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PERTUBUHAN TEKNOLOGI DAN INOVASI PENDIDIKAN MALAYSIA

Improving High School Students' Alignment of Qualitative Research Questions, Designs, and Data Sources Through a Feedback-Rich Web-Based Intervention

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ABSTRACT

Students who are new to qualitative research often learn the labels of common designs without yet being able to align a research question with an appropriate qualitative approach and a suitable source of information. This classroom intervention study examined whether a feedback-rich web-based tool could improve that alignment skill in an introductory Grade 11 qualitative research course. The intervention was implemented with one intact class in a Philippine public secondary school using a one-group pretest-posttest design. Across both administrations, 54 response files were generated. Because the tool used student-created participant codes rather than named accounts, only records with complete and matchable pretest-posttest codes were retained for the primary analysis, resulting in 26 complete paired cases. The primary outcome was overall alignment score on parallel 10-item forms, each requiring students to select both a qualitative design and a source of information. Mean overall score increased from 7.62 to 12.85 out of 20, for a mean gain of 5.23 points (95% CI [2.96, 7.50], $p < .001$, $d = 1.123$). Twenty-three of 26 students improved, one remained unchanged, and two declined. Supporting analyses showed gains in both design selection (3.88 to 6.50 out of 10) and source selection (3.73 to 6.12 out of 10). Brief post-intervention interviews with eight students suggested that improvement was associated with a shift from guess-based responding to cue-based reasoning supported by immediate explanatory feedback. The findings suggest that a lightweight, feedback-rich digital practice environment may support short-term gains in methodological alignment in introductory qualitative research instruction. However, the results should be interpreted cautiously because the study used a single-group, single-class design, an immediate posttest, and a reduced matched analytic sample.

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1. Introduction

Introductory research methods courses frequently ask students to do more than recall terminology. Students must learn to connect a research problem, a research question, an appropriate methodological approach, and the forms of evidence needed to answer that question coherently. Across the research methods education literature, this coherence is one of the recurring points of difficulty because students often experience methods instruction as abstract, demanding, or insufficiently connected to authentic decision making (Earley, 2014). In qualitative inquiry, the challenge becomes especially visible when students can name familiar approaches yet cannot justify why a question about lived experience, culture, process, or a bounded case calls for one design rather than another (Creswell & Poth, 2018; Tomaszewski et al., 2020).

The instructional problem is not trivial. In introductory qualitative research, weak alignment at the design stage can propagate into poorly framed studies, mismatched data collection, and superficial methodological justification. Tomaszewski et al. (2020) note that novice researchers often struggle to align problems, research questions, data collection, and analysis with an appropriate qualitative approach. Creswell and Poth (2018) likewise emphasize that qualitative designs are distinguished not only by labels but by the kinds of questions they are built to answer. When students do not yet read the cues embedded in a question, they may treat methodology as a vocabulary exercise rather than as reasoned inquiry design.

In the Philippine senior high school curriculum, this alignment problem is directly relevant because Practical Research 1 is offered as a Grade 11 applied subject and includes competencies related to stating research questions, choosing an appropriate qualitative research design, planning data collection and analysis procedures, and collecting data through observation and interviews (Department of Education, 2018). Thus, the ability to connect a qualitative question, a defensible design, and a suitable source of information is not only an advanced university-level concern; it is also an expected learning outcome in Philippine senior high school research instruction. Local evidence suggests that this expectation can be difficult for learners and teachers to meet. For example, Samante's (2023) DepEd action research report identified conceptualization, development of the research problem, identification of appropriate methodology, and data analysis as difficulty areas among senior high school students writing research. Rio et al. (2021) similarly reported that teachers assigned to teach qualitative research without adequate training perceived students as underprepared for the demands of qualitative research, including reading, writing, and methodological understanding.

Formative feedback offers a plausible instructional response to this problem. Foundational work on classroom assessment has long shown that learning improves when evidence of student understanding is used to adjust instruction and close the gap between current and desired performance (Black & Wiliam, 1998). Feedback is most useful when it is task-focused, timely, and specific about how to improve performance (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006; Shute, 2008). More recent work on feedback literacy further argues that learners benefit not only from receiving information but also from developing the capacity to interpret and use that information productively (Carless & Boud, 2018). For methodological alignment tasks, this means students need repeated opportunities to make decisions, see why a choice fits or does not fit, and revise the logic underlying subsequent decisions.

Digital environments can make this kind of feedback-rich practice more feasible. In technology-mediated learning settings, digital systems can support rapid feedback cycles, repeated low-stakes attempts, and structured opportunities for students to act on information about their performance (Banihashem et al., 2022). Such supports do not need to be technically complex to be instructionally useful. When the learning goal is conceptual discrimination among closely related options, a lightweight tool that combines guided examples, immediate explanations, and parallel practice can serve as a focused mechanism for strengthening decision quality. In settings where connectivity and device access are uneven, simplicity and portability also matter because they increase the chances that an intervention can be used during ordinary instruction rather than only under ideal conditions.

The problem addressed in this study is the weak ability of novice Grade 11 students to align qualitative research questions with appropriate qualitative designs and data sources. In ordinary classroom practice, students may learn

the labels of qualitative approaches through teacher explanation, printed modules, examples, and proposal-checking activities, but feedback on alignment often arrives after students have already drafted a topic, question, or methodology section. Existing practices are useful, yet they may not provide enough repeated, low-stakes, immediate feedback on the specific micro-decision of matching a question cue to a design and evidence source. This gap justifies a focused intervention that isolates methodological alignment as a learnable decision-making skill and gives students immediate explanatory feedback before they move into full proposal writing.

The present study evaluated a browser-based intervention called QualiMatch, designed to help Grade 11 students align qualitative research questions with appropriate qualitative designs and data sources. To preserve the flagship focus of this paper, the analysis centers on overall pretest-posttest improvement as the primary learning outcome. Subscores for design selection and source selection are treated as supporting evidence, and brief interview data are used only to illuminate the mechanism of change rather than to constitute a separate qualitative account. The study asked whether students' overall alignment performance improved after the intervention and whether brief explanatory interviews could clarify how improvement occurred.

2. Literature Review

Methodological alignment can be understood as a form of disciplinary reasoning. Instead of asking students merely to remember the names of phenomenology, case study, ethnography, grounded theory, or narrative inquiry, instruction asks them to infer what a research question is trying to understand and then match that purpose to a defensible methodological choice. Creswell and Poth (2018) describe these qualitative approaches as distinct traditions with different intellectual purposes, while Tomaszewski et al. (2020) show that novices often need explicit comparative support to see how particular questions connect to particular designs and forms of data. This suggests that alignment is not a peripheral skill. It is a threshold capability for entering qualitative inquiry in a meaningful way. Research methods education also suggests that procedural explanations alone are often insufficient. Earley's (2014) synthesis of 89 studies on research methods education concluded that the field repeatedly returns to questions of student difficulty, instructional technique, and the practical goals of methods courses. In other words, the challenge is not only what students should know, but how instruction can help them convert inert knowledge into usable methodological judgment. In a more recent example from public health education, scaffolded, step-by-step research methods instruction was reported by students as especially helpful for understanding course concepts (Lederer, 2025). Although that context differs from school-level qualitative research instruction, it reinforces the broader pedagogical point that complex research decisions become more learnable when instructional supports are explicit, sequenced, and applied.

The present intervention was grounded in three complementary perspectives: formative assessment, feedback literacy, and cognitive engagement. First, formative assessment theory explains why repeated evidence of student understanding should be used to close the gap between current and desired performance (Black & Wiliam, 1998). Hattie and Timperley (2007) argue that effective feedback clarifies where learners are going, how they are progressing, and what should happen next, while Shute (2008) emphasizes that formative feedback is most useful when it is timely, specific, and task-focused. For methodological alignment, this means students should not only be told that an answer is correct or incorrect; they should also be shown why a question cue fits one design or source better than another.

Second, feedback literacy explains the learner-side process through which feedback becomes useful. Carless and Boud (2018) define student feedback literacy as the capacity to understand, interpret, and use feedback to improve learning. This is important for qualitative research instruction because alignment requires more than answer recognition. Students must notice cues in a research question, compare plausible alternatives, revise their decision rule, and apply that rule to a new item.

Third, the intervention reflects the logic of the ICAP framework, which distinguishes passive, active, constructive, and interactive forms of cognitive engagement (Chi & Wylie, 2014). In this study, students were not positioned as passive recipients of definitions. They actively selected a design and source, received explanatory feedback, and then

constructed their own aligned question in the build task. The expected mechanism was therefore cue noticing, comparison with feedback, rule refinement, and application to a new alignment decision.

On this basis, QualiMatch was designed as a narrow instructional model rather than a broad research-methods platform. The model involved four linked moves: brief cue clarification, repeated alignment decisions, immediate explanatory feedback, and short learner-generated application. This sequence was intended to convert qualitative design labels into usable methodological judgment. It also limited the technological burden of the intervention: the web-based format served the instructional purpose of rapid feedback and repeated practice, while the learning mechanism remained grounded in formative assessment, feedback uptake, and active/constructive engagement.

2.1. Research Questions

- To what extent is participation in a feedback-rich web-based intervention associated with short-term improvement in students' overall alignment of qualitative research questions, designs, and data sources?
- Do supporting pretest-posttest gains also appear in the two component skills, namely qualitative design selection and data source selection?
- How do brief post-intervention interviews illuminate the reasoning processes that students reported using after the intervention?

3. Method

3.1. Context

The study was conducted in an introductory Grade 11 qualitative research course in a Philippine public secondary school. It was designed as a preliminary classroom-based intervention study using a one-group pretest-posttest design with one intact class during regular instruction. This design was appropriate for examining short-term instructional change in an authentic classroom setting, but it was not intended to provide definitive causal evidence because no comparison or control group was included. Accordingly, the results are interpreted as pretest-posttest changes associated with the intervention rather than as conclusive evidence that the intervention alone caused the observed improvement. The goal was instructional rather than selective remediation: the intervention was delivered to the whole class as part of routine course activity.

3.2. Participants

One intact Grade 11 class participated in the intervention. Across the pretest and posttest administrations, 54 response files were generated. The unit of analysis, however, was not an individual export file but a matched student record across the two administrations. Because the tool used student-created participant codes rather than named accounts, records were retained only when the same participant code could be linked across the pretest and posttest and when both records contained complete responses. Files that appeared in only one administration, had missing or inconsistent participant codes, or contained incomplete responses were excluded from the principal paired analysis because they could not support within-student pretest-posttest comparison. No record was excluded on the basis of score level. The final paired analytic sample consisted of 26 students with complete matched records. This reduction is acknowledged as a limitation because unmatched or incomplete files may not be missing completely at random. After the posttest, eight students participated in brief voluntary semi-structured interviews intended to clarify how they were making alignment decisions and which aspects of the intervention they found most helpful or confusing. No names were used in the analytic dataset or interview reporting.

3.3. Intervention

The intervention was delivered through QualiMatch, a lightweight browser-based tool designed for classroom use on phones, tablets, laptops, or shared computers. The tool was intentionally simple. It had no backend database, could run from a hosted or local copy, and used participant-code-based local exports rather than named accounts.

Those features were treated as enabling context rather than as the central contribution of this paper. Instructionally, the intervention combined baseline measurement, concise concept clarification, guided practice with immediate explanatory feedback, a short application task, and a parallel posttest. Its feedback sequence was designed around task-focused, usable guidance of the kind emphasized in formative feedback scholarship (Hattie & Timperley, 2007; Shute, 2008). Table 1 summarizes the intervention components.

Table 1: Intervention Components, Approximate Duration, and Instructional Purposes

Component	Approximate duration	Instructional function	Role in the overall intervention
Orientation and code setup	5 minutes	Prepare students to use participant codes and access the browser-based tool	Supports anonymous but matchable pretest-posttest tracking
Pretest	10 minutes	Establish baseline alignment performance on a parallel 10-item form	Provides the pre-intervention measure of students' ability to match a qualitative research question with both a design and a source of information
Concise instruction page	10 minutes	Clarify plain-language differences among qualitative designs and common sources of information	Highlights the cue structure of research questions, such as lived experience, bounded case, process, culture, and story
Guided practice with immediate feedback	15 minutes	Allow repeated low-stakes decisions followed by explanatory feedback	Supports error correction and helps students compare why one option fits better than plausible alternatives
Build task	10 minutes	Require students to draft a qualitative question and align it with a design and source	Encourages application beyond recognition by asking students to use the same alignment logic in a self-generated example
Posttest	10 minutes	Assess immediate post-intervention change using the same response structure as the pretest	Provides the post-intervention measure for short-term change in overall alignment performance
Brief interviews	After the posttest	Clarify student reasoning and perceived usefulness of the intervention	Provides limited explanatory evidence about students' use of cue-based reasoning and feedback

Although five qualitative design labels appeared in the tool and assessment because they are commonly introduced in introductory qualitative research instruction, the intervention did not attempt to teach the full methodological

depth of all five traditions. Instead, it treated them as introductory, cue-based categories for novice decision making. The instructional emphasis was on recognizing prototypical cues, such as lived experience, bounded case, culture, process, and personal story, and linking those cues to a defensible design-source pairing. This clarification was added to avoid presenting the intervention as comprehensive training in qualitative methodology.

3.4. Measures

The principal measure was a pretest-posttest alignment task delivered in parallel 10-item forms. Each item required two linked selections: one qualitative design and one source of information. The design options were phenomenology, case study, ethnography, grounded theory, and narrative inquiry. These options were used as introductory design categories for cue-recognition practice, not as full methodological traditions to be mastered in a single session. The purpose of the measure was to assess whether students could identify the most appropriate design-source pairing from prototypical question cues. The source options were interview, focus group discussion, observation, document analysis, and artifact analysis. One point was awarded for the correct design and one point for the correct source, yielding a maximum of 2 points per item and 20 points overall per form. Two supporting subscores were also computed: design score (0 to 10) and source score (0 to 10). The options reflected common introductory distinctions among qualitative approaches and evidence sources (Creswell & Poth, 2018; Tomaszewski et al., 2020). Internal consistency for the overall score was modest but acceptable for classroom monitoring use (alpha = .596 for the pretest and .560 for the posttest). Interviews were guided by short prompts about decision processes, feedback usefulness, and remaining confusion. Interview extracts were used only in a limited explanatory role.

3.5. Procedure

Implementation occurred within one regular class session of approximately 60 minutes, excluding the brief post-intervention interviews. Students first completed the pretest, which served as the baseline measure of alignment skill. They then worked through a short instructional sequence that highlighted plain-language distinctions among qualitative designs and sources of information. This was followed by guided practice items that provided immediate explanations for correct and incorrect choices. Students next completed a brief build task in which they drafted a qualitative research question and aligned it with a design and data source. Finally, students took a parallel posttest with the same response structure as the pretest. When devices were limited, students used shared devices under teacher supervision, but participant codes preserved individual response tracking. Interviews with eight volunteers were conducted after the posttest on the same day. During the two testing segments, students received procedural assistance only; no content hints or answer confirmations were provided.

3.6. Data Analysis

The primary outcome was within-student change in overall score from pretest to posttest. Descriptive statistics were used to summarize pretest and posttest performance. A paired-samples significance test, 95% confidence interval for the mean gain, and Cohen's d were used to describe the magnitude and precision of change. Because the main purpose of this paper was to examine overall pretest-posttest change, component results for design and source selection were treated as supporting findings rather than as separate analytic narratives. Interview data were reviewed for concise explanatory patterns related to shifts in reasoning, especially movement from guess-based to cue-based responding. Student statements originally expressed in Filipino or Cebuano were translated into English for reporting, with wording smoothed only where necessary to preserve meaning. This analytic strategy reflects the study's priority on documenting intervention-related change while using limited qualitative evidence only to illuminate uptake of feedback and cue-based reasoning (Carless & Boud, 2018; Shute, 2008). Because the study used a one-group pretest-posttest design, the analyses describe within-student change and the magnitude of short-term gain, but they do not establish causality in the same manner as a randomized or comparison-group design.

4. Results

Overall alignment performance was higher at posttest than at pretest. Mean pretest score was 7.62 out of 20 (SD = 4.74), and mean posttest score was 12.85 (SD = 4.29), yielding a mean gain of 5.23 points. The 95% confidence interval for the gain was [2.96, 7.50]. The pretest-posttest difference was statistically significant ($p < .001$) and large in standardized magnitude ($d = 1.123$). At the student level, 23 of 26 students (88.5%) improved, one student (3.8%) remained unchanged, and two students (7.7%) declined. Table 2 summarizes the quantitative outcomes. The overall pretest-posttest change is presented visually in Figures 1 and 2. As shown in Figure 1, the mean overall alignment score increased from 7.62 in the pretest to 12.85 in the posttest, indicating a clear improvement in performance after the intervention. Figure 2 complements this finding by showing the learner-level pattern of change: 23 of the 26 matched learners improved, one showed no change, and two declined. Together, these figures reinforce that the observed gain was not limited to a small subset of learners, but reflected a broadly positive shift in class performance.

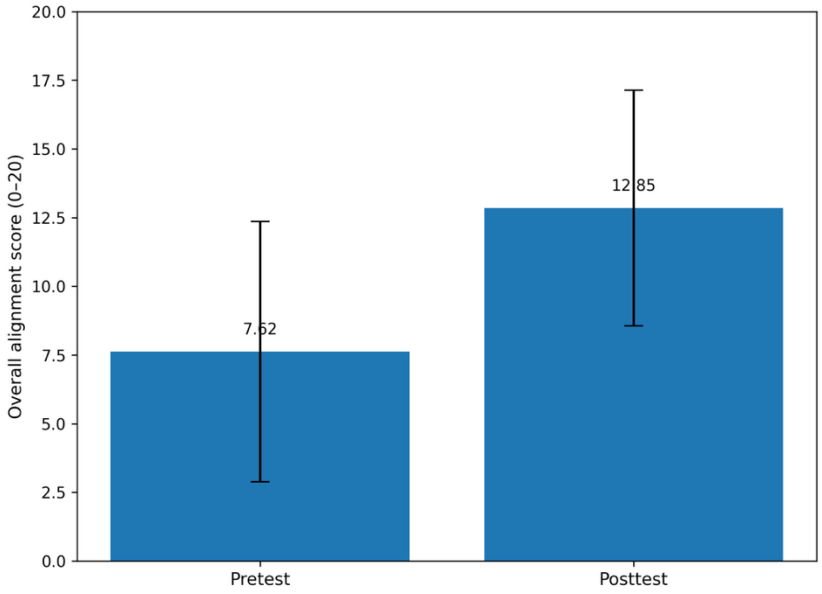

Figure 1. Mean overall alignment scores on the pretest and posttest.

Note. Error bars represent ±1 standard deviation. Higher scores indicate better alignment of qualitative research questions, qualitative designs, and data sources.

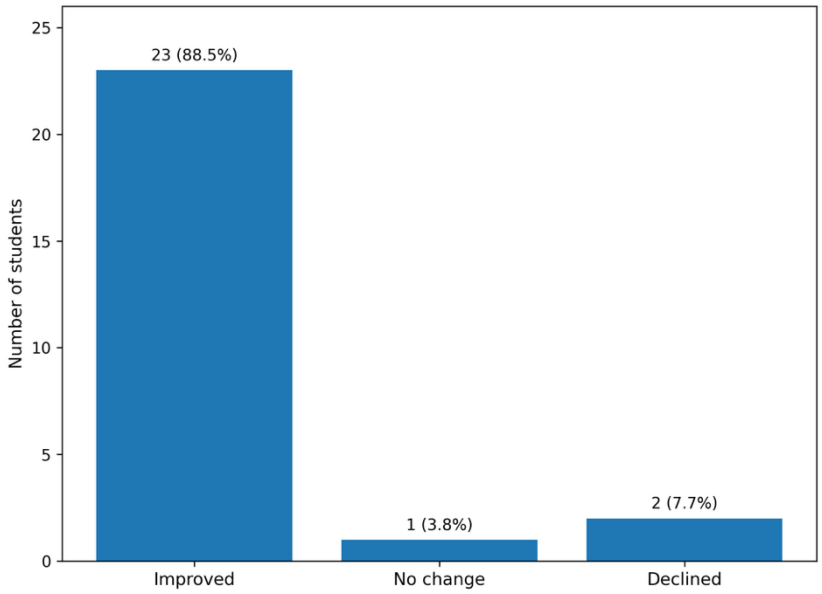

Figure 2. Learner-level change in overall alignment score from pretest to posttest (n = 26).

Note. Of the 26 learners with matched records, 23 improved, 1 showed no change, and 2 declined.

Table 2: Pretest-Posttest Outcomes

Outcome	Pretest M (SD)	Posttest M (SD)	Mean gain	95% CI for gain	p	Cohen's d
Overall score (0–20)	7.62 (4.74)	12.85 (4.29)	5.23	[2.96, 7.50]	< .001	1.123
Design selection (0–10)	3.88 (2.61)	6.50 (2.60)	2.62	[1.36, 3.87]	< .001	1.027
Source selection (0–10)	3.73 (2.37)	6.12 (2.11)	2.38	[1.34, 3.43]	< .001	0.888

Note. Of the 26 students in the paired analytic sample, 23 improved, 1 remained unchanged, and 2 declined in overall score.

Supporting analyses showed that improvement occurred in both component skills. Mean design-selection score increased from 3.88 to 6.50 out of 10, with a mean gain of 2.62 points (95% CI [1.36, 3.87], $p < .001$, $d = 1.027$). Mean source-selection score increased from 3.73 to 6.12, with a mean gain of 2.38 points (95% CI [1.34, 3.43], $p < .001$, $d = 0.888$). The posttest pattern therefore suggests short-term gains in both the identification of appropriate qualitative approaches and the choice of suitable information sources, while leaving the main interpretation centered on the combined alignment outcome.

Brief interviews with eight students suggested a possible shift in reasoning, although they cannot rule out test familiarity or short-term recall as additional contributors to the score gains. One student described the pre-intervention situation as "mixing up the designs because they sounded the same" (I1). After the intervention, students more often described looking for cues in the wording of the question and then linking those cues to a design and source. A representative explanation was, "If it's lived meaning, phenomenology; if it's a bounded system like a program, case study" (I8). Students also reported that the immediate explanations helped them justify source choices more deliberately, for example by distinguishing personal meanings from observable behavior or documentary

evidence. Taken together, the interview data suggest a shift from guess-based responding toward more explicit cue-based reasoning.

5. Discussion

The principal finding is that students' alignment scores were substantially higher after participation in a short, feedback-rich web-based intervention. Because the study used a one-group pretest-posttest design, this pattern should be interpreted as short-term improvement associated with the intervention rather than definitive evidence of a causal effect. Even with this caution, the result is instructionally meaningful because the target skill is a documented bottleneck in introductory qualitative research: students may know the names of designs before they can use those names to make defensible methodological decisions. The finding is consistent with research methods education literature showing that students often need explicit support to connect methodological ideas to authentic decisions (Earley, 2014; Tomaszewski et al., 2020), and it fits qualitative methods guidance that emphasizes internal coherence among the research question, design, and form of data collected (Creswell & Poth, 2018).

The learning mechanism suggested by the study can be interpreted through the combined lenses of formative assessment, feedback literacy, and cognitive engagement. From a formative assessment perspective, QualiMatch repeatedly generated evidence of student understanding and immediately returned task-specific information about why an option was or was not appropriate (Black & Wiliam, 1998; Hattie & Timperley, 2007; Shute, 2008). From a feedback literacy perspective, the important process was not merely receiving the correct answer but learning how to use explanatory feedback to refine the next decision (Carless & Boud, 2018). From an ICAP perspective, the tool moved students beyond passive exposure to definitions by requiring active selection, comparison of alternatives, and a constructive build task in which they generated their own aligned example (Chi & Wylie, 2014). These perspectives help explain why students' interview comments emphasized cue-based reasoning, such as attending to lived meaning, bounded context, process, and story.

The intervention's structure may help explain why the gain was visible within a single session. Introductory qualitative research often becomes difficult when distinctions are introduced as abstract definitions instead of as decision points tied to question cues. QualiMatch narrowed the cognitive demand to a manageable but important instructional problem: what kind of understanding is this question seeking, and what source of information can answer it best? The practice environment repeatedly returned students to those two linked decisions. That focus likely reduced some of the noise that makes early methods learning feel diffuse. It also supports a broader conclusion from digital feedback research: technology-mediated tools can add value when they make feedback cycles more immediate, more usable, and easier to act on during learning rather than after it (Banihashem et al., 2022).

The supporting subscore pattern is also informative. Both component skills improved, but the standardized gain was somewhat larger for design selection than for source selection. One plausible interpretation is that the intervention made the purpose of common qualitative approaches more visible, whereas source selection remained partly constrained by contextual judgment. Choosing between interview, focus group discussion, observation, document analysis, and artifact analysis may require students to weigh not only conceptual fit but also what kind of evidence is realistically obtainable in a school-based study. That does not weaken the intervention's value. Instead, it suggests that source selection may benefit from additional contrastive examples and short justifications that make evidentiary logic more explicit.

The interviews provide limited but useful support for this interpretation. Students described moving from confusion because the designs "sounded the same" toward a more disciplined search for cues such as lived meaning, bounded context, process, and story. This matters because it indicates that the intervention likely helped restructure students' attention. In other words, students were not only memorizing answers on a parallel form; they were learning what to notice in the text of a research question. That kind of cue detection is important for transfer, even though transfer to full proposal writing was not directly measured in this study.

The study therefore contributes to educational technology and classroom methods instruction in a modest but clear way. It shows that even a lightweight browser-based tool, when organized around immediate explanatory feedback and repeated low-stakes decisions, may support meaningful short-term improvement in an area of research instruction that is often treated as conceptually difficult. The contribution is not that the tool is technologically sophisticated. It is that the design of feedback and practice was pedagogically disciplined around a narrow instructional bottleneck. That emphasis on instructional fit, rather than technical complexity, may be especially valuable for schools working under ordinary classroom constraints.

Alternative explanations should also be considered. Some improvement may have resulted from familiarity with the item format, short-term recall from the instructional sequence, or the general effect of receiving immediate instruction before the posttest. The use of parallel forms reduced but did not eliminate the possibility that students became more comfortable with the task structure itself. The immediate timing of the posttest also means that the study measured short-term performance rather than durable retention. For these reasons, the findings should be read as promising classroom-based evidence rather than as final proof of intervention effectiveness. A stronger next study would include a comparison group, delayed posttest, and transfer task requiring students to apply alignment logic to independently written research proposals.

5.1.Implications

For teachers of introductory research, the results suggest that methodological alignment may be worth teaching directly and early, before students begin drafting full methodology sections. Short intervention cycles that ask students to identify question cues, justify design choices, and distinguish among plausible data sources may reduce later proposal-writing difficulties. This recommendation is consistent with the wider research methods education literature, which has repeatedly identified the need to make methods learning more applied, explicit, and connected to authentic tasks (Earley, 2014; Tomaszewski et al., 2020).

For instructional designers and school-based educational technology practitioners, the findings point to the usefulness of small, purpose-built tools rather than only large platforms. A browser-based environment that works across devices, supports immediate explanatory feedback, and minimizes account or connectivity barriers may be sufficient to support meaningful short-term classroom gains when the learning objective is tightly specified. Such an approach also aligns with feedback research that emphasizes timely, usable guidance and with barrier-reducing design principles that support learner variability (CAST, 2024; Hattie & Timperley, 2007). Future refinements could strengthen transfer by requiring short written justifications, including more boundary cases between similar methods, and spacing practice across multiple lessons rather than a single session.

5.2.Limitations

Several limitations should guide interpretation. First, the study used a one-group pretest-posttest design in a single intact class. Improvement was clear, but the design does not rule out alternative explanations such as test-format familiarity, short-term recall, maturation during the session, or the influence of immediate instruction before the posttest. As research design texts note, such classroom studies are useful for practical instructional inquiry but offer weaker support for causal attribution than comparative designs (Creswell & Creswell, 2023). Second, the paired analytic sample was limited to 26 matched records drawn from 54 generated response files. Because exclusions were based on incomplete or unmatchable records, the final sample may not fully represent all students who began the activity. Third, the posttest was administered in the same session as the intervention. The study therefore establishes immediate short-term gain, not delayed retention or transfer to independent proposal writing.

Additional limitations follow from the paper's intentional scope. The intervention was implemented in one course context and centered on a specific alignment task, so generalization should be cautious. Interviews were deliberately brief and explanatory, not a full qualitative dataset. Finally, the study did not directly assess whether gains transferred to students' independently written research proposals or persisted across later methodological work. Those questions remain important targets for future research in research methods education and feedback-rich digital instruction (Banihashem et al., 2022; Earley, 2014).

6. Conclusion

Participation in a feedback-rich web-based intervention was associated with substantial short-term pretest-posttest improvement in Grade 11 students' ability to align qualitative research questions with appropriate designs and data sources. The strongest contribution of the study is the overall pretest-posttest change: students improved markedly on the combined alignment task, with supporting gains in both design selection and source selection. Brief interview evidence suggests that this improvement was associated with a shift from guess-based answering to cue-based reasoning supported by immediate explanatory feedback, a pattern that is consistent with the broader formative feedback literature.

In introductory qualitative research instruction, methodological alignment is often treated as background knowledge that students are expected to absorb while writing proposals. The present findings suggest that methodological alignment may be taught more explicitly as a focused learnable skill through repeated, feedback-rich decision making. Larger comparative studies with delayed follow-up are needed, but the current evidence suggests that a lightweight classroom intervention may make a meaningful short-term difference in how students reason about qualitative methodology and use feedback to improve methodological choices.

Declarations

Competing Interests

None.

Ethical Approval

The intervention was implemented under school and division classroom research procedures for minimal-risk educational studies. Participation was handled through informed parent or guardian consent and student assent. Students were informed that the activity would not create grade penalties for non-participation and that interviews were optional. Analytic records used participant codes instead of names, and results are reported only in de-identified form. The intervention posed minimal risk comparable to ordinary classroom learning activities.

Author's Contribution

Author[1]: Conceptualization, Formal analysis, Validation, Visualization, Writing – original draft, Supervision, Investigation

Author[2]: Methodology, Resources, Writing – review and editing

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