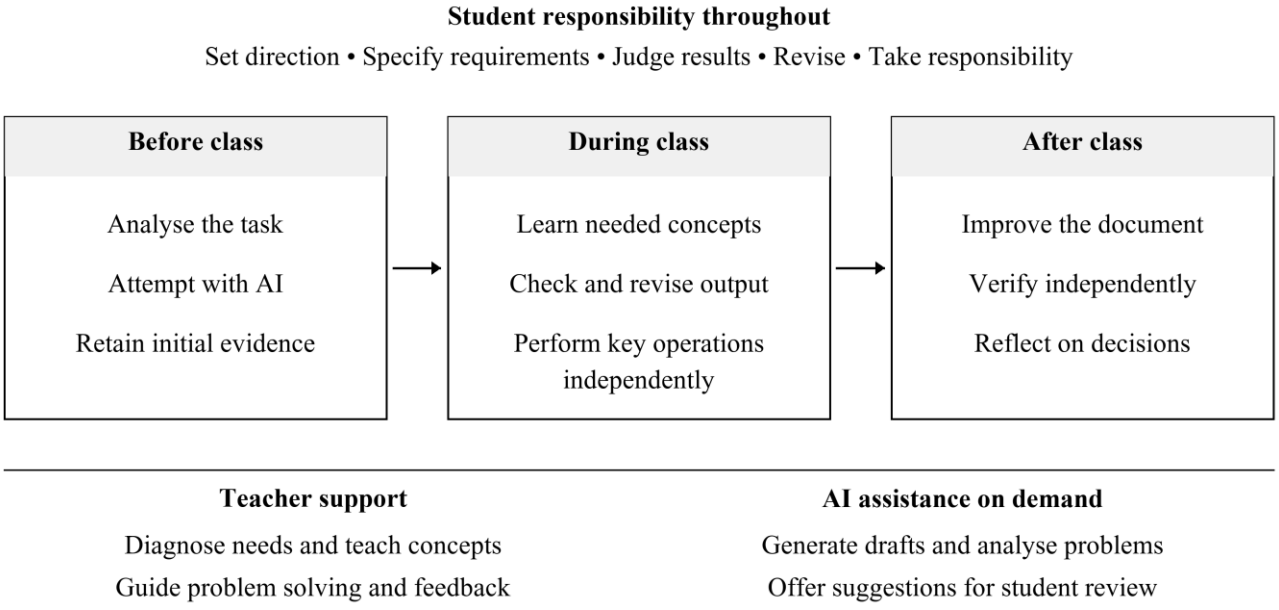


Figure 1: Student responsibility across the intended learning cycle.

An initial attempt gives students an output to compare with subsequent explanations. Research on problem solving before instruction supports this sequence while emphasizing design and implementation [6]. Because an AI-generated draft may conceal limited understanding, students first identify an uncertain feature and explain a requirement.

Evaluative judgement concerns decisions about the quality of one's own and others' work [7]; feedback literacy includes interpreting feedback and acting on it [8]. Students connect a visible problem to a document property, decide on a change and check the returned file. These concepts guide interpretation rather than constitute measured psychological outcomes.

2.2. Connecting the Initial Attempt with Classroom Instruction

Before class, students attempt the task with AI and are expected to submit the initial file with a difficulty or uncertainty. In class, they inspect a textbook or sample, identify automatically generated elements and distinguish content, appearance and structural problems. This informs the teacher's explanation.

Instruction covers four tasks: heading styles and multilevel numbering; a cover and automatic contents; sections for headers, footers and pagination; and modifying or creating styles. Before-and-after examples show each task's effect. Explanations of styles and section breaks precede tutorial-based manual practice and submission of an editable file, supplying concepts and checks for renewed AI collaboration.

A clothing analogy introduces styles as reusable formatting, followed by a demonstration of genuine heading styles in navigation and contents generation. A partition analogy introduces sections with distinct layout rules: a page break alone creates no new section. Demonstrating section boundaries and header/footer links explains how front matter and body numbering can differ.

Students return to AI collaboration using a role–background–task–output scaffold. Requirements specify editable format, content preservation, headings, paragraphs, contents fields and section behavior. They identify a failed requirement, request or make a targeted correction, and repeat the check. Critical operations are to be completed independently. Group presentations demonstrate the Word file; submission retains the presentation, artifact and process record. Table 1 separates this design from the retained evidence.

Table 1: Intended learning sequence and retained evidence.

Phase	Student activity and teacher support	Evidence available in this case
Before class	Students analyse the task and attempt it with AI; the teacher identifies needs for instruction.	Trials confirmed by the teacher; initial records not retained.
During class	The teacher explains four tasks and key concepts; students practise, collaborate with AI and check results.	Teaching materials, six presentations, final artifacts and partial process traces.
After class	Students improve the file, verify independently and reflect; the teacher uses the evidence for feedback.	Final submissions available; individual independent verification not separately documented.

The complete design is distinguished from the retained archive; the table does not certify that every activity was documented.

After class, students improve the artifact, verify functions independently and reflect on decisions. A checked, satisfactory output may be retained. The design values reasons for revision and evidence for acceptance rather than a fixed number of AI turns.

3. Case Context and Methods

3.1. Setting and Corpus

The approach was implemented at Shenzhen Polytechnic University in an engineering-oriented AI applications course in autumn 2026. The teacher reported two building fire-protection classes and one landscape-related class, each with approximately 40 students. Only one available building fire-protection class archive is analysed; the others provide implementation context.

The roster contains 40 students in six groups of 8, 5, 6, 5, 8 and 8. The task opened on 12 October 2026; all group submission timestamps fall on that date, and records were exported on 19 October. The 14 files comprise six presentations, six final documents and two screenshots (Table 2). Four final documents are DOCX and two are PDF. Groups are the analytical units; functional tests

use the four editable files.

Table 2: Corpus of group submissions.

Group	Members	Presentation	Final file	Strongest retained process evidence
G1	8	PPTX	DOCX	Iteration narrative
G2	5	PDF	PDF	Artifact comparison images
G3	6	PPTX	DOCX	No iteration evidence indicated on process page
G4	5	PPTX	PDF	Two separate AI-interface captures and narrative
G5	8	PPTX	DOCX	Embedded AI-interface capture and narrative
G6	8	PPTX	DOCX	Artifact images, including cover comparison

The 14 files comprise six presentations, six final documents and two separate screenshots. Embedded images are included within the presentation files.

The artifacts organize 11 films into chapters with plot summaries, quotations and reviews. Course instructions name WorkBuddy, but model and software versions were not archived. Preclass trials were confirmed by the teacher without retained records. The archive supports analysis of final artifacts and selected process traces, not reconstruction of the entire sequence.

3.2. Comparison of Requirements and Verified Results

Analysis compared three levels: explicit requirements in presentation text and images; evidence supporting process claims; and final artifact properties. Requirements were operationally specific when they named inspectable properties, such as Heading 2 or body numbering starting at 1. Chinese statements are paraphrased in English. Narratives, AI-interface captures and artifact images were distinguished. All groups were screened; G3, G4 and G6 illustrate contrasting relationships among requirements, revision and document behavior.

The four DOCX packages were inspected for Heading 1 and Heading 2 assignments, contents instructions, sections, PAGE fields and STYLEREF fields. Style identifiers were resolved through document definitions. PAGE generates page numbers; STYLEREF can insert style-linked text into headers. Field presence was distinguished from satisfaction of the complete layout requirement.

Each file was opened read-only in native Microsoft Word. The first level-one heading was temporarily replaced with a distinctive label, the first contents field updated, and the label's appearance checked. Files were closed without saving. Selected rendered pages were inspected for contents and pagination problems. These tests establish artifact properties, not students' independent checking ability.

Results are descriptive. Repeated group-linked ratings lacked a confirmed scale or rubric and were excluded from achievement analysis. Blank individual submission cells were not treated as nonparticipation. Students provided informed consent for anonymized analysis and publication; labels G1–G6 replace identities, and identifying details and platform links are excluded.

4. Findings

4.1. Functional Automation Was Present But Incomplete

All four editable files contained Heading 1 paragraphs and genuine contents fields and passed the heading-change test (Table 3). Their contents were structurally linked and responsive to edits, demonstrating why behavior matters when assessing AI-assisted files.

Table 3: Structural inspection and controlled functional test.

Indicator	G1	G3	G5	G6
Heading 1 paragraphs	11	11	12	12
Heading 2 paragraphs	43	0	43	43
TOC field present	Yes	Yes	Yes	Yes
TOC responded to temporary heading edit	Yes	Yes	Yes	Yes
Sections in the document	2	5	3	2
PAGE field present	Yes	Yes	No	Yes
STYLEREF field present	No	No	No	No

n = 4 DOCX files; G2 and G4 supplied PDF-only final documents. Field presence and section counts are indicators, not overall quality scores. The functional test was conducted for this study.

G1, G5 and G6 used Heading 2; G3 did not. G5 and G6 had 12 Heading 1 paragraphs because a preface or introduction accompanied the 11 films. Three files contained PAGE fields; none contained STYLEREF. Every file had multiple sections, which alone did not establish correct numbering. Without the raw draft, heading counts could not establish full content preservation.

Rendered pages exposed further problems: G1's initially empty contents populated after updating; G5's contents repeated page references; and G6's visible page numbering began on the contents page. Passing one functional test therefore did not establish overall correctness. PDF-only submissions were outside the structural audit.

4.2. Three Contrasting Group Cases

G3 requested a cover, contents, conspicuous headings and recurring subsections, but described monotonous colour as the initial problem and proposed richer colours. Its process slide indicated no iteration evidence. The final file had 11 Heading 1 paragraphs, no Heading 2 and a responsive one-level contents field. Thus, the reported concern was aesthetic while a required structural level remained absent. Neither awareness of that omission nor implementation of the colour change was established.

G4 named styles, numbering, sections, STYLEREF and content preservation and narrated five correction rounds. Two interface captures supported particular requests, not the complete sequence. The submitted PDF still numbered its cover despite a stated requirement for unnumbered front matter. Without an editable file, internal sections and fields could not be checked. Detailed specifications therefore did not guarantee conformity of the delivered artifact.

G6 supplied few operational constraints but requested a combined cover. Presentation images showed a cover change from seven films to eleven, supporting that visible revision without reconstructing the conversation. The final file had two heading levels and responsive contents, but displayed page 1 on the contents page. A visible improvement coexisted with a need for separate pagination checks (Table 4).

Table 4: Contrasting cases and corresponding teaching responses.

Case	Reported focus or visible change	Artifact evidence	Teaching response
G3	Requested clearer headings; reported a need for richer text colours.	Heading 1 and responsive TOC present; Heading 2 absent.	Demonstrate the difference between visible emphasis and heading structure.
G4	Specified sections, fields and unnumbered front matter; narrated five rounds.	Submitted PDF still showed a cover page number; editable file absent.	Check compliance in the delivered file and retain editable evidence.
G6	Requested a combined cover; displayed a change from seven films to eleven.	Two heading levels and responsive TOC present; contents page displayed page 1.	Check pagination separately from the visible cover revision.

Reported revisions are not treated as complete verified histories. The teaching responses are interpretations derived from the comparison.

4.3. Process Evidence Was Uneven Across the Class

G1 supplied an iteration narrative, G2 artifact comparisons and G5 a partial AI-interface capture about quotation typography. Across six groups, the strongest retained process evidence comprised AI-interface captures in two groups, artifact images or comparisons in two, narrative alone in one, and no iteration evidence indicated on one process page. These categories describe retained evidence, not mutually exclusive activities. No complete conversation archive supported reconstruction of all prompts, outputs and checks.

5. Discussion and Teaching Refinement

5.1. Link a Concept to a Requirement and a Student Check

G3 highlights semantic hierarchy, G4 verification after a precise request, and G6 checks beyond visible revision. Styles and sections supply vocabulary for specifications and explanations of failed checks, making foundational knowledge relevant to AI-assisted work.

Teaching should connect concepts, requirements, checks and decisions. Students can specify two heading levels, inspect navigation, then change a heading in a copy and update contents. Researcher-administered tests established feasibility for four files; future teaching should record student-performed checks. Table 5 aligns these with the four tasks.

Table 5: Acceptance checks aligned with the four instructional tasks.

Task	Student operation	Evidence for acceptance
1 Styles and numbering	Inspect heading levels and navigation; change a shared heading style.	Correct hierarchy and consistent changes across intended headings.
2 Cover and contents	Edit a heading in a copy; update the complete contents field.	Changed text appears with an appropriate page reference; cover requirements hold.
3 Sections and pagination	Show section boundaries and links; inspect numbering and running headers.	Front matter and body follow the specified rules; heading-linked headers update when required.
4 Custom styles and final review	Modify a named style; compare source content and inspect print layout.	Consistent formatting, preserved required material and a usable editable file.

These checks refine the teaching design. They are not presented as the undocumented grading rubric used for the exported platform ratings.

Revision should target a failed requirement while preserving working features. A pagination request can identify the front-matter boundary, starting number and acceptable result. Students then inspect sections and links, repair or request correction, and repeat the test. Acceptance depends on evidence rather than an AI completion message.

5.2. Distinguish Group Production from Individual Capability

Group assessment can examine the final file and a selected revision: its initial defect, prompt, changed output and check. Live demonstration shows whether an automatic function responds to change. An unchanged output is acceptable when shown to meet requirements.

Individual assessment needs separate evidence: students can independently correct a heading, refresh contents or diagnose a numbering boundary and explain the concept. Recording this would address an archival gap. Artifact quality, decision justification and independent performance should be distinguished; group grades cannot establish each member’s mastery.

5.3. Transfer to Professional Topics

A planned extension asks groups to select a building fire-protection or other vocational topic,

generate material with second-level headings, verify content and format it with AI. Presentations introduce the topic, show content-generation prompts and revisions, explain a professional concept in about one minute, show formatting prompts and revisions, and demonstrate the Word file. Submission includes the presentation, editable artifact and process link.

Professional claims require source checks, while document functions require demonstrations. This extends responsibility from presentation to content. Because the archive concerns films, professional-topic transfer is a proposed extension rather than an observed outcome.

6. Limitations

This retrospective case covers one class archive and six groups, not all three implementation classes or individual learning gains. Preclass artifacts, comparable pretests and post-tests, and individual assessment records were not retained. Process traces were partial, two final files were PDF-only, and raw drafts and AI versions were unavailable. Missing records do not demonstrate that activities did not occur.

The audit used explicit indicators and a repeatable probe but did not cover all layout, accessibility or accuracy issues. No independent second coder was used. Future work should retain initial and final editable files, record acceptance decisions and assess independent operations to examine how instruction changes students' criteria and actions.

7. Conclusion

This case connects vocational teaching design with inspectable artifacts. Four editable files had functioning contents, while group comparisons revealed gaps among requirements, revisions and behavior. The resulting refinement is to connect formatting concepts with explicit specifications and student-performed checks. Teachers supply knowledge at points of difficulty, AI assists production and revision, and students retain responsibility for acceptance. This organizes human–AI collaboration while keeping claims about independent learning proportionate to the evidence.

Acknowledgements

The author gratefully acknowledges support from the Guangdong Province Vocational Education Teaching Reform Research and Practice Project (2023JG064).

Data Availability and Use of AI

Anonymized group-level results are presented in the tables. No identifiable coursework, student records or platform links are included. Generative AI tools were used only to assist with literature retrieval, linguistic revision, translation and script file validation. The AI was not involved in study design, data analysis, interpretation of findings or drawing conclusions. Technical findings were cross-checked against submitted files and the native behaviour of Microsoft Word. The author takes full responsibility for the manuscript and its interpretations.

Author Contributions

The first author was responsible for research design, methodology development, and writing the original draft. The corresponding author contributed to data organization and curation, as well as manuscript review, editing, and language refinement. Both authors reviewed and approved the final version of the manuscript.

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