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Case-based economics instruction and financial literacy: a quasi-experimental study of tenth-grade students

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ABSTRACT

This study compared financial knowledge scores among tenth-grade pupils receiving case-based or conventional economics instruction. Two intact classes (N = 72) completed a 20-item test before and after two 135-minute lessons. Content appraisal of 20 item specifications by two validators gave a mean Aiken's V of .808; a 35-record item analysis yielded Cronbach's alpha of .877. Mean posttest scores were 77.92 and 67.08, a significant difference of 10.833 points, $t(70) = 3.858$, $p < .001$. ANCOVA controlling for baseline scores estimated a difference of 9.760 points (95% CI [6.618, 12.902]), $F(1, 69) = 38.398$, $p < .001$. However, internal consistency in the study sample was weaker (KR-20 = −.160 at pretest and .485 at posttest). Case-based instruction was associated with higher immediate test scores, but measurement limitations and the use of one nonrandomly assigned class per condition restrict causal interpretation and inferences beyond the financial knowledge domain.

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Introduction

Financial literacy involves understanding financial information and using that knowledge to make informed choices about spending, saving, borrowing, and financial risk. For adolescents, the knowledge component extends beyond recalling terminology to applying concepts in situations they may encounter. The OECD framework for school-age learners emphasises practical financial decisions appropriate to their stage of development (OECD, 2024). Although financial knowledge is related to attitudes, confidence, and behaviour, these dimensions should be distinguished when assessing the outcomes of classroom instruction (OECD, 2023).

Indonesia's 2025 National Survey of Financial Literacy and Inclusion recorded a financial literacy index of 66.46% nationally, compared with 51.68% among people aged 15–17, using the continuity method (Otoritas Jasa Keuangan & Badan Pusat Statistik [OJK & BPS], 2025). These national figures do not describe the students in the present school, but they highlight the importance of strengthening financial education during adolescence. International evidence similarly indicates that many students have difficulty applying their financial knowledge to everyday decisions (OECD, 2024).

Studies of Indonesian adolescents have often examined the household and personal factors associated with financial behaviour. Wulandari et al. (2022) investigated family environment, future orientation, self-control, and saving intentions. Dewi and Suwena (2023) examined gender and pocket money, while Nurdiani and Wardani (2025) focused on family financial education and locus of control. Aszahra et al. (2026) also

investigated financial knowledge, family education, and saving behaviour among vocational students. Although these studies help explain differences in students' financial experiences, they offer limited evidence on how different methods of classroom instruction influence the learning of financial concepts.

Research on the integration of financial education into school lessons provides further context. Ulfah et al. (2021) found that economics teaching included financial topics but did not consistently address potentially harmful financial practices. Nurjanah and Sari (2025) identified constraints related to teaching time and implementation, while Hamidah et al. (2024) reviewed factors associated with adolescents' financial behaviour. Studies by Putri et al. (2025), Bahtiar et al. (2026), and Wijayanto et al. (2025) examined links between financial literacy and consumption or financial management in different populations. Together, these findings distinguish the factors associated with financial behaviour from the instructional practices that support financial understanding. This study focuses on the latter.

At SMAN 1 Sampit, preliminary discussions with economics teachers and students indicated that lessons frequently relied on explanations, note-taking, and routine exercises. Students reportedly found it difficult to apply classroom concepts when managing pocket money, planning savings, or recognising risks in digital financial services. These observations informed the choice of setting and research questions, without being treated as representative estimates of student financial literacy. The school provided two established tenth-grade classes in which the same subject matter could be taught through different approaches.

Case-based learning (CBL) begins with a realistic situation that requires students to identify a problem, seek information, consider alternative actions, and justify a decision. Its emphasis on active inquiry and discussion is consistent with constructivist perspectives on learning (Almulla, 2023). Studies in other fields, particularly higher education, have reported benefits for participation and knowledge acquisition when learners discuss cases collaboratively (Burgess et al., 2021; Sartania et al., 2022; Wu et al., 2023). Their findings provide a theoretical basis for the approach, although differences in learners and assessment contexts limit direct comparisons with secondary school financial education.

Studies in economics education offer a closer comparison, although they address different learning outcomes. Busmachiu and Saunders (2022) described the use of cases in financial management courses. Iswanto et al. (2024) examined critical thinking in school economics, Astuti et al. (2026) investigated economics learning outcomes, and Imran et al. (2026) and Wahyudi et al. (2026) studied active approaches to economics education at university level. This literature supports the use of authentic financial problems in teaching, but leaves a more specific question about their contribution to financial knowledge among secondary school students.

Other Indonesian studies have explored practical learning through different pedagogical approaches. Arifin et al. (2025) combined augmented reality with cooperative learning, Maruao et al. (2026) examined teaching informed by local contexts, and Saputri et al. (2025), Kosasih and Juhana (2025), and Rustiana et al. (2026) explored interactive media or game-based activities. Saputri and Maharbid (2024) and Oktaviani et al. (2026) investigated active learning with younger pupils. These studies indicate the value of meaningful contexts, but differences in age groups, teaching methods, and outcome measures preclude direct comparisons of effectiveness.

Simulations and educational activities outside regular lessons have also been used to introduce financial decisions to secondary students (Sihombing et al., 2025; Tarigan et al., 2026; Istina & Setiawan, 2026). In a broader meta-analysis of 76 randomised experiments, Kaiser et al. (2022) found positive average effects of financial education on knowledge and subsequent behaviour. Salas-Velasco (2022) examined financial knowledge and self-efficacy after an educational intervention, whereas Mishra and Orosz (2026) investigated project-based rather than case-based learning. The evidence supports applied financial instruction while leaving scope to compare a defined CBL intervention with conventional teaching.

Financial knowledge is an investment in human capital (Lusardi & Mitchell, 2023), although its translation into everyday behaviour may depend on social influences and self-efficacy (Riaz et al., 2022). Related research by Wahyuni et al. (2023), Wendy (2024), and Putri and Fatimah (2026) illustrates the distinction between understanding financial concepts and acting on them. The present study assessed knowledge and its application to written scenarios. Actual spending, saving, and other financial behaviours were not measured over time.

Despite the growing literature on financial education, evidence remains limited on how case-based economics instruction compares with conventional teaching in developing financial knowledge among tenth-grade students. To address this gap, the study compared pretest and posttest scores in two intact classes and examined their final scores after accounting for initial performance. The study sought to establish whether the CBL class obtained higher scores on a knowledge-focused assessment, while recognising that a comparison involving two nonrandomly selected classes cannot establish a broadly generalisable causal effect.

Method

The study employed a quantitative quasi-experimental design with a nonequivalent control group and pretest and posttest measurements. Two existing tenth-grade classes were taught the same economics content through different instructional approaches. Neither students nor classes were randomly assigned. Consequently, class characteristics could contribute to differences between the observed outcomes, even after adjustment for pretest scores.

The study was conducted at SMAN 1 Sampit, East Kotawaringin Regency, Central Kalimantan, during the first semester of the 2026/2027 academic year. Two of the twelve tenth-grade classes were selected purposively, considering previous economics assignments, test results, and the teacher's recommendations. Class X.G received CBL (n = 36), whereas class X.F followed conventional instruction (n = 36). All 72 pupils completed both assessments. The pretest provided a quantitative comparison of initial performance; no further demographic characteristics were included as covariates. The sample size was determined by enrolment in the two classes. Under a conventional independent-samples model, 36 pupils per group would provide approximately 80% power to detect a standardised difference of d = 0.67 at a two-sided significance level of .05. This sensitivity estimate does not account for the fact that each teaching condition was delivered to only one class.

The case-based learning programme was delivered in two 135-minute lessons on 16 and 18 September 2026. The first lesson began with a pretest and a discussion of everyday financial choices. Pupils then examined a realistic case involving limited pocket money, identified the central financial problem, analysed income and expenditure, and gathered information about saving, borrowing, investment, financial institutions and financial risk. Working in groups, they compared possible solutions and began preparing a visual presentation of their preferred decision. In the second lesson, the groups refined their proposals, presented and defended their choices, responded to questions, and received clarification of financial concepts. Pupils subsequently reflected on their own financial decisions and completed the posttest at the end of the lesson. The learning sequence followed the lesson plan's six stages of case orientation, problem identification, case analysis, information gathering, development of alternatives, and presentation and argumentation, followed by individual reflection. Worksheets, case materials, student presentations and assessment rubrics supported these activities. The control class covered the same financial topics and received the same total instructional time through explanation, questions, conventional discussion and exercises. A classroom observer used a 25-item checklist at each lesson to assess the implementation of the planned activities, with each item rated from 0 to 4. The observation records covered the lesson openings and closings, the six stages of case-based learning and classroom management. The two lessons were classified as very good under the checklist criteria. The observation ratings were used to describe instructional implementation, not to calculate pupils' financial knowledge scores.

Table 1. Study Group Design

Group	Class	n	Pretest	Instruction	Posttest
Experimental	X.G	36	O_1	CBL, 2 sessions	O_2
Control	X.F	36	O_3	Conventional	O_4

Source: Study design and classroom allocation, 2026.

The primary outcome was a 20-item multiple-choice test of financial knowledge applied to everyday decisions (five points per correct answer; score range 0–100), administered before and after instruction. During instrument development, two specialists rated 20 item specifications on a four-point scale. Mean Aiken's V was .808 (range .667–1.000), with 13 high ratings and seven moderate ratings requiring refinement. A 35-record item analysis yielded Cronbach's alpha of .877 and corrected item–total correlations of .376–.645. Since these estimates concerned the item specifications and a smaller dataset, KR-20 and corrected item–total correlations were also assessed for the 72 pupils' pretest and posttest scores. The assessment covered budgeting, priorities, saving, borrowing, investment, financial institutions and risk; cognitive demands drew on Anderson and Krathwohl (2001). The formative quiz, worksheets and reflections did not contribute to the research test score.

All 72 pupils had matched pretest and posttest records. Descriptive analyses included means, standard deviations, mean changes, and the average of individual normalised gains, calculated as (posttest − pretest)/(100 − pretest). Independent-samples t-tests compared initial and final scores between classes, and paired t-tests assessed changes within each class. ANCOVA was used to compare posttest scores after adjusting for pretest performance, with instructional group as the factor. The assumption of equal regression slopes was examined through the interaction between class and pretest. Shapiro–Wilk and Levene tests assessed distributional and variance assumptions. Sensitivity analyses used heteroskedasticity-robust HC3 standard errors and a Mann–

Whitney comparison of gain scores. All tests were two-sided, with α = .05. As each instructional approach was represented by a single class, student-level inference was interpreted cautiously.

Results and Discussions

The classroom observations provided additional evidence about the delivery of the instructional programme. In the first lesson, the observer recorded the use of a financial case, problem identification, budget analysis, information gathering and initial solution development. The second lesson included further consideration of alternatives, group presentations, clarification of key concepts, individual reflection and administration of the posttest. Both sessions received the highest implementation category, very good, on the observer's 25-item checklist. These observations support the account of how case-based learning was delivered, although they do not establish which particular activity contributed to subsequent test performance.

The average pretest scores were 49.58 (SD = 9.88) in the CBL class and 48.47 (SD = 10.61) in the control class. The difference of 1.11 points was not statistically significant, t(70) = 0.460, p = .647, with a standardised mean difference of d = 0.108. This finding suggests similar performance on the baseline assessment, although other differences between classes may have remained. Following instruction, the mean posttest scores were 77.92 (SD = 10.38) and 67.08 (SD = 13.28), representing increases of 28.33 and 18.61 points. Mean individual N-Gain values were 0.579 for the experimental class and 0.379 for the control class (Table 2).

Table 2. Financial Knowledge Test Scores (Mean and SD)

Measure	Experimental (n = 36)	Control (n = 36)
Pretest, mean (SD)	49.58 (9.88)	48.47 (10.61)
Posttest, mean (SD)	77.92 (10.38)	67.08 (13.28)
Mean gain, points (SD)	28.33 (6.65)	18.61 (6.61)
Mean individual N-Gain (SD)	0.579 (0.154)	0.379 (0.157)

Source: Primary test-score data, 2026.

Shapiro–Wilk tests did not identify significant departures from normality in the unadjusted pretest, posttest, or individual N-Gain distributions for either class (all p > .05). Levene's tests likewise indicated no significant differences in the variances of those scores (Table 3). The ANCOVA residuals, however, showed a departure from normality, W = 0.949, p = .006, while their variances were similar across groups (Levene p = .935). The interaction between class and pretest was not statistically significant, F(1, 68) = 2.946, p = .091, providing no evidence against the assumption of equal regression slopes. The adjusted comparison was therefore reported alongside a sensitivity analysis using robust standard errors.

Table 3. Distributional and Variance Diagnostics (p-values)

Test	Pretest	Posttest	N-Gain
Shapiro–Wilk: experimental	0.105	0.143	0.707
Shapiro–Wilk: control	0.389	0.066	0.283
Levene: between groups	0.480	0.498	0.658

Source: Primary test-score data and statistical analysis, 2026.

The experimental class scored 10.833 points higher on the posttest than the control class (95% CI [5.232, 16.434]), t(70) = 3.858, p < .001. Cohen's d was approximately 0.91. Both classes improved significantly between assessments, with paired t(35) = −25.546 for the CBL class and t(35) = −16.886 for the control class (both p < .001). The difference in mean gains was 9.722 points, t(70) = 6.218, p < .001. A Mann–Whitney comparison of gain scores produced a consistent result (U = 1,095.5, p < .001). These tests describe differences observed among the pupils in the two classes; they do not independently establish an instructional effect across classes or schools.

Table 4. Baseline, Change and Adjusted Group Comparisons

Statistical comparison	Statistic	p-value	Effect or interpretation
Pretest, independent t-test	t(70) = 0.460	.647	Difference 1.111 points (d = 0.108)
Posttest, independent t-test	t(70) = 3.858	< .001	Difference 10.833; 95% CI [5.232, 16.434]

Statistical comparison	Statistic	p-value	Effect or interpretation
Within-group change: CBL	$t(35) = -25.546$	$< .001$	Mean increase 28.333 points
Within-group change: control	$t(35) = -16.886$	$< .001$	Mean increase 18.611 points
Difference in gains	$t(70) = 6.218$	$< .001$	Gain difference 9.722 points
ANCOVA, adjusted for pretest	$F(1, 69) = 38.398$	$< .001$	Adjusted difference 9.760; partial $\eta^2 = .358$

Source: Primary test-score data and statistical analysis, 2026.

After controlling for pretest performance, ANCOVA estimated a 9.760-point posttest advantage for the CBL class (95% CI [6.618, 12.902]), $F(1, 69) = 38.398$, $p < .001$, partial $\eta^2 = .358$. The adjusted means were 77.38 (95% CI [75.16, 79.60]) for the CBL class and 67.62 (95% CI [65.40, 69.84]) for the control class. Partial η^2 reflects the contribution of the group term relative to that term and the residual variation in the model; it should not be interpreted as the percentage of all learning gains caused by the intervention. An analysis using HC3 robust standard errors yielded a similar adjusted contrast (95% CI [6.56, 12.96], $p < .001$). This agreement strengthens confidence in the observed statistical difference but does not remove potential confounding between class membership and instructional approach.

Table 5 summarises the instrument appraisal and results from different test administrations. Two validators rated 20 specifications with a mean Aiken's V of .808 (range .667–1.000); 13 were classified as high and seven as moderate, with refinement recommended. The 35-record item analysis yielded Cronbach's alpha of .877 and corrected item–total correlations of .376–.645. In contrast, KR-20 in the 72-pupil study sample was −.160 at pretest and .485 at posttest, with 11 and three items, respectively, showing negative corrected item–total correlations. Favourable development-stage results thus did not ensure consistent scores during the intervention. These results support interpreting the observed differences as performance on the administered test rather than demonstrated change in every dimension of financial literacy.

Table 5. Instrument Content Appraisal and Internal Consistency

Evidence	Sample or scope	Reported result
Content appraisal (Aiken's V)	2 validators; 20 specifications	Mean .808; range .667–1.000; 13 high, 7 moderate
Item analysis (Cronbach's alpha)	35 records; 20 items	Alpha .877; corrected item–total r .376–.645
Pretest consistency (KR-20)	72 pupils; 20 items	−.160; 11 negative corrected item–total correlations
Posttest consistency (KR-20)	72 pupils; 20 items	.485; 3 negative corrected item–total correlations

Source: Expert ratings (2 validators), 35-record item analysis, and responses from 72 study participants, 2026.

The main finding was a higher immediate financial knowledge test score among pupils taught through CBL. The unadjusted difference was 10.833 points, and the pretest-adjusted difference was 9.760 points. Case activities provided opportunities to apply concepts to budgeting, spending priorities, saving and financial risks. However, the assessment did not generate separate scores for these topics, and reliability in the main sample was weaker than in the initial item analysis. The results therefore cannot identify which aspect of knowledge contributed most to the difference or establish improvements in attitudes and financial behaviour.

Constructivist theory offers a plausible explanation for the observed pattern. The cases required pupils to examine financial dilemmas, calculate available resources, compare options, and justify their choices in discussion. Such activities involve applying, analysing, and evaluating information, as described by Anderson and Krathwohl (2001). They are also consistent with the emphasis on contextual learning and collaborative discussion in Almulla (2023), Burgess et al. (2021), Sartania et al. (2022), and Wu et al. (2023). Although these processes were part of the lessons, the study did not test whether a particular stage or cognitive process mediated the score difference.

The direction of the findings is consistent with research on active economics instruction, although differences in setting and outcome prevent direct comparison of effect sizes. Busmachiu and Saunders (2022) described financial management teaching using cases, Iswanto et al. (2024) examined critical thinking about inflation, and Astuti et al. (2026) investigated economics learning outcomes. Imran et al. (2026) and Wahyudi et al. (2026) considered case-based approaches in higher education. In contrast, the present comparison focused on a short intervention involving secondary pupils and a financial knowledge assessment. The results contribute evidence from this classroom context without establishing that CBL would outperform other active methods in different schools.

Findings from other teaching approaches offer a useful perspective on the role of context. Arifin et al. (2025) combined augmented reality with cooperative learning, Maruao et al. (2026) incorporated local knowledge, and Saputri et al. (2025) developed money management media. Kosasih and Juhana (2025) and Rustiana et al. (2026) considered game-based approaches, whereas Saputri and Maharbid (2024) and Oktaviani et al. (2026) investigated active learning among younger pupils. Sihombing et al. (2025), Tarigan et al. (2026), and Istina and Setiawan (2026) discussed simulations or practical financial decision activities involving adolescents. These studies share an emphasis on meaningful tasks, but their varied designs do not warrant a common estimate of effectiveness.

The control class also showed a substantial increase, gaining 18.61 points on average after conventional instruction on the same topics. This finding accords with evidence that financial education can improve knowledge through different instructional formats (Kaiser et al., 2022; Salas-Velasco, 2022). Mishra and Orosz (2026), for example, studied project-based learning rather than CBL. The contribution of the present comparison lies in the additional gain observed in the CBL class, not in an absence of learning among pupils taught conventionally. Repeated exposure to the test could have influenced both groups, although its contribution cannot be determined from the available design.

The content of the cases was relevant to financial decisions commonly faced by adolescents. Studies by Wulandari et al. (2022) and Aszahra et al. (2026) examined saving among secondary school students, while Dewi and Suwena (2023) and Nurdiani and Wardani (2025) considered pocket money, gender, and family financial education. Putri and Fatimah (2026) investigated saving behaviour, and Hamidah et al. (2024) reviewed research on adolescents' financial decisions. Research on consumption and financial management (Putri et al., 2025; Bahtiar et al., 2026; Wijayanto et al., 2025) further demonstrates why financial knowledge should not be equated with financial behaviour. The present test results do not establish changes in pupils' actual saving, spending, or borrowing practices.

A distinction between knowledge and behaviour is also central to the wider literature. The OECD and OJK frameworks address financial knowledge alongside attitudes, confidence, and behaviour (OECD, 2023, 2024; OJK & BPS, 2025). Riaz et al. (2022) highlighted social influences and financial self-efficacy, while Wahyuni et al. (2023) and Wendy (2024) examined financial management and investment choices in other populations. Lusardi and Mitchell (2023) located financial literacy within the development of human capital. These perspectives suggest that gains in knowledge may be valuable, but the study did not determine whether they subsequently influenced financial decisions.

Several alternative explanations should be considered. Classroom culture, scheduling, differences in teaching delivery, or pupils' responses to an unfamiliar activity may also have affected the results. The pretest scores were similar and ANCOVA adjusted for initial performance, but neither procedure controls for unmeasured class characteristics. Because there was only one class per teaching condition, the statistical tests cannot distinguish a class effect from an effect of the instructional approach. The short interval between tests also allows for possible practice effects. Although expert ratings and the 35-record item analysis were favourable, the lower reliability coefficients in the study sample warrant caution about the magnitude and generalisability of the observed difference.

For classroom practice, the findings support considering authentic financial problems as a way to engage pupils in reasoning about limited resources and competing priorities. Teachers can ask pupils to compare the costs and risks of several options, justify a decision, and reflect on its consequences. This approach can be adapted to the time constraints described by Ulfah et al. (2021) and Nurjanah and Sari (2025), as well as to local contexts discussed by Maruao et al. (2026). Future evaluations would benefit from validated assessment items, observation of both instructional conditions by more than one observer, and follow-up measures of knowledge and financial decision-making.

Overall, the comparison supports a difference in short-term test performance between the two classes. General conclusions about the effectiveness of the instructional approach depend on stronger evidence that the administered test functions consistently and on comparisons across additional classrooms. Subsequent studies should examine refined items, report validity evidence for the final test form, and distinguish classroom effects from instructional effects.

Conclusions

Among the tenth-grade pupils studied, case-based economics instruction was associated with higher immediate financial knowledge test scores than conventional teaching. The posttest difference was 10.833 points, $t(70) = 3.858$, $p < .001$, and the pretest-adjusted difference was 9.760 points (95% CI [6.618, 12.902]), $F(1, 69) = 38.398$,

$p < .001$. Expert appraisal and an initial 35-record item analysis provided encouraging instrument-development evidence, but weaker reliability in the study sample, non-normal ANCOVA residuals, and the use of one class per condition restrict broader inference. Future studies should use refined and independently validated items, include several classrooms per condition, and examine whether the knowledge differences persist and extend to financial behaviour.

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