Volume 4 Number 2 (2026)
July-December 2026
Page: 1805-1820

Journal of Creative Power and Ambition (JCPA)
https://edujavare.com/index.php/jcpa
E-ISSN: 3031-4054
DOI: 10.70610/jcpa.1733

Structured Collaborative Learning for Accounting Standards Instruction: A Pre-Experimental Study

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Article history Submitted: 2026/04/01; Revised: 2026/05/11; Accepted: 2026/08/04

Abstract

This study investigates the effectiveness of the Card Exchange and Knowledge Tour, a structured collaborative active learning protocol, in improving conceptual understanding of Indonesian Financial Accounting Standards (PSAK) among undergraduate accounting students at a public university in Indonesia. Using a pre-experimental one-group pretest–posttest design involving 29 matched pairs, raw Google Form response data were independently cleaned, scored, and analyzed using paired-samples t-tests, Wilcoxon signed-rank tests, and effect size estimation, while proportion-correct metrics ensured comparability across a 12-item pre-test and an 18-item post-test. The findings indicate that students' scores improved significantly from 73.3% to 82.0% [$t(28) = 2.924$, $p = .007$; $W = 63.5$, $p = .013$], with a medium effect size (Cohen's $d = 0.543$; $r = 0.460$), exceeding typical benchmarks for single-session active learning interventions. Students also demonstrated significant improvements in learning confidence ($p < .001$) and perceived ability to apply accounting standards ($p = .008$), while the perception instruments exhibited strong internal consistency ($\alpha = .785$–$.862$). Theoretically, the protocol simultaneously activates social constructivism, retrieval practice, and peer instruction, generating synergistic learning gains without requiring technological mediation. Practically, it provides accounting educators with an accessible, evidence-based alternative to technology-dependent instructional approaches, making it particularly suitable for institutions with limited digital infrastructure. The novelty of this study lies in integrating card-based learning, structured station rotation, and reciprocal peer questioning into a single theoretically grounded, multi-mechanism instructional protocol, an approach that has not previously been empirically examined in accounting standards instruction, particularly within the context of Indonesian PSAK education.

Keywords Active Learning; Collaborative Learning; Accounting Education; PSAK Instruction; Peer Instruction

INTRODUCTION

Accounting standards education faces a persistent instructional challenge across many jurisdictions: students frequently master procedural mechanics while struggling to internalize the underlying regulatory logic that standards are meant to

encode (Paisey et al., 2025). In Indonesia, this challenge is intensified by ongoing convergence between PSAK and IFRS, which continually adds interpretive complexity to an already demanding curriculum. Teaching accounting standards is, for this reason, fundamentally different from teaching other accounting topics.

Unlike financial statement preparation or ratio analysis, standards such as PSAK require students to internalize abstract regulatory language, interpret principle-based rules, and apply them across diverse transaction scenarios. The challenge is not merely cognitive; it is linguistic. The formal language of PSAK is dense, technical, and frequently counterintuitive for undergraduate students encountering it for the first time. Students can memorize definitions without ever grasping what a standard requires practitioners to do, and this gap between surface recall and genuine comprehension becomes visible only when they face applied case scenarios.

This instructional problem has a recognizable classroom manifestation. When PSAK topics are covered through conventional group presentations, a common format in advanced accounting courses, the distributional outcome is predictable: the presenting group understands their assigned standard reasonably well, having prepared for it, while the rest of the class follows with varying degrees of attention that rarely produces lasting comprehension. Students in the audience are often physically present but cognitively disengaged present in the room while the material passes over them rather than through them. Each group knows their own PSAK; the remaining standards are effectively unlearned. The format rewards preparation for one topic while structurally permitting passivity toward the rest.

A substantial body of scholarship confirms that this pattern is not inevitable. Active and collaborative learning approaches encompassing structured peer discussion, case-based analysis, retrieval-based tasks, and reciprocal explanation consistently outperform passive methods in producing conceptual understanding and knowledge retention (Freeman et al., 2014; Nsor-Ambala, 2022; Nowak et al., 2023). Freeman et al.'s (2014) meta-analysis across 225 studies in higher education reported a mean effect size of d = 0.47 and a failure rate 1.5 times lower under active learning conditions. In accounting education specifically, collaborative formats that require students to articulate and justify reasoning under peer accountability produce deeper theoretical understanding than formats that do not (Nsor-Ambala, 2022). Consistent with this, Goosen and Steenkamp (2025) found that it was the deliberate design of group-work structures, rather than group work itself, that reliably developed accounting students' collaborative competencies reinforcing that

instructional design quality, not grouping per se, is the operative variable. A critical qualification in this literature is that collaborative learning effectiveness depends not on grouping per se, but on the structure and theoretical grounding of the interaction design. Anghel (2024) found that both the quantity and quality of peer engagement independently predict academic achievement, with quality operationalized as depth and reciprocity of interaction exerting the stronger effect. Taggart and Wheeler (2025) similarly observed that collaborative activities anchored in explicit theoretical frameworks consistently produced stronger student outcomes than informally structured group work. For accounting educators, this carries a practical implication: how students interact, what they are accountable for, and what cognitive demands the design imposes matter more than whether students are simply sitting in groups.

The dominant institutional response to calls for instructional innovation in accounting education has, nonetheless, leaned heavily toward technological solutions digital simulations, blended platforms, AI-assisted tools, and case software (Birt et al., 2023; Kelly et al., 2023). While these carry genuine value, they have simultaneously narrowed attention away from a simpler and arguably more accessible question: can thoughtful instructional design, independent of technology, produce the learning gains that PSAK instruction demands? For educators in Indonesian public universities, where infrastructure varies, connectivity is inconsistent, and digital resources are unevenly distributed, this question carries direct operational weight. It is against this backdrop that the present study asks a more foundational question, one that precedes any decision about digital or non-digital delivery: what specific instructional design, whatever its medium, activates the mechanisms already known to drive learning gains?

The Card Exchange and Knowledge Tour protocol was developed as a practical response to this question. Rather than relying on passive group presentations, the protocol creates conditions in which all students must actively engage with all topics. Groups prepare knowledge cards summarizing their assigned PSAK; they then rotate across stations, read other groups' cards, document a personal synthesis, and participate in reciprocal questioning on all topics, not only their own. The structural accountability this creates transforms the nature of engagement: knowing they will be questioned on every PSAK, students approach each station with genuine purpose. Observations during the session confirmed this shift: students actively interrogated card content, asked clarifying questions about substantive PSAK distinctions, and challenged each other's interpretations in ways that passive presentation formats never elicited.

Despite growing interest in active learning pedagogy in accounting education, the specific combination of card-based preparation, structured station rotation, synthesis documentation, and reciprocal peer questioning as an integrated multi-mechanism protocol has not been empirically examined in accounting standards instruction, particularly in Indonesian PSAK contexts (Engineer et al., 2021; Paisey et al., 2025). Individual elements such as gallery walks, card-based learning, and peer instruction each have precedent in the broader pedagogical literature; the novelty of the present study lies in their deliberate theoretical integration and in the empirical testing of this combined design within a domain accounting standards where the evidence base for structured, non-digital collaborative approaches remains sparse.

Accordingly, this study aims to (1) evaluate whether the Card Exchange and Knowledge Tour protocol produces significant gains in undergraduate accounting students' conceptual understanding of PSAK, and (2) examine corresponding changes in students' confidence and perceived ability to apply the standards they studied.

METHODS

This study employed a quantitative pre-experimental design using a one-group pretest–posttest approach. Pre-experimental designs are appropriate for initial proof-of-concept investigations where the primary objective is to demonstrate the plausibility of a causal mechanism rather than to establish definitive causal attribution (Shadish et al., 2002). This exploratory, single-group approach was selected deliberately: before investing in a resource-intensive controlled trial, it is necessary to establish whether the protocol's theorized mechanisms produce a detectable, replicable effect at all. The research question whether the Card Exchange and Knowledge Tour mechanism activates theoretically predicted learning processes is best addressed within a within-subject framework, which eliminates between-subject variance attributable to individual differences in prior knowledge, motivation, and academic background. These differences represent the primary confounds in intact-group studies and would substantially obscure intervention effects in a between-group design.

As this study was conducted as part of routine instructional activity within an existing course rather than as a separately commissioned research project, it did not undergo review by a formal institutional ethics committee. All students were informed of the study's purpose and data use, and participation and response submission were treated as informed consent; students retained the option not to

submit responses without any academic consequence.

Participants were 33 students enrolled in one section of an advanced financial accounting course in the Undergraduate Accounting study program at Universitas Negeri Jakarta. Intact group sampling was employed, as all enrolled students participated in the regular instructional session in which the intervention was embedded. Of the 33 enrolled students, 31 completed the pre-test; two enrolled students did not respond to the pre-test instrument and were excluded from the outset. Of these 31 pre-test respondents, a further two were absent from the post-test session, yielding a final matched analytic sample of 29 pre–post pairs. Table 1 reports enrollment by study group, and Table 2 reports the corresponding response and matching flow.

Students had completed introductory and intermediate accounting coursework but had not yet been formally instructed on the PSAK topics covered in the intervention, ensuring genuine baseline equivalence. Because sampling was conducted at the intact-group level and demographic variables were not part of the study's theoretical model, individual demographic characteristics such as age and gender were not collected or analyzed; this is noted as a limitation in Section 3.7. Informed consent was confirmed within the response instruments.

Table 1. Participant Distribution by Study Group

Study Group (Kelompok)	PSAK Topic Assigned	N
Kelompok 1	ISAK 16 – Service Concession Arrangements	4
Kelompok 2	PSAK 220 – Government Grants	6
Kelompok 3	PSAK 111 – Joint Arrangements	6
Kelompok 4	PSAK 224 – Related Party Disclosures	5
Kelompok 5	PSAK 113 – Fair Value Measurement	6
Kelompok 6	PSAK 210 – Events After the Reporting Period	6
Total enrolled		**33**

Source: Google Form response data (2025). Total enrolled = 33; 31 submitted pre-test responses and 29 matched pre–post pairs were analyzed (see Table 2).

The Card Exchange and Knowledge Tour was implemented as a structured four-stage collaborative session within a single 90-minute class period. In Stage 1 (Preparation, 20 minutes), each group prepared knowledge cards summarizing the

core principles, recognition criteria, and disclosure requirements of their assigned PSAK. Cards were designed to be concise and visually accessible dense enough to enable genuine engagement but brief enough to be assimilated within a five-minute station visit. In Stage 2 (Knowledge Tour, 30 minutes), groups rotated across five stations in a structured sequence, spending approximately five minutes at each station studying the host group's cards. Rotation timing was externally managed to ensure equal cross-PSAK exposure. In Stage 3 (Synthesis, 15 minutes), each student individually documented key learning points from all stations, constructing a personal synthesis of the multi-PSAK content encountered during the tour. In Stage 4 (Reciprocal Questioning, 25 minutes), groups posed questions to one another based on the cards encountered during the tour. The explicit accountability created by this final stage students knew from the outset that they would be questioned on all topics motivated purposeful engagement throughout Stages 1 through 3.

Conceptual understanding was assessed using multiple-choice instruments administered via Google Form immediately before and after the intervention. The pre-test comprised 12 items covering six PSAK topics (two items per topic), targeting knowledge-level and application-level comprehension of core accounting recognition, measurement, and disclosure principles. The post-test comprised 18 items, retaining the original 12 and adding six new items addressing deeper conceptual dimensions, including cross-standard integration and scenario-based application encountered during the intervention. Because the two instruments differed in item count, all scores were converted to proportion correct (range: 0–1) prior to analysis to ensure metric comparability.

Both instruments were developed directly by the course instructional team for this intervention, based on the recognition, measurement, and disclosure requirements stated in the official PSAK/ISAK texts covered in each session, rather than adapted from a pre-existing standardized instrument. Item content validity was established through alignment with official PSAK documentation and review by the course instructor, who holds subject-matter expertise in the PSAK topics assessed; this review served as the study's expert-review step prior to administration. Student perceptions were assessed using Likert-scale items (1–5): ATT1 (confidence) and ATT2 (application ability) at both time points, and ATT3 (method suitability) and ATT4 (card utility) post-intervention only.

Raw response data were extracted directly from Google Form exports without pre-processing, ensuring analytical independence. Responses were matched at the

individual level using a three-pass hierarchical protocol: (1) exact NIM match within the same study group; (2) name-prefix match within the same group; (3) exact case-insensitive name match. Two unmatched participants (absent from the post-test) were excluded. Table 2 summarizes the cleaning outcomes.

Table 2. Data Cleaning and Matching Summary

Parameter	Value
Students enrolled	33
Pre-test responses collected	31
Post-test responses collected	30
Successfully matched pairs	29
Excluded (no pre-test response)	2
Excluded (absent from post-test)	2
Pre-test items (MC)	12
Post-test items (MC)	18
Score metric used in analysis	Proportion correct (0–1)

Source: Processed by authors (2025).

Descriptive statistics were computed for proportion-correct scores at both time points and for the pre-post difference. The Shapiro-Wilk test assessed normality of difference scores. Pre-post differences were evaluated using both a paired-samples t-test and a Wilcoxon signed-rank test; convergent significance across both tests served as the primary inferential criterion, ensuring robustness to distributional assumptions. Effect size was estimated using Cohen's d and nonparametric r. The 95% confidence interval on the mean difference supplemented significance testing. Perception item changes were assessed via Wilcoxon signed-rank tests; internal consistency via Cronbach's alpha. All analyses were conducted using Python 3 (SciPy and NumPy) directly on the cleaned, matched dataset

FINDINGS AND DISCUSSION

Descriptive Statistics

Table 3 presents descriptive statistics for proportion-correct scores. Students improved from a mean of 73.3% on the pre-test (M = 0.733, SD = 0.169) to 82.0% on the post-test (M = 0.820, SD = 0.127), a gain of approximately 8.7 percentage points. In raw terms, this represents an improvement from an average of 8.8 correct out of 12 pre-test items to 14.8 correct out of 18 post-test items.

Table 3. Descriptive Statistics of Proportion-Correct Scores

Occasion	N	M	SD	Min	Max	Median
Pre-test (/12)	29	0.733	0.169	0.417	1.000	0.750
Post-test (/18)	29	0.820	0.127	0.556	1.000	0.833
Difference	29	0.087	0.161	−0.222	0.417	0.083

Source: Processed by authors (2025).

As Table 3 shows, the narrowing of the standard deviation from 0.169 to 0.127 is noteworthy: the score distribution became more homogeneous after the intervention, suggesting that lower-performing students gained disproportionately a pattern consistent with social constructivist predictions about peer scaffolding within the Zone of Proximal Development (Vygotsky, 1978). This variance compression is not merely a statistical artifact; it reflects the equalizing function of structured peer interaction, where students who initially grasped less had access to explanation and scaffolding from peers who had prepared each topic in depth.

Normality Testing and Inferential Analysis

The Shapiro-Wilk test confirmed normality of difference scores ($W = 0.967$, $p = .478$), validating the use of parametric alongside nonparametric analysis. The paired-samples t-test yielded $t(28) = 2.924$ ($p = .007$, two-tailed), with a 95% confidence interval of [0.026, 0.148] fully excluding zero. Cohen's $d = 0.543$ indicates a medium effect. The Wilcoxon test confirmed this independently ($W = 63.5$, $p = .013$; $r = 0.460$).

Table 4. Inferential Test Results

Test	Statistic	p (two-tailed)	Effect Size	95% CI
Paired t-test	t(28) = 2.924	.007	d = 0.543 (medium)	[0.026, 0.148]
Wilcoxon signed-rank	W = 63.5	.013	r = 0.460 (medium)	–
Shapiro-Wilk (diff.)	W = 0.967	.478	–	–

Source: Processed by authors (2025).

As Table 4 shows, the convergence of both tests each significant, in the same

direction, with comparable effect sizes provides robust evidence that the observed improvement is genuine and not dependent on distributional assumptions (Cohen, 1994; Kelley & Preacher, 2012). The effect size contextualizes well against Freeman et al.'s (2014) meta-analytic range of d = 0.19–0.47 for single-session active learning interventions: the Card Exchange and Knowledge Tour exceeds this range, suggesting that its multi-mechanism design generates additive benefits beyond single-mechanism approaches. Beyond its statistical significance, an effect of this magnitude is also educationally meaningful: it corresponds to moving a student who began at roughly the class median to a position several percentile ranks higher after a single 90-minute session a practically noticeable shift within one class period, not merely a numerically significant one.

Direction of Score Change

Table 5 summarizes individual-level patterns of change. Of the 29 participants, 19 (65.5%) showed improvement, 5 (17.2%) showed no change, and 5 (17.2%) showed a relative decline.

Table 5. Direction of Score Change

Direction	N	%	Notes
Improved (post% > pre%)	19	65.5%	Primary outcome group
No change	5	17.2%	Difference ≤ 0.00
Declined (post% < pre%)	5	17.2%	3 had pre ≥ 0.75 (ceiling)
Total	**29**	**100%**	

Source: Processed by authors (2025).

The five declining cases warrant interpretive attention: three had relatively high pre-test scores (proportion correct ≥ 0.75), consistent with a ceiling effect students with strong prior knowledge had limited room to improve proportionally on the pre-test scale. The six additional post-test items covering deeper integration dimensions may also have been differentially challenging for students whose Knowledge Tour exposure to certain topics was less thorough.

Perception Outcomes and Reliability

Table 6 presents perception change results. Confidence (ATT1) increased from M = 3.07 to M = 3.93 (W = 32.5, p < .001), and perceived application ability (ATT2) from M = 3.28 to M = 3.86 (W = 32.5, p = .008). Post-only items showed strong endorsement: method suitability (ATT3: M = 4.17) and card utility (ATT4: M = 4.10).

Table 6. Perception Change: Wilcoxon Test Results

Item	Pre M (SD)	Post M (SD)	W	p
ATT1 – Confidence	3.07 (0.96)	3.93 (0.75)	32.5	< .001
ATT2 – Application Ability	3.28 (0.84)	3.86 (0.69)	32.5	.008
ATT3 – Method Suitability*	–	4.17 (0.81)	–	–
ATT4 – Card Learning Utility*	–	4.10 (0.82)	–	–

*Source: Processed by authors (2025). *Post-test only items. Likert-scale means (1–5) are reported to two decimal places; proportion-correct scores (0–1) in Tables 3–4 are reported to three decimal places, reflecting the respective measurement scales.*

Cronbach's alpha confirmed satisfactory to good reliability: α = .785 for the 2-item pre-scale and α = .862 for the 4-item post-scale, substantially above the α = .596 reported from prior partially miscoded data. The improvement in ATT2 (application ability) is particularly meaningful: it suggests students experienced not merely greater confidence but a qualitatively different self-assessment a sense that they could actually use the PSAK, not just recognize it (Twyford & Dean, 2024).

Why It Worked: Three Mechanisms in One Design

The results pattern significant gains, medium effect, variance compression, and perception improvements reflects the simultaneous activation of three learning mechanisms that the Card Exchange and Knowledge Tour embeds within a single protocol. Understanding how these mechanisms interact clarifies both why the intervention worked and how it can be refined. The first is social constructivist scaffolding. Students rotating to each station encounter PSAK content beyond their immediate expertise, supported by peers who had prepared that content in depth. This is not generic group work; it is a structured instantiation of Vygotsky's (1978) Zone of Proximal Development, challenge met with scaffolded support. Crucially,

the scaffolding is provided not by the instructor but by peers who have recently constructed their own understanding, making explanations particularly accessible (Costley et al., 2022; Saqr & Alamro, 2019). The variance compression observed SD dropping from 0.169 to 0.127 is the distributional signature this mechanism predicts: lower-performing students gain the most from peer scaffolding, narrowing the gap.

The second is retrieval practice. Each rotation requires students to retrieve and re-articulate their own PSAK content to visiting groups, recall information from visited stations during synthesis, and retrieve cross-standard knowledge during reciprocal questioning. These are not passive review events; they are active retrieval under social accountability, a condition that amplifies encoding depth beyond what solitary recall produces (Franzoi et al., 2025; Jayaram, 2026; Roediger & Karpicke, 2006). Kirk-Johnson et al. (2019) demonstrated that knowing peers will evaluate one's responses increases the cognitive effort invested in retrieval, further strengthening retention.

The third is peer instruction and the protégé effect. Mazur (1997) established that explaining a concept to a peer forces the explainer to confront gaps in their own understanding that passive study cannot reveal. Nestojko et al. (2014) showed that even the expectation of teaching knowing one will need to explain enhances learning before the explanation occurs. In the Card Exchange and Knowledge Tour, this expectation is established at Stage 1 and sustained through Stage 4. The significant gain in perceived application ability ($p = .008$) is the perceptual correlate of this mechanism: students who have had to explain and defend a PSAK to questioning peers develop a qualitatively different relationship with the material than those who have merely listened to a presentation about it.

What distinguishes this protocol is not the presence of any one mechanism but their structural co-activation. Solo retrieval drills, unstructured discussions, and one-directional presentations each engage one pathway at a time. The Card Exchange and Knowledge Tour activates all three simultaneously and in a mutually reinforcing sequence: the social constructivist dynamics of the tour create the interactional context within which retrieval is socially accountable, and the reciprocal questioning converts both into a peer instruction experience. This design synergy likely explains why the effect size ($d = 0.543$) exceeds the typical range for single-mechanism interventions.

Comparison with Prior Accounting Education Studies

The present findings extend, and in some respects diverge from, prior accounting education research on collaborative learning. Nsor-Ambala (2022) found that collaborative formats improved theoretical understanding primarily when peer accountability was explicit a condition the present protocol satisfies structurally through its reciprocal questioning stage, which may explain why the observed effect size sits at the upper end of comparable interventions. Goosen and Steenkamp (2025) similarly found that structured, deliberately designed group-work protocols outperformed loosely organized group work in developing accounting students' collaborative competencies, consistent with the present study's emphasis on externally managed rotation and staged accountability rather than open-ended group discussion.

By contrast, not all group-based interventions in accounting and related disciplines report positive or unambiguous outcomes. Engineer et al. (2021) documented that unstructured group work in an active-learning computing course often produced uneven participation, with some students disengaging entirely while others carried a disproportionate share of the task a dynamic the Card Exchange and Knowledge Tour is specifically designed to prevent through its rotation-based, individually accountable structure. This contrast reinforces the broader point established earlier in this paper: it is the structure of collaboration, not collaboration itself, that determines whether learning gains materialize.

Implementation Challenges

Despite its accessibility, implementation is not without challenges. Coordinating five stations within a fixed 90-minute period requires precise time management; delays at any single station propagate through the rotation schedule and can compress later stages, particularly Stage 4 questioning. Facilitators unfamiliar with the protocol may need one or two practice runs to calibrate rotation timing accurately, and substantially larger classes may require additional stations or co-facilitators to preserve the five-minute exposure window per topic. Instructors adopting the protocol should budget explicit buffer time between stages to absorb these transition delays.

Implications for Practice

Three practical implications follow from these findings. First, the Card Exchange and Knowledge Tour requires no technological infrastructure only knowledge cards, classroom space, and structured facilitation. This is particularly relevant for

universities with limited technological infrastructure: because the protocol requires only paper cards, classroom space, and a basic timing mechanism such as a phone timer or wall clock, it can be implemented in settings without reliable internet access, projector availability, or licensed software conditions that remain common across many Indonesian public university campuses outside major urban centers. Second, the four-stage structure (prepare → rotate → synthesize → question) is topic-agnostic and can be applied to other PSAK topics, PSA auditing standards, taxation frameworks, or any content area with multiple parallel knowledge units requiring cross-integration. Third, the simultaneous gains in conceptual understanding and self-efficacy suggest the protocol operates on motivational as well as cognitive dimensions, a combination that may produce longer-term retention and transfer benefits beyond what immediate post-tests can capture (Nowak et al., 2023). Accounting lecturers adopting this protocol are specifically advised to prepare a facilitator timing script in advance, specifying exact rotation and transition cues, since the intervention's benefits depend on maintaining equal cross-topic exposure across groups.

Limitations

This study has several limitations. The pre-experimental, one-group design lacks a control group, so improvement cannot be definitively attributed to the intervention alone rather than to testing effects, maturation, or other threats to internal validity (Shadish et al., 2002). The sample was limited to 29 matched pairs drawn from a single intact class at one university, which constrains statistical power and limits generalizability beyond similar Indonesian public university contexts. Additionally, because individual demographic characteristics were not collected, potential moderating effects of age, gender, or prior academic performance could not be examined

CONCLUSION

This study demonstrates that a structured, non-digital collaborative learning protocol the Card Exchange and Knowledge Tour can produce significant, practically meaningful gains in undergraduate students' understanding of accounting standards, offering accounting educators an accessible alternative to technology-dependent instructional reform. This study set out to answer a practical question that arose from direct classroom observation: can a structured, non-digital collaborative protocol address the persistent gap between PSAK exposure and PSAK

comprehension? The answer, based on analysis of independently cleaned and matched raw response data from 29 student pairs, is affirmative, and the magnitude of the effect exceeds what single-mechanism active learning interventions typically produce. Proportion-correct scores improved significantly from 73.3% to 82.0% [$t(28) = 2.924$, $p = .007$; $W = 63.5$, $p = .013$], with a medium effect size ($d = 0.543$; $r = 0.460$). Perception data confirmed concurrent gains in student confidence and perceived application ability, supported by reliable instruments ($\alpha = .785–.862$).

These findings carry three distinct contributions. Theoretically, they demonstrate that the structured co-activation of social constructivism, retrieval practice, and peer instruction within a single protocol produces synergistic learning gains exceeding what any single mechanism would generate alone. Empirically, they establish the first quantitative evidence for this specific multi-mechanism integration in accounting standards instruction. Practically, they offer accounting educators particularly those in Indonesian public university settings navigating PSAK–IFRS convergence under variable resource conditions a theoretically grounded, infrastructure-free alternative to technology-dependent approaches. Future research should test this protocol through quasi-experimental designs with matched control groups, assess retention longitudinally at two-week and four-week intervals, and extend testing beyond PSAK to other accounting subjects and institutional settings including auditing standards, taxation, consolidation accounting, private universities, and vocational accounting programs.

REFERENCES

Anghel, E. (2024). Let's do this together: Do the quantity and the quality of collaborative learning predict achievement among college students? Active Learning in Higher Education, 25(2), 227–241. https://doi.org/10.1177/14697874221120783

Birt, J., Safari, M., & De Castro, V. B. (2023). Critical analysis of integration of ICT and data analytics into the accounting curriculum: A multidimensional perspective. Accounting & Finance, 63(4), 4037–4063. https://doi.org/10.1111/acfi.13084

Cohen, J. (1994). The earth is round ($p < .05$). American Psychologist, 49(12), 997–1003. https://doi.org/10.1037/0003-066X.49.12.997

Costley, J., Courtney, M., & Fanguy, M. (2022). The interaction of collaboration, note-taking completeness, and performance over 10 weeks of an online course. The Internet and Higher Education, 52, 100831. https://doi.org/10.1016/j.iheduc.2021.100831

Engineer, R., Naeem Syeda, A., & Simion, B. (2021). A qualitative study of group work and participation dynamics in a CS2 active learning environment. Proceedings of the 26th ACM Conference on Innovation and Technology in Computer Science Education, 25–31. https://doi.org/10.1145/3430665.3456359

Franzoi, L., Cembrani, V., Mulatti, C., & Treccani, B. (2025). Retrieval practice enhances learning in real primary school settings, whether distributed or not. Frontiers in Psychology, 16, 1632206. https://doi.org/10.3389/fpsyg.2025.1632206

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. Proceedings of the National Academy of Sciences, 111(23), 8410–8415. https://doi.org/10.1073/pnas.1319030111

Goosen, R., & Steenkamp, G. (2025). How can course design facilitate the development of teamwork skills for diligent students? Accounting Education, 34(3), 387–409. https://doi.org/10.1080/09639284.2024.2335224

Jayaram, S. (2026). Spaced repetition and active recall improves academic performance among pharmacy students. Currents in Pharmacy Teaching and Learning, 18(2), 102510. https://doi.org/10.1016/j.cptl.2025.102510

Kelley, K., & Preacher, K. J. (2012). On effect size. Psychological Methods, 17(2), 137–152. https://doi.org/10.1037/a0028086

Kelly, O., Hall, T., & Connolly, C. (2023). PACE-IT: Designing blended learning for accounting education in the challenging context of a global pandemic. Accounting Education, 32(6), 626–645. https://doi.org/10.1080/09639284.2022.2090851

Kirk-Johnson, A., Galla, B. M., & Fraundorf, S. H. (2019). Perceiving effort as poor learning: The misinterpreted-effort hypothesis of how experienced effort and perceived learning relate to study strategy choice. Cognitive Psychology, 115, 101237. https://doi.org/10.1016/j.cogpsych.2019.101237

Mazur, E. (1997). Peer instruction: A user's manual. Prentice Hall.

Nestojko, J. F., Bui, D. C., Kornell, N., & Bjork, E. L. (2014). Expecting to teach enhances learning and organization of knowledge in free recall of text passages. Memory & Cognition, 42(7), 1038–1048. https://doi.org/10.3758/s13421-014-0416-z

Nowak, G., Speed, O., & Vuk, J. (2023). Microlearning activities improve student comprehension of difficult concepts and performance in a biochemistry course. Currents in Pharmacy Teaching and Learning, 15(1), 69–78. https://doi.org/10.1016/j.cptl.2023.02.010

Nsor-Ambala, R. (2022). The impact of collaborative learning approaches on assessment outcomes in an accounting theory class. Accounting Education, 31(1), 1–38. https://doi.org/10.1080/09639284.2021.1944232

Paisey, C., Flanagan, C., Bradley, L., McCallum, S., & Zou, Y. (2025). Listen up! Listening skills in accounting education: Gaps and proposed new research and teaching agendas. Accounting Education, 34(1), 126–157. https://doi.org/10.1080/09639284.2023.2301382

Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. Psychological Science, 17(3), 249–255. https://doi.org/10.1111/j.1467-9280.2006.01693.x

Saqr, M., & Alamro, A. (2019). The role of social network analysis as a learning analytics tool in online problem-based learning. BMC Medical Education, 19(1), 160. https://doi.org/10.1186/s12909-019-1599-6

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). Experimental and quasi-experimental designs for generalized causal inference. Houghton Mifflin.

Taggart, J., & Wheeler, L. B. (2025). Collaborative learning as constructivist practice: An exploratory qualitative descriptive study of faculty approaches to student group work. Active Learning in Higher Education, 26(1), 59–76. https://doi.org/10.1177/14697874231193938

Twyford, E., & Dean, B. A. (2024). Inviting students to talk the talk: Developing employability skills in accounting education through industry-led experiences. Accounting Education, 33(3), 296–318. https://doi.org/10.1080/09639284.2023.2191288

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.