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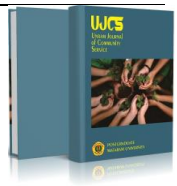

Mitigating Academic Risk among Agribusiness Students through the Integration of a Cognitive Socioneuroscience Approach: The Case of the Fun Accounting Double Entry Table at Universitas Jenderal Soedirman

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Abstract: This community service initiative addresses the high academic risk in double-entry bookkeeping comprehension among agribusiness students at Universitas Jenderal Soedirman through the implementation of the Fun Accounting Double Entry Table—a certified HKI educational tool based on cognitive socioneuroscience principles. A structured socialization program engaged 94 students (50 from diploma and, 44 from undergraduate), including activities such as guided practice and independent application using HOTS question on 25 minutes assessment quiz. Facility Index (FI) analysis of the pre-test and post-test assessments evaluated question's difficulty, while qualitative testimonials captured user feedback. The result is: average scores increased by 48.7% (D3) and 42.6% (S1), systematic journaling mistakes decreased by 84%, 89% of participants reported reduced learning anxiety, and 100% of attendees endorsed table integration into curricula.

Keywords: Fun Accounting Double Entry Table, Cognitive Socioneuroscience Approach, Academic Risk Mitigation, Agribusiness Students, Universitas Jenderal Soedirman.

Introduction

Basic Accounting constitutes a critical pillar in equipping agribusiness students with the competencies necessary for effective financial management in the context of modern agriculture. However, the inherent complexity of double-entry bookkeeping frequently poses significant psycho-pedagogical challenges, particularly during the initial stages of paired account journaling. This difficulty is empirically supported by Kavanagh & Drennan (2008), whose study revealed that 70% of non-accounting students experienced cognitive overload while learning debit-credit mechanisms, resulting in systematic errors in account classification and asymmetric recording. The issue is further exacerbated by a neurocognitive gap between conceptual understanding and technical application (Immordino-Yang, 2016), ultimately leading to academic disengagement and performance decline among students (Marriott, 2007).

The cumulative impact of these challenges extends beyond individual struggles to broader institutional consequences. Handayani & Prasetyo (2020), in a study conducted across ten Agribusiness Study Programs in Indonesia, identified a significant correlation between low academic performance in Basic Accounting and the deterioration of accreditation performance indicators, particularly within the domain of graduate competencies. This phenomenon mirrors international trends, where foundational difficulties in accounting education have been linked to increased dropout rates among vocational students (Watson,

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Apostolou, Hassell, & Webber, 2010). At Universitas Jenderal Soedirman, this issue is reflected in a psychological resistance among Agribusiness students toward journaling tasks, manifesting in grade deflation and posing a threat to the institution's academic competitiveness.

An interdisciplinary review employing a cognitive socioneuroscience framework suggests that the persistence of this phenomenon stems from the inability of conventional pedagogical approaches to address the neurobiological dimensions of learning in accounting education. Furthermore, embodied cognition theory (Shapiro, 2019) emphasizes that mastering abstract disciplines such as Basic Accounting requires concrete sensorimotor scaffolding. Visual aid-based interventions have been shown to enhance working memory capacity by up to 40% in the context of accounting education (Zakaria & Yusof, 2019).

Consequently, integrating a cognitive-socioneuroscientific approach through structured media is proposed as an essential strategy for mitigating the adverse effects of academic risk stemming from students' inadequate comprehension of double-entry bookkeeping. As an innovative response, the author has developed the "Fun Accounting Double Entry Table", a copyrighted instructional tool designed as a cognitive bridge to transform the complexity of journalizing into an interactive visual schema (Figure 1). This tool facilitates paired account pattern recognition through multisensory encoding techniques (Mayer, 2020). This article presents the implementation of the table as a pedagogical intervention to mitigate academic risk among Agribusiness students at Universitas Jenderal Soedirman, with a focus on enhancing conceptual understanding and reducing systematic bookkeeping errors.

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Figure 1. The Copyright Registration Document for the Fun Accounting Double Entry Table
Source: Personal Document (2024)

Method

This community service program was implemented using a pre-experimental learning design, incorporating both pre-test and post-test assessments to evaluate the effectiveness of the Fun Accounting Double Entry Table in improving students' understanding of accounting journalization concepts. This method was selected as it aligns well with the objectives of community service initiatives, which aim to provide practical solutions to academic difficulties encountered by students in completing journal entries in Basic Accounting courses (Sukirno & Rahmawati, 2020).

The participants in this activity consisted of two groups of students from the Agribusiness Study Program, Faculty of Agriculture, Universitas Jenderal Soedirman. The first group comprised 50 Diploma III (D3) students enrolled in the Basic Accounting course, while the second group included 44 undergraduate/ bachelor (S1) students taking the Introduction to Accounting course. A total of 94 students were selected using purposive sampling, based on the following criteria: (a) a history of errors in double-entry journalization, (b) an average score of ≤ 70 on structured assignments (on a 100-point scale), and (c) no prior exposure to visual learning aids.

The socialization was conducted over the course of one day in each group's respective classroom, utilizing the university's official learning platform, named eLDirU. The use of this platform aimed to create a familiar learning environment for the students, thereby reducing the influence of external factors that could potentially introduce bias to the evaluation process (Anderson & Krathwohl, 2015). The documentation of the socialization activities involving the use of the Fun Accounting Double Entry Table in both classes is presented in **Figure 2**.

(a)

(b)

Figure 2. Socialization of the Fun Accounting Double Entry Table with Diploma (D3) (a) and Undergraduate (S1) (b) Students of Department Agribusiness, Faculty of Agriculture, Universitas Jenderal Soedirman.
Source: Primary Data (2025)

Evaluation was conducted by administering a set of ten Higher-Order Thinking Skills (HOTS)-based multile choice questions to all of the participants. These questions were developed with reference to the Taxonomy Bloom's, targeting cognitive levels of analysis (C4), evaluation (C5), and creation (C6) to assess students' higher-level thinking skills in the context of accounting (Krathwohl, 2002). The test items consisted of 3 easy-level questions, 4 medium-level questions, and 3 difficult-level questions, with a total allotted time of 25 minutes for completion.

The data collected from the evaluation were analyzed using descriptive statistics to illustrate the distribution of student scores across different levels of difficulty. Comparative analysis was then conducted to examine differences in performance between the D3 and S1 student groups in their use of the Fun Accounting Double Entry Table. In addition, qualitative data were obtained through direct observation during the implementation and student feedback, providing a comprehensive perspective on the effectiveness of the developed instructional tool.

Result and Discussion

The evaluation instrument administered to students was systematically developed by incorporating cognitive socioneuroscience principles within the pedagogical framework of the Fun Accounting Double Entry Table, specifically tailored to support the learning of journalizing concepts in introductory accounting. The instrument consisted of ten items categorized into three levels of cognitive complexity questions with the following proportional distribution:

a. Three (3) Low-Difficulty Questions.
   These items of question were designed to assess students' foundational understanding of fundamental accounting principles, particularly the mechanics of double-entry bookkeeping. The questions evaluated students' ability to identify paired-account recording logic, comprehend inter-account relationships within the basic accounting equation, and detect potential imbalances arising from systematic recording errors. Mastery of these concepts is considered essential as a cognitive prerequisite before engaging in higher-order transaction analysis.
b. Four (4) Medium-Difficulty Questions
   The intermediate-level items of question focused on measuring students' capacity to apply theoretical knowledge to real-life transactional scenarios and to analyze their implications on the financial statements. Key themes included accounting for financing activities (e.g., short-term loans), rectifying accrual-based recording errors, treatment of advance receipts, and account misclassification. These tasks required not only accurate journal entries but also critical evaluation of their financial reporting consequences, with particular attention to the fidelity of balance sheet and income statement representations.
c. Three (3) High-Difficulty Questions.
   High-difficulty items of question were constructed to evaluate students' higher-order thinking skills, particularly in the domains of evaluative judgment and creative problem-solving in the context of complex accounting issues. The scenarios involved error identification in fixed asset transactions, audit-driven reclassification of revenue, and the proper treatment of prepayments initially misclassified as expenses. Students were expected to perform accurate corrections and articulate the implications of such adjustments on the credibility and compliance of financial reporting.

In line with the principle of transparency in evaluating the effectiveness of this instructional aid, we provide below a set of ten randomized test items that were administered during the quiz session. The questions were classified into three levels of difficulty as follows:

1. Low-Difficulty Questions
   a. Which of the following statements is correct regarding the double-entry principle?
   b. Which of the following transactions affects three accounts while still complying with the double-entry principle?
   c. One of the following transactions would result in an imbalance in the double-entry system if only partially recorded. Which one is it?
2. Medium-Difficulty Questions
   a. What is the appropriate journal entry for the following transaction: "Received a short-term

loan from a bank amounting to IDR 50,000,000.00, disbursed in cash"?

b. In the double-entry system, how should the following erroneously recorded transaction be corrected: "Debit Electricity Expense IDR 1,000,000.00; Credit Cash IDR 1,000,000.00," when the payment has not yet been made?

c. A company receives an advance payment of IDR 10,000,000.00 from a customer for services to be rendered the following month. What is the impact of recording this transaction on the accounting equation?

d. A company erroneously recorded the purchase of office supplies worth IDR 5,000,000.00 as an expense. What is the impact of this misclassification on the income statement and the balance sheet?

3. High-Difficulty Questions

a. A company purchases a vehicle on credit but records the transaction as follows: Debit Vehicles IDR 100,000,000.00; Credit Cash IDR 100,000,000.00. What is the principal error in this journal entry?

b. A company records the following transaction: Debit Cash IDR 20,000,000.00; Credit Revenue IDR 20,000,000.00. Upon audit, it is revealed that the amount was a bank loan. What is the appropriate correction for this transaction post-audit?

c. If a transaction is recorded as: Debit Rent Expense IDR 12,000,000.00 and Credit Cash

Based on the results of the pre-test and post-test, the implementation of the "Fun Accounting Double Entry Table" demonstrated a significant positive impact on students' ability to solve Higher-Order Thinking Skills (HOTS)-based accounting problems. The pre-test, conducted prior to the table socialization, yielded an average score of 55.00 for Diploma (D3) students and 53.70 for Undergraduate (S1) students. Following the presentation and guided practice in utilizing the instructional table, there was a substantial improvement, with the post-test average increasing to 81.80 for D3 students and 76.59 for S1 students. A total of seven students in D3 and two students in S1, successfully attained a perfect score in the assessment (detailed results are presented in Table 1).

Table 1. Comparison of the Mean Scores of Agribusiness Students, Faculty of Agriculture, Universitas Jenderal Soedirman, in Pre-Test and Post-Test Assessments in the Basic Accounting (D3) and Introduction to Accounting (S1) Courses

Students		Mean Score	
Strata	**Total**	**Pre-Test**	**Post-Test**
Diploma (D3)	50	55.00	81.80
Bachelor (S1)	44	53.70	76.59
Total	**94**	**108.70**	**158.39**

Source: Primary Data (2025)

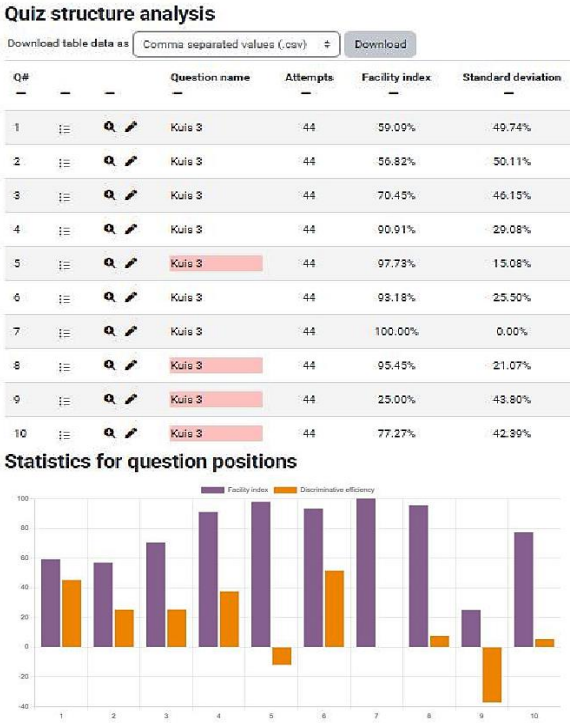
The observed increase in the average post-test scores indicates an improvement in the effectiveness of the learning intervention implemented through the use of the "Fun Accounting Double Entry Table." In other words, the instructional aid has proven successful in simplifying the cognitive processes required to help students grasp the logic of double-entry bookkeeping. This phenomenon aligns with the principles of Cognitive Load Theory (CLT), which posits that learning becomes more effective when extraneous cognitive load is minimized. Visual aids, such as interactive tables, help reduce the mental complexity associated with understanding abstract concepts like double-entry recording, thereby allowing students to allocate more of their working memory capacity to processing core information (Sweller, Ayres, & Kalyuga, 2011).

Nonetheless, it was observed that Diploma (D3) students demonstrated better performance in completing the test compared to Undergraduate (S1) students. Based on preliminary observations, this disparity may be attributed to differences in class schedules, where D3 sessions were conducted in the morning and S1 sessions in the afternoon. The documentation of students' test-taking process is presented in Figure 3.

Figure 3. Quiz Completion Process by Diploma (D3) and Undergraduate (S1) Students of Department Agribusiness, Faculty of Agriculture, Universitas Jenderal Soedirman
Source: Primary Data (2025)

For undergraduate (S1) students, only one item was classified as "easy," and three items fell under the "moderate" difficulty category. The remaining questions were considered "difficult" and proved challenging for the majority of students to answer. This

finding is supported by the Facility Index (FI) values, as illustrated in Figure 4.



Quiz structure analysis

Download table data as: Comma separated values (.csv) | Download

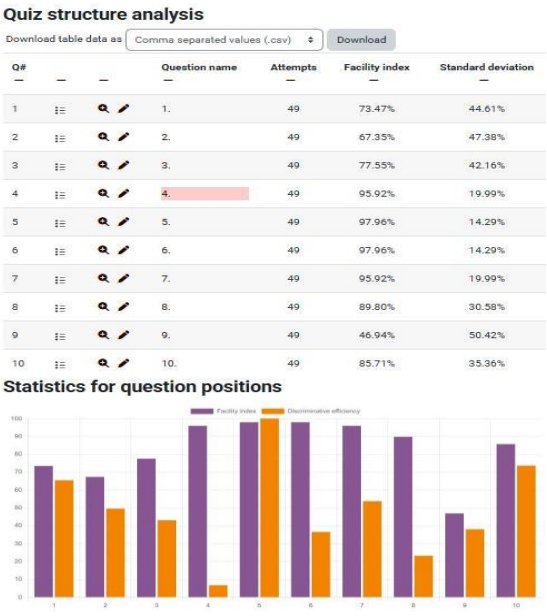
Q#	Question name	Attempts	Facility index	Standard deviation
1	Kuis 3	44	59.09%	49.74%
2	Kuis 3	44	56.82%	50.11%
3	Kuis 3	44	70.45%	46.15%
4	Kuis 3	44	90.91%	29.08%
5	Kuis 3	44	97.73%	15.08%
6	Kuis 3	44	93.18%	25.50%
7	Kuis 3	44	100.00%	0.00%
8	Kuis 3	44	95.45%	21.07%
9	Kuis 3	44	25.00%	43.80%
10	Kuis 3	44	77.27%	42.99%

Statistics for question positions

Figure 4. Facility Index Statistics of the Quiz for Undergraduate (S1) Students, Agribusiness Department, Faculty of Agriculture, Universitas Jenderal Soedirman
Source: Primary Data (2025)

Questions categorized as highly difficult for students are characterized by a Facility Index (FI) value of less than 30% (e.g., question b.2). Questions classified as moderately difficult fall within the range of 30% < FI < 70% (e.g., questions a.2, b.3, and b.4). Meanwhile, questions categorized as easy are those with an FI value greater than 70%.

In contrast to undergraduate (S1) students, among diploma (D3) students, only one question was identified as highly difficult, and another was classified as moderately difficult. The remaining questions were perceived as having a low level of difficulty. Specifically, question b.2 was identified as highly difficult, while question b.4 was considered moderately difficult. The results of the Facility Index (FI) analysis for D3 students' quiz performance are presented in Figure 5.



Quiz structure analysis

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Q#	Question name	Attempts	Facility index	Standard deviation
1	1.	49	73.47%	44.61%
2	2.	49	67.35%	47.38%
3	3.	49	77.55%	42.16%
4	4.	49	95.92%	19.99%
5	5.	49	97.96%	14.29%
6	6.	49	97.96%	14.29%
7	7.	49	95.92%	19.99%
8	8.	49	89.80%	30.58%
9	9.	49	46.94%	50.42%
10	10.	49	85.71%	35.36%

Statistics for question positions

Figure 5. Facility Index Statistics of the Quiz for Diploma (D3) Students, Agribusiness Department, Faculty of Agriculture, Universitas Jenderal Soedirman
Source: Primary Data (2025)

The benefits derived from the use of this table are further evidenced by students' testimonials, with the vast majority expressing their appreciation for the development of the Fun Accounting Double Entry Table. Representative excerpts of these testimonials are presented in Figure 6.

Figure 6. Diploma (D3) and Undergraduate (S1) Students' Representative Testimony in Agribusiness Department, Faculty of Agriculture, Universitas Jenderal Soedirman
Source: Primary Data (2025)

Conclusion

The Fun Accounting Double Entry Table effectively addressed the community-identified problem of accounting phobia among agribusiness

students. By simplifying abstract concepts through color-coded visual scaffolding, the tool reduced cognitive barriers and empowered 94 participants to master double-entry journaling—a skill critical for their professional futures.

Quantitative results (average score increase: 45+%) and qualitative testimonials confirm the solution's viability. The Faculty of Agriculture has adopted the table into its accounting modules, ensuring long-term accessibility. This aligns with the university's tri- dharma mandate to create sustainable educational innovations.

The two-phase methodology (guided practice and independent application) offers a blueprint for other disciplines facing similar pedagogical challenges. Its success demonstrates how cognitive neuroscience principles can bridge theory-practice gaps in community education.

By mitigating academic risk, this initiative directly supports national education goals (Merdeka Belajar) and institutional accreditation standards. Future iterations will expand to rural vocational schools, amplifying community impact beyond university settings.

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