

Developing a Technology-Mediated Feedback Loop for PBL-Based Senior High EFL Writing

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Abstract: High-quality feedback is central to project-based learning (PBL) writing because authentic projects require multiple drafts, negotiation of meaning, and sustained revision. In many senior high EFL classrooms, however, iterative feedback cycles are difficult to sustain at scale: teacher workload grows rapidly, and teachers have limited visibility into whether and how students use feedback in subsequent drafts. This paper specifies a technology-enhanced feedback cycle (TE-FC) designed for exam-constrained school contexts. The TE-FC integrates (a) structured peer review guided by audience- and purpose-focused prompts, (b) teacher feedforward that targets a small number of high-leverage revisions, (c) student uptake notes that document decision-making about feedback, and (d) lightweight trace indicators drawn from revision histories and comment threads. Trace use is deliberately descriptive and teacher-readable rather than model-driven; it supports instructional decision-making without requiring complex analytics. To develop and evaluate the TE-FC, the paper adopts a qualitatively driven design-based research (DBR) approach, iteratively refining the cycle through classroom implementation and triangulating evidence from observation fieldnotes, student writing portfolios, feedback artifacts, interviews, and descriptive summaries of comments and revisions. The paper contributes a practical workflow, an evaluation plan, and a set of design principles for scalable feedback in PBL writing, emphasizing feasibility, transparency of uptake, and student feedback literacy.

Keywords: Project-based learning; EFL writing; Formative feedback; Peer review; Feedback literacy; Revision; Design-based research; Learning traces

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1. Introduction

Project-based learning (PBL) writing asks students to communicate for real purposes and audiences, which makes drafting, feedback, and revision central rather than optional. Rather than writing only to satisfy a teacher-as-examiner, students write to inform, persuade, or represent the school or community through multi-stage products such as brochures, campaign letters, or cultural introductions ^[1]. In exam-constrained senior high EFL settings, however, writing practices are often shaped by time pressure and test routines, so feedback may become one-shot correction and revision may be minimal.

Formative feedback is most productive when it helps learners close gaps between current and desired performance and when it supports self-regulation rather than replacing it ^[2]. In writing, students must interpret comments, judge

relevance, and translate feedback into revision moves; this interpretive work is shaped by classroom norms and students' confidence and agency ^[3]. When feedback is treated as a list of errors to fix, students may comply superficially without developing transferable revision strategies.

Two classroom constraints are especially salient. First, teacher workload increases when students produce longer, more meaningful texts and revise multiple times. Second, teachers often lack visibility into how feedback is used: comments may be given, but uptake in revision can be partial or unclear. Paper-based workflows make it difficult to compare drafts, trace decision-making, or identify bottlenecks early. Without evidence of uptake, teachers may repeat the same advice, while students may disengage or rely on others to correct their writing.

A feedback-systems perspective suggests that the challenge is not only the quality of individual comments, but the design of the whole feedback process: who provides feedback, when, in what form, and how students are expected to respond ^[4]. Technology can help, but only if it supports well-scaffolded routines. Shared documents, comment threads, and version histories can preserve feedback artifacts and make revision activity visible, yet these affordances can also increase overload if the workflow is not carefully designed.

This paper proposes a Technology-Enhanced Feedback Cycle (TE-FC) that uses a shared-document platform to make feedback processes traceable and manageable without complex analytics. The TE-FC is developed through a qualitatively driven design-based research (DBR) approach that prioritizes classroom feasibility while allowing limited descriptive quantification for triangulation ^[5]. The research questions guiding the study are as follows:

- (1) How can a technology-enhanced feedback cycle be designed and iteratively refined to support PBL writing at scale while remaining feasible for teachers?
- (2) How do students experience and enact feedback, collaboration, and revision when asynchronous peer review and traceable revision histories are introduced?
- (3) What descriptive trace patterns (comments, revisions, uptake) align with qualitatively observed shifts in engagement, audience awareness, and revision ownership?

2. Literature review and design rationale

2.1. PBL writing and audience-oriented criteria

PBL organizes learning around extended inquiry and public products, which naturally foregrounds audience awareness and rhetorical decision-making ^[6]. Since projects culminate in meaningful products, writing quality depends on clarity of purpose, coherence, and evidence, not only grammatical accuracy. This implies that feedback prompts and criteria in PBL writing should prioritize reader understanding, communicative impact, and strategic organization.

2.2. Formative feedback, uptake, and self-regulation

Research on formative feedback emphasizes that comments are productive when they are specific, actionable, and oriented to improvement ^[7]. However, feedback improves writing only through uptake in revision. Students need support to interpret feedback, set priorities, and plan changes, behaviors closely related to self-regulated learning ^[8]. Feedback literacy highlights the importance of learners' capacity to appreciate feedback, make judgments, manage emotion, and take action ^[9]. These insights suggest that an effective feedback cycle should require students to document decisions and next steps, not merely receive comments.

2.3. Peer review as dialogic support and reviewer learning

Peer feedback can increase feedback frequency and provide authentic reader perspectives. Importantly, giving feedback can also improve the reviewer's own writing by strengthening criteria awareness ^[10]. Yet peer review quality is uneven: comments may be vague, overly polite, or focused only on grammar. Structured prompts, exemplars, and role rotation can improve quality by directing attention to meaning-level issues and requiring concrete revision options ^[11].

2.4. Operationalizing revision depth

To evaluate whether feedback is leading to substantial improvement, teachers need a workable notion of revision depth. Classic revision research distinguishes surface changes from meaning changes^[12]. In PBL writing, meaning-level revisions are especially important because authentic tasks demand clarity, persuasion, and audience impact. A feasible feedback cycle should therefore include routines and artifacts that encourage and make visible meaning-level revision moves.

2.5. Why technology-enhanced should mean traceable and feasible

Digital writing platforms preserve drafts, comment threads, and version histories, which can make learning processes visible. However, in exam-constrained school contexts, technology must reduce rather than increase teacher burden. The key design requirement is feasibility: trace indicators should be descriptive and easy to interpret during teaching, and routines should keep the number of steps small.

2.6. DBR as a method for classroom-feasible innovation

DBR aims to develop interventions that work in real settings while generating transferable design principles^[13]. It is well-suited to feedback workflows because implementation is inherently iterative: prompts, timing, and roles must be refined to fit classroom realities^[14].

3. Design framework: The technology-enhanced feedback cycle

The TE-FC is a repeating workflow embedded in PBL writing units. It combines structured peer review, selective teacher feedforward, student uptake notes, and lightweight trace checks. The cycle aims to do as follows:

- (a) Scale feedback without proportional workload growth;
- (b) Make feedback use visible;
- (c) Cultivate feedback literacy through routine practice.

In practical terms, technology refers to any school-approved platform that supports shared drafting, comment threads, and version history. The TE-FC can be implemented with a local server, a learning management system, or a cloud document tool, depending on policy. What matters is that the platform can preserve drafts and feedback artifacts so that revision can be traced and discussed. The platform is therefore treated as infrastructure; the pedagogical cycle is the intervention.

- Project brief and criteria
- Draft 1 (with writer's note)
- Structured peer review (prompts and roles)
- Teacher feedforward triage (2-3 high-leverage moves)
- Uptake note and revision plan
- Draft 2 (revision with trace visibility)
- Trace-informed micro-conference (targeted support)
- Final product and reflection
- (Repeat as needed for the next product cycle)

Figure 1. The technology-enhanced feedback cycle (TE-FC).

3.1. Core phases and teacher decision points

The core phases are as follows:

- (1) Phase 1, criteria and audience alignment: Where the teacher introduces the project brief and co-constructs success criteria in student-friendly language. To protect feasibility, criteria are limited to a small set of high-leverage dimensions (purpose, audience impact, organization, evidence, and language);

- (2) Phase 2, drafting with a writer's note: Each draft includes a brief note stating audience, key message, and the writer's current concern (e.g., "Is my argument convincing?");
- (3) Phase 3, structured peer review: Peers comment using prompts that require reader-based diagnosis and one concrete revision suggestion; reviewer roles rotate to distribute attention;
- (4) Phase 4, teacher feedforward triage: After peer comments are posted, the teacher provides two to three priority feedforward points, often phrased as questions or next-step suggestions rather than full correction;
- (5) Phase 5, uptake note and revision plan: Students explicitly record what feedback they will adopt or reject and why, and they specify planned revision actions;
- (6) Phase 6, trace-informed micro-conferences: Short conferences are reserved for bottlenecks (e.g., unresolved comment threads or minimal meaning-level revision);
- (7) Phase 7, publication and reflection: Students share the product with a real or simulated audience and reflect on revision strategies for transfer.

3.2. Artifacts and lightweight trace indicators

Beyond normal digital artifacts (drafts, comments, and version history), the TE-FC adds two short tools: a writer's note and an uptake note. These artifacts make decision-making visible and cultivate feedback literacy by requiring learners to justify revision choices. Trace use is descriptive. Teachers look for teacher-readable indicators such as participation in peer commenting; evidence additions; re-organization between drafts; and alignment between uptake notes and visible revisions. These indicators are not treated as definitive measures of learning; instead, they function as signals that guide timely instructional decisions, such as which students need micro-conferences and which groups need re-training in peer review norms.

4. Methodology: Qualitatively driven DBR protocol

4.1. Design and logic

The study uses DBR to iteratively refine the TE-FC in naturalistic classrooms and to generate transferable design principles ^[15]. Design features (peer-review prompts, feedforward triage, and uptake notes) are treated as conjectures expected to mediate revision depth and feedback literacy. Across cycles, refinements are documented as design decisions linked to evidence (teacher memos, artifacts, and interview themes).

4.2. Context and implementation cycles

Each DBR cycle corresponds to one PBL writing unit (approximately 3–5 weeks). A cycle typically includes: project briefing and criteria negotiation; Draft 1 with writer's notes; structured peer review; teacher feedforward; uptake notes and Draft 2; trace-informed micro-conferences; final product publication or presentation; and reflection. At least two cycles are recommended to allow meaningful refinement of prompts, timing, and workload distribution.

4.3. Participants and sampling

Participants are senior high EFL students in a regular classroom setting. A purposive subsample is selected for interviews to capture diverse proficiency levels and participation patterns. The teacher is included as a participant for reflective memos and interviews because teacher decision-making is central to feasibility. Sampling decisions and classroom contextual factors (class size, schedule constraints, access to devices) are recorded to support transferability judgments.

4.4. Data sources (QUAL priority) and embedded descriptive traces

Qualitative evidence includes classroom observation field notes focusing on feedback episodes and collaboration talk; writing portfolios containing drafts, revision histories, peer comments, teacher feedforward, writer's notes, and uptake

notes; student reflection logs; and semi-structured interviews with students and the teacher. Embedded quantitative evidence is restricted to descriptive summaries used for triangulation only (e.g., comment counts per student, basic distribution of comment types, revision frequency, and uptake coding). These summaries are not used for complex statistical modeling; their purpose is to improve visibility and support credible qualitative interpretation.

4.5. Artifact-based coding of feedback and revision

Draft-to-draft comparisons are coded using a simplified taxonomy adapted from Faigley and Witte. Meaning-level revisions include changes in ideas, structure, evidence, coherence, and audience alignment. Surface-level revisions include grammar, spelling, and local wording. Peer comments are coded by function (e.g., reader response, question, suggestion, evidence request, language correction) and by focus (meaning-level versus surface-level). Uptake notes are coded for decision quality (adopt/reject with reasons), which provides a direct window into feedback literacy.

4.6. Trustworthiness and ethics

Trustworthiness is supported through triangulation across observations, interviews, and artifacts; an audit trail of design decisions and coding memos; and member checking of interview summaries when feasible ^[16]. Ethical procedures include parental consent and student assent (where required), anonymization of drafts and comment logs, secure storage, minimization of risk, and the right to withdraw without penalty. As digital traces may be perceived as surveillance, the study emphasizes transparent communication about purposes, limited access permissions, and a clearly defined data retention policy.

5. Evaluation plan and design principles

Evaluation prioritizes feasibility and process quality rather than large-scale effect sizes. The protocol looks for converging evidence across feasibility (workload and completion), process (feedback quality and uptake reasoning), and product (revision depth).

5.1. Feasibility indicators

The feasibility indicators are as follows:

- (1) Completion rates of peer review and uptake notes across groups and cycles;
- (2) Teacher-reported time per draft stage (triage, conferencing, and monitoring) and perceived manageability;
- (3) Equity of participation (e.g., distribution of commenting and revision activity) and access constraints.

5.2. Process indicators

The process indicators are as follows:

- (1) Quality of peer comments, especially the proportion of meaning-level comments and the presence of concrete suggestions (coded from comment threads);
- (2) Clarity and justification in uptake notes (adopt/reject with reasons and planned actions);
- (3) Evidence of dialogic interaction in comment replies or conferences (e.g., questions, negotiation, and clarification).

5.3. Product indicators

The product indicators are as follows:

- (1) Documented revision depth between drafts (meaning-level versus surface-level changes);
- (2) Audience alignment and rhetorical organization in final products, evaluated through portfolio evidence and teacher judgment;

- (3) Transfer evidence in reflection logs (students naming strategies they can reuse in later writing).

5.4. Anticipated design principles for scalable feedback cycles

The design principles are as outlined:

- (1) Make purpose and audience explicit before drafting, and keep success criteria compact and memorable;
- (2) Require evidence-based peer comments (claim, reason, suggestion) with prompts that privilege meaning-level issues;
- (3) Triage teacher feedback to a small number of high-leverage revision moves to protect feasibility;
- (4) Insist on visible uptake notes so that revision decisions are transparent and discussable;
- (5) Use trace-informed micro-conferences to target bottlenecks rather than conferencing every student in the same way;
- (6) Embed privacy safeguards and clear norms so traceability supports learning rather than surveillance.

6. Discussion

The TE-FC operationalizes formative feedback and feedback literacy for PBL writing through a feasible routine: structured peer review, selective teacher feedforward, and visible uptake. A central contribution is the explicit design for uptake visibility. When students are required to document what they will adopt or reject and why, feedback becomes a resource for judgment-making rather than a checklist for compliance. This aligns with feedback literacy as an educational goal and with formative assessment principles emphasizing learner agency^[17].

A second contribution is a pragmatic notion of traceability. Rather than pursuing complex analytics, the TE-FC relies on teacher-readable traces such as comment participation, evidence addition, and visible re-organization between drafts. These traces are not treated as definitive measures of learning; instead, they serve as signals that help teachers decide where to invest limited conferencing time and what kinds of peer-review re-training are needed.

The protocol also anticipates constraints. Platform access and privacy policies vary across schools, and uneven digital literacy can produce participation gaps. Peer comments can drift toward surface correction unless prompts, exemplars, and norms are consistently reinforced. Finally, because this paper specifies a DBR protocol and design rationale, empirical claims about effectiveness must be reserved for subsequent implementation reports. The next step is to conduct multiple design iterations and report how refinements influence feasibility, feedback quality, and revision depth across time.

7. Conclusion

The proposed TE-FC provides a feasible pathway for sustaining iterative writing in PBL. It increases feedback opportunities, makes uptake visible, and supports student ownership of revision. Through a qualitatively driven DBR approach, the study aims to refine the cycle and contribute reusable design principles for scalable feedback in senior high EFL writing. If implemented with careful attention to privacy and workload, technology-enhanced traceability can help teachers shift from repetitive correction toward strategic coaching on organization, evidence, and audience impact.

Disclosure statement

The author declares no conflict of interest.

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