

Interactive Effects of Structured Practice and Research Interest on University Students' Learning Outcomes in an Educational Research Course

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ABSTRACT

Educational research courses are expected to prepare prospective teachers to understand research concepts and apply them in authentic research tasks. Yet research-methods learning is often experienced as conceptually dense and technically demanding, making the instructional approach and students' disposition toward research important considerations. This study examined whether the effect of structured practice on learning outcomes differed according to students' research-interest level. A quasi-experimental 2×2 factorial design was used with 52 students enrolled in an educational research course at STKIP Hamzar Lombok, Indonesia. Instructional method was the treatment factor (structured practice versus direct instruction), while research interest was classified as high or low using the original upper- and lower-group procedure. Assumption checks supported the use of factorial analysis of variance. The analysis showed significant main effects of instructional method, $F(1, 48) = 4.439$, $p = .040$, partial $\eta^2 = .085$, and research interest, $F(1, 48) = 4.557$, $p = .038$, partial $\eta^2 = .087$. More importantly, the interaction between instructional method and research interest was significant, $F(1, 48) = 9.665$, $p = .003$, partial $\eta^2 = .168$. Simple-effects analysis indicated that among students with high research interest, structured practice was associated with higher learning outcomes than direct instruction ($M = 27.17$ vs. 22.64), $t(48) = 3.688$, $p < .001$, $d = 1.31$. Among students with low research interest, the difference was not statistically significant ($M = 22.42$ vs. 23.29), $t(48) = -0.708$, $p = .482$, $d = -0.32$. The findings suggest that the pedagogical value of structured practice is conditional rather than uniform, highlighting the importance of aligning instructional scaffolding with students' readiness and orientation toward research

INTRODUCTION

Research methods education occupies a distinctive position in teacher education. Unlike courses in which students can demonstrate understanding primarily by recalling concepts or applying established procedures, an educational research course asks students to move between conceptual knowledge and the practices of inquiry. Students are expected to identify problems, formulate questions, select appropriate approaches, understand evidence, construct instruments, interpret findings, and communicate conclusions. For prospective teachers, these capabilities are relevant not only to the completion of academic assignments but also to the longer-term development of evidence-informed professional practice.

Despite this importance, research methods courses can be difficult to teach and learn. Research methods combine abstract terminology, procedural decisions, statistical reasoning, ethical considerations, and the interpretation of evidence. Recent scholarship continues to describe research-methods education as an area in which pedagogical approaches are diverse but not yet consolidated into a strong common pedagogical culture. A synthesis of literature on teaching social-science research methods identified experiential, active-learning, and student-centred approaches as recurring strategies, while also highlighting fragmentation in the evidence base (Nind & Katramadou, 2023). A systematic review focused specifically on research-methods education in advanced education similarly identified methodological knowledge, research competencies, and pedagogical practice as three central dimensions requiring stronger pedagogical attention (Mendes et al., 2023).

The challenge is particularly relevant in teacher education. In Indonesia, research-methods courses are commonly connected to the preparation of scientific reports and final research projects. A recent Indonesian study of a research-methods course reported that students may perceive the material as complex and technical and may experience a gap between course learning and the application of research procedures in scientific writing (Wahab et al., 2024). Such evidence suggests that teaching research methods cannot be reduced to the transmission of methodological terminology. Students need repeated opportunities to use concepts, receive feedback, and connect methodological decisions to authentic research problems.

One response is to increase the degree of active engagement within the course. A meta-analysis of 104 studies involving 15,896 students in humanities and social-science courses found that active instruction was associated with higher assessment performance than traditional lecturing, with a weighted mean standardized difference of 0.489 (Kozanitis & Nenciovici, 2023). Research-based learning studies likewise indicate that engaging students in research processes can support research-related skills and dispositions, although the effects are not automatically guaranteed and depend on how the learning experience is designed (Wessels et al., 2021; Arifin et al., 2022). These findings support the general proposition that students learn research more effectively when they are given opportunities to enact research processes rather than only listen to descriptions of them.

The present study focuses on one particular form of active engagement: structured practice. In the original intervention, structured practice consisted of lecturer-guided assignments and repeated exercises directed toward the formulation of educational research problems, research proposals, instruments, and research-report components. The defining characteristic is not simply that students received more assignments. Rather, the practice was sequenced, guided, and repeatedly connected to the concepts introduced in the course. Such a design is compatible with broader evidence that practice and retrieval can strengthen learning when students repeatedly work with newly introduced knowledge (Agarwal et al., 2021; McDermott, 2021). It also resonates with contemporary work on research-methods pedagogy that emphasizes scaffolding, authentic tasks, and opportunities for students to apply research design principles (Haughton, 2023; Nind & Katramadou, 2023).

However, an instructional method may not have the same effect for every learner. Students enter research-methods courses with different levels of prior exposure, confidence, motivation, and interest in research. Interest is especially relevant because it can influence attention, persistence, willingness to engage with challenging tasks, and the value students attach to a learning activity. Research on interest and achievement has found systematic relationships between students' interest and academic performance, while also showing that the relationship depends on domain and context (Höft & Bernholt, 2021). More recent work on undergraduate research interest has similarly highlighted the importance of contextual support and academic confidence in shaping students' orientation toward research (Ahmad et al., 2025).

Research interest therefore provides a theoretically plausible learner characteristic through which instructional effects may vary. A structured practice environment requires students to act on research problems, tolerate uncertainty, revise their work, and sustain attention across a sequence of tasks. Students who are already interested in research may be particularly willing to invest effort in these activities. Conversely, students with lower research interest may respond differently to an instructional design that places more responsibility on independent practice. This does not imply that low-interest students are incapable of benefiting from structured practice; rather, it raises an empirical question about whether the same instructional method produces comparable learning outcomes across levels of research interest.

The existing literature provides important pieces of this argument, but an empirical gap remains. Studies of active learning generally compare instructional approaches at the group level, while research-methods education literature often describes pedagogical strategies without systematically examining learner characteristics as moderators. A review of research-based learning has explicitly identified the need for research designs incorporating moderating variables such as motivation, self-efficacy, and engagement. Studies of research-methods courses also emphasize differences in students' attitudes and engagement across course contexts (Turner et al., 2018; Student attitudes toward research, 2022). What is less clear is whether structured practice and direct instruction interact

with students' research-interest level in predicting achievement in an educational research course.

The present study addresses this gap through a 2×2 factorial analysis. It compares structured practice and direct instruction and examines whether their effects differ between students classified as having high and low research interest. The study is situated in teacher education at STKIP Hamzar Lombok, Indonesia, and uses individual-level data from 52 students. The original study was conducted as part of a postgraduate research project and reported a factorial comparison of instructional methods and research interest. The present manuscript reconstructs the analysis from the individual raw data in order to improve statistical transparency and international reporting.

The study asks three research questions. First, is there a difference in educational-research learning outcomes between students taught through structured practice and those taught through direct instruction? Second, is there a difference in learning outcomes between students with high and low research interest? Third, does research-interest level moderate the relationship between instructional method and learning outcomes? The third question is the central question because a significant interaction would indicate that the effectiveness of an instructional approach is conditional on learner characteristics.

Based on the literature, we expected that structured practice would be associated with higher learning outcomes than direct instruction (H1), that students with higher research interest would show higher learning outcomes than students with lower research interest (H2), and that the effect of instructional method would vary according to research-interest level (H3). The hypotheses are tested statistically rather than treated as assumptions about individual students.

THEORETICAL REVIEW

The conceptual framework combines an instructional-design perspective with a learner-characteristics perspective. Structured practice is treated as an instructional condition that increases students' opportunities to perform research-related cognitive and procedural activities. Research interest is treated as an attribute that may shape how students respond to that condition. Learning outcome is the observed achievement score in the educational research course.

Structured practice in this study should be distinguished from unstructured homework. The original intervention involved planned exercises following course content, with assignments, question-and-answer sessions, presentations, and lecturer guidance. Students were expected to repeatedly use research concepts in the preparation of research problems, proposals, instruments, and research reports. The mechanism proposed here is practice through guided enactment: concepts become usable knowledge when students repeatedly make decisions, receive feedback, and revise their work.

Direct instruction, by contrast, refers to the comparison condition in which the lecturer played the dominant role in presenting course material. Direct instruction can be effective for introducing complex information, modelling procedures, and establishing conceptual foundations. The present study therefore does not conceptualize direct instruction as inherently ineffective.

Instead, the empirical question is whether the balance between lecturer presentation and student practice matters for learning research methods and whether that balance matters differently for students with different research interests.

Research interest is conceptualized as a relatively stable orientation toward research-related activities. In the original measurement, students completed a Likert-type research-interest scale and were then classified into high and low groups using the upper/lower 27% procedure. The raw data show that research-interest scores were available at the individual level. Because the original factorial design used the categorical classification, the primary analysis retains that structure. A continuous-score analysis may be reported as a sensitivity analysis in a subsequent version if the full instrument documentation and analytic rationale are available.

The interaction hypothesis follows from the possibility of an aptitude-treatment or learner-by-method pattern. If structured practice requires sustained self-regulation and active engagement, students who already have a stronger orientation toward research may be more likely to exploit the learning opportunities embedded in the intervention. If so, the difference between structured practice and direct instruction should be larger among high-interest students. The converse possibility is also empirically open: students with lower research interest might need more explicit lecturer guidance, which could reduce or reverse the advantage of structured practice. The present study does not assume which pattern will occur; it tests the interaction.

METHODOLOGY

Research design and setting

The study used a quantitative quasi-experimental design with a 2×2 factorial structure. The treatment factor was instructional method with two levels: structured practice and direct instruction. The learner attribute was research-interest level with two levels: high and low. The dependent variable was students' learning outcome in an educational research course. The design is described as quasi-experimental because the two instructional conditions were implemented in naturally occurring class/campus contexts rather than through individual random assignment to treatment conditions.

The original research involved students in the Early Childhood Education (PGPAUD) program at STKIP Hamzar Lombok. The accessible population comprised 94 students across four classes. Two classes were selected for the intervention comparison. The original study described Campus B in East Lombok as the structured-practice setting and Campus A in North Lombok as the direct-learning setting. From these classes, the upper and lower 27% of research-interest scores were selected for the factorial sample, resulting in 24 students in the structured-practice condition and 28 in the direct-instruction condition, for a total of 52 students.

Participants and grouping

The final analytical sample consisted of 52 students. The structured-practice group contained 24 students, including 12 classified as high in research

interest and 12 classified as low. The direct-instruction group contained 28 students, including 14 high-interest and 14 low-interest students. The grouping procedure followed the original research design. The raw-data appendix confirms the individual observations and the corresponding interest classifications.

Instructional conditions

Both instructional conditions covered the same educational research content. The original intervention was implemented over ten meetings. In the structured-practice condition, students received planned exercises after learning activities, particularly on content requiring reinforcement. Activities included identifying and formulating research problems, developing research proposals, preparing research instruments, and presenting or discussing research work. Lecturer feedback and direction were incorporated into the process. In the direct-instruction condition, the lecturer provided the course material with substantially less structured student practice. The original design therefore differed primarily in the organization and intensity of student practice rather than in the nominal course content.

Research-interest measurement

Research interest was measured using the original Likert-type scale developed for the study. Students were ranked according to their total research-interest scores. The highest 27% and lowest 27% were selected to form the high- and low-interest groups. The raw data show scores ranging from 112 to 146 in the structured-practice class and from 109 to 153 in the direct-instruction class. Because the present source package contains the post-validation raw scores but not the complete item-level validity and reliability output, this manuscript does not invent reliability coefficients. Those coefficients should be inserted from the original instrument-validation record before submission.

Learning-outcome measure

Learning outcomes were measured using a course achievement test covering the educational research material taught during the intervention. The original manuscript states that the assessment covered basic concepts of educational research, types of educational research, research methods, scientific ethics and plagiarism, proposal preparation, and research-report preparation. The dependent variable in the re-analysis is the observed learning-outcome score recorded for each participant.

Data analysis

The raw data were re-entered and analyzed using a two-way factorial ANOVA. Before the main analysis, the four cells of the design were inspected for normality and homogeneity of variance. Shapiro-Wilk tests were calculated for each cell, and Levene's test was used to assess equality of variances. The factorial ANOVA estimated the main effects of instructional method and research interest and their interaction. Partial eta squared was reported as the effect-size measure for ANOVA effects. Because the interaction was statistically significant, simple effects were examined using the pooled error term from the factorial model. Mean differences, 95% confidence intervals, and Cohen's *d* were also calculated to make the magnitude of the conditional effects interpretable.

Analytical transparency

The present analysis differs in important respects from the statistical reporting in the earlier manuscript. The calculations were reconstructed directly from the 52 individual learning-outcome scores in the raw-data appendix. This procedure produced a mean of 22.64 for the direct-instruction/high-interest cell, whereas the earlier manuscript reported 22.79. The re-analysis also showed that the low-interest contrast was not statistically significant. Accordingly, the revised manuscript does not reproduce the earlier claim that direct instruction was significantly superior for low-interest students. This correction is essential for consistency between the reported statistics and the conclusions.

RESEARCH RESULTS

The analysis was based on all 52 individual observations in the supplied raw-data appendix. The descriptive pattern is shown below.

Table 1. Descriptive statistics of learning outcomes by instructional method and research-interest level.

Instructional method	Research interest	n	Mean	SD
Structured Practice	High	12	27.17	3.93
Structured Practice	Low	12	22.42	2.71
Direct Instruction	High	14	22.64	3.00
Direct Instruction	Low	14	23.29	2.76

Assumption testing indicated no statistically significant departure from normality in any cell:

Table 2. Shapiro–Wilk tests by factorial cell.

Method	Interest	n	Shapiro–Wilk W	p
Structured Practice	High	12	0.960	.782
Structured Practice	Low	12	0.905	.184
Direct Instruction	High	14	0.949	.538
Direct Instruction	Low	14	0.969	.860

Levene’s test was non-significant, $F(3, 48) = 1.222$, $p = .312$. The residual Shapiro–Wilk test was also non-significant ($W = 0.971$, $p = .242$). The factorial ANOVA results are presented in Table 3.

Table 3. Two-way ANOVA of learning outcomes.

Source	SS	df	MS	F	p	Partial η^2
Instructional method	43.154	1	43.154	4.439	.040	.085
Research interest	44.308	1	44.308	4.557	.038	.087
Method $\times$ research interest	93.960	1	93.960	9.665	.003	.168
Error	466.655	48	9.722			

There was a significant main effect of instructional method, $F(1,48) = 4.439$, $p = .040$, partial $\eta^2 = .085$. There was also a significant main effect of research interest, $F(1,48) = 4.557$, $p = .038$, partial $\eta^2 = .087$. Most importantly, the interaction between instructional method and research interest was significant, $F(1,48) = 9.665$, $p = .003$, partial $\eta^2 = .168$.

Because the interaction was significant, simple effects were examined within each research-interest level.

Table 4. Simple effects of instructional method within research-interest levels.

Research interest	M Structured	M Direct	Difference	t(48)	p	95% CI	Cohen's d
High	27.17	22.64	4.52	3.688	< .001	[2.06, 6.99]	1.31
Low	22.42	23.29	-0.87	-0.708	.482	[-3.34, 1.60]	-0.32

Among high-interest students, structured practice was associated with a 4.52-point higher mean than direct instruction, $t(48) = 3.688$, $p < .001$, with a 95% confidence interval of [2.06, 6.99] and Cohen's $d = 1.31$. Among low-interest students, the descriptive mean was 0.87 points higher for direct instruction, but the contrast was not statistically significant, $t(48) = -0.708$, $p = .482$, 95% CI [-3.34, 1.60], $d = -0.32$.

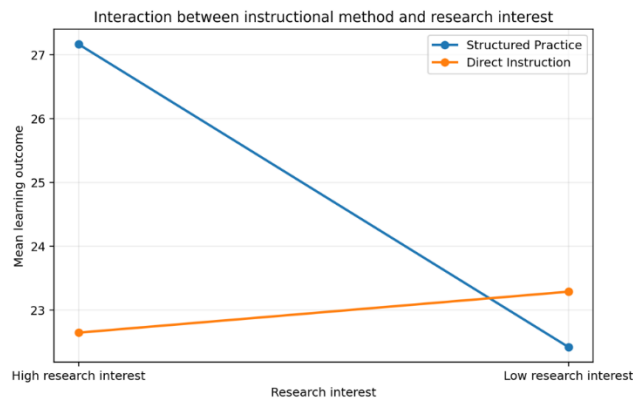


Figure 1. Interaction between instructional method and research-interest level.

DISCUSSION

The most important finding is the significant interaction between instructional method and research interest. This finding changes how the intervention should be interpreted. The evidence does not support a simple claim that structured practice is uniformly more effective than direct instruction. Instead, the learning outcome associated with the instructional method varied according to research-interest level. The difference between methods was substantial among high-interest students, whereas the corresponding difference among low-interest students was small and statistically non-significant.

The high-interest result is consistent with the proposition that structured practice can convert students' existing orientation toward research into sustained engagement with research tasks. Students who are already interested in research may be more willing to invest effort in identifying problems, constructing proposals, revising instruments, and explaining methodological choices. Structured practice gives such students repeated opportunities to use the knowledge introduced in the course. This interpretation is compatible with research on active learning showing that active instruction can improve learning achievement relative to traditional lecturing, including in education and other humanities and social-science disciplines (Kozanitis & Nenciovici, 2023). It is also consistent with evidence that repeated retrieval and practice can strengthen learning across educational contexts (Agarwal et al., 2021; McDermott, 2021).

The finding also aligns with literature on research-based learning. Research-based learning is not a single instructional technique; it encompasses multiple designs in which students participate in research processes. Reviews indicate that effective implementations commonly involve research skills such as analysing data, conducting research, and communicating results, while also identifying motivation and engagement as important variables for future investigation. Wessels et al. (2021), using data from 952 students in 70 research-based learning courses at ten German universities, found changes in cognitive and affective-motivational research dispositions over time, but also emphasized the need to examine the conditions under which research-based learning produces particular outcomes. The present study contributes to this discussion by treating research interest as a moderator of an instructional condition.

The low-interest result requires a different interpretation. The direct-instruction group had a slightly higher descriptive mean than the structured-practice group, but the difference was not statistically significant. Therefore, the data do not support the conclusion that direct instruction is more effective for low-interest students. One possible pedagogical interpretation is that students who begin with lower research interest may need more explicit scaffolding before they can take full advantage of repeated independent practice. However, this explanation remains a hypothesis because the present study did not directly measure self-regulation, prior knowledge, academic confidence, or task engagement. The appropriate conclusion is therefore limited to the observed statistical pattern: the structured-practice advantage evident among high-interest students was not observed among low-interest students.

The interaction can also be interpreted through research-methods pedagogy. Research-methods learning requires students to connect declarative knowledge knowing what a research design, variable, instrument, or hypothesis is with procedural knowledge knowing how to formulate, apply, and evaluate those components. Systematic reviews of research-methods teaching have repeatedly identified experiential, active, and student-centred approaches as prominent pedagogical strategies (Nind & Katramadou, 2023; Mendes et al., 2023). The present results suggest that structured practice may be particularly productive when learners already have an orientation that supports engagement with research. This does not reduce the role of the lecturer; rather, it suggests that lecturer guidance may be most useful when embedded in a structured sequence of increasingly authentic research tasks.

The results are also compatible with recent research-methods teaching interventions. A study of problem-based learning in an Indonesian research-methods course reported the importance of connecting methodological concepts with student-developed research projects and scientific writing. Another study of integrating research-methods training into undergraduate elective courses found improvements in students' self-assessed research knowledge and confidence and evidence that students could apply core research-design skills in final proposals. Together, these studies support the broader pedagogical value of application, although they do not establish that one method is universally superior. The contribution of the present study is the conditional perspective: the value of structured practice may depend on students' research orientation.

An important theoretical implication is therefore the need to move from method-centred comparisons toward learner-by-method explanations. Many instructional studies ask whether intervention A produces higher scores than intervention B. Such comparisons are useful but can conceal meaningful heterogeneity. A factorial design allows the researcher to ask a second question: for whom and under what learner conditions does the instructional difference occur? The significant partial eta squared for the interaction ($\eta p^2 = .168$) indicates that the interaction accounted for a meaningful proportion of the model's explained variance in this sample. This does not justify broad generalization, but it provides a clear empirical reason to investigate learner characteristics in future research on research-methods pedagogy.

There are also practical implications for teacher education. First, research-methods courses may benefit from structured sequences of authentic practice rather than relying predominantly on lecture-based presentation. Second, students' research interest should be assessed early, not to label students permanently, but to identify where additional motivational and instructional scaffolding may be needed. Third, structured practice should be designed with graduated support. High-interest students may be ready for progressively independent research tasks, whereas students with lower research interest may require stronger modelling, shorter task cycles, explicit feedback, and visible connections between research tasks and future professional practice. These are design implications rather than claims directly tested by the present study.

At the same time, the findings should not be interpreted as evidence against direct instruction. Direct instruction can provide efficient explanation and modelling, particularly when students encounter unfamiliar terminology and procedures. The comparison in this study reflects a particular implementation of direct instruction and a particular structured-practice intervention. Future research should therefore compare more finely specified combinations of explicit instruction, guided practice, peer discussion, formative feedback, and independent research tasks. Such designs could determine whether the critical feature is practice itself, the degree of scaffolding, feedback frequency, task authenticity, or some combination of these elements.

The study also contributes contextually by providing evidence from an Indonesian teacher-education setting. International research-methods pedagogy is often represented by studies from Europe, North America, and other well-resourced higher-education systems. Evidence from Indonesian teacher education can help test whether pedagogical propositions travel across institutional and cultural contexts. The present findings should not be treated as nationally representative, but they add a context-specific case in which instructional method and research interest were examined together.

Theoretical and Pedagogical Implications

The findings make a contribution at the intersection of instructional design and research-methods education. Much of the literature on active learning asks whether active approaches produce better achievement than lecture-based approaches. That comparison is important, but it can conceal variation in how students respond to the same instructional environment. The present study adds a learner-sensitive dimension by showing that the difference between structured practice and direct instruction was not constant across research-interest levels. The significant interaction suggests that instructional effectiveness should be considered not only as a property of a teaching method but also as a relationship between a method and the characteristics of the learners who encounter it.

This interpretation is particularly relevant to research-methods education because research learning is cumulative and procedural. Students cannot demonstrate methodological competence simply by recognizing definitions. They must repeatedly coordinate several forms of reasoning: identifying a problem, translating it into a research question, selecting an appropriate design, identifying variables, constructing or selecting instruments, considering evidence, and communicating decisions. Structured practice creates opportunities for these actions to be rehearsed in sequence. The high-interest students in the present study may have been more prepared to exploit these opportunities, which could explain the relatively large conditional difference observed in that subgroup. This mechanism should be tested directly in future studies rather than treated as established causal evidence from the current design.

A second implication concerns scaffolding. The absence of a statistically significant method difference among low-interest students should not be interpreted as evidence that these students should receive less active learning. Rather, it may indicate that active practice needs to be accompanied by

motivational and cognitive scaffolding. For example, instructors could begin with highly modelled research tasks, provide worked examples, use shorter cycles of practice and feedback, and explicitly demonstrate how research-methods skills relate to professional problems encountered by teachers. Once students develop greater confidence and familiarity, the level of independence can gradually increase. This graduated approach is compatible with contemporary research-methods pedagogy that emphasizes authentic tasks, structured support, and the connection between methodological concepts and actual research activity.

A third implication concerns curriculum assessment. Research-methods courses often use a final examination or final research proposal as the primary evidence of learning. The present study measured immediate cognitive achievement, which is useful but incomplete. A more comprehensive assessment system could combine conceptual tests, proposal components, instrument-development tasks, methodological justification, reflective explanations, and an authentic mini-research project. Such assessment would make it possible to determine whether structured practice improves not only short-term test performance but also the ability to transfer methodological knowledge to new research problems.

Finally, the study suggests a useful direction for future comparative research. Rather than comparing only 'active' and 'traditional' teaching, researchers could manipulate the components of structured practice separately: task sequencing, modelling, feedback, peer collaboration, retrieval opportunities, and autonomy. Research interest could be measured continuously, alongside self-efficacy and prior research experience. A sufficiently powered factorial or multilevel design could then identify which components produce the largest changes for different learner profiles. Such a programme would move research-methods pedagogy toward more precise evidence about what works, for whom, and under which instructional conditions.

Limitations

Several limitations should be acknowledged. First, the sample was small ($N = 52$) and was drawn from one teacher-education institution. The findings therefore require replication with larger and more diverse samples before broader generalization is warranted. Second, the instructional conditions were implemented in different campus contexts. The original design associated structured practice with one campus and direct instruction with another, so campus context, instructor context, or other unmeasured differences cannot be completely separated from instructional method. This is a central reason for describing the study as quasi-experimental rather than a fully randomized experiment.

Third, the high/low research-interest grouping was based on the upper and lower 27% of the observed scores. This is consistent with the original design but discards information from the middle portion of the distribution and makes the categories relative to the sampled groups. Future studies should preregister a theoretically justified cut-off or, preferably, analyse research interest as a continuous moderator while retaining adequate statistical power. The

availability of individual interest scores in the present dataset makes such a re-analysis possible, but the current manuscript retains the original 2×2 structure as its primary analysis.

Fourth, the outcome measure focused on cognitive achievement in the educational research course. Research-methods education has broader outcomes, including research self-efficacy, attitudes toward research, methodological reasoning, research writing, ethical judgement, and the ability to transfer research skills to authentic projects. Future studies should include multiple outcome measures and, where possible, delayed assessments to determine whether learning is retained and transferred.

Finally, the source materials available for this reconstruction do not contain the complete instrument-development record, detailed validity statistics, reliability coefficients, ethics approval documentation, or the full implementation fidelity record. These materials should be added to the submission package from the original postgraduate research archive. The absence of those details in the present reconstruction should not be filled by invented values.

CONCLUSIONS AND RECOMMENDATIONS

This study examined whether structured practice and direct instruction produced different learning outcomes in an educational research course and whether the difference varied according to students' research-interest level. The re-analysis of 52 individual observations showed significant main effects of instructional method and research interest, but the most important result was the significant interaction between the two factors. Structured practice was associated with substantially higher learning outcomes among students with high research interest, whereas the difference between instructional methods was not statistically significant among students with low research interest.

The central implication is that the effectiveness of research-methods pedagogy should be considered in relation to learner characteristics. Structured practice may provide particularly valuable learning opportunities for students who are already oriented toward research, while students with lower research interest may require additional motivational and instructional scaffolding before intensive practice can produce comparable benefits. The findings do not establish that one method is universally superior. Instead, they support a more conditional approach to instructional design in which the organization of practice, the level of lecturer guidance, and students' research orientation are considered together.

Future research should replicate the factorial design with larger samples, randomize instructional conditions where feasible, measure implementation fidelity, retain research interest as a continuous variable, and include outcomes beyond immediate cognitive achievement. Such work can help establish whether the interaction observed here is robust across institutions, disciplines, and forms of research-methods instruction.

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