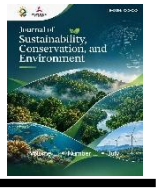
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Is Financial Literacy Associated with Problem-Solving Ability? A Study of Primary Students in Healthy Food Contexts

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abstract

Background: Financial literacy and problem-solving ability are essential competencies for navigating everyday situations.
Aims: This study examined students' performance in both competencies and their association when assessed through healthy food contexts.
Methods: A quantitative correlational design was employed with 265 sixth-grade primary school students. Data were collected using a 10-item financial literacy test and a 10-item contextual problem-solving test. Problem-solving ability was assessed across four stages: understanding the problem, devising a plan, carrying out the plan, and looking back. The data were analyzed using descriptive statistics, the Shapiro-Wilk normality test, and Spearman's rank-order correlation.
Results: The results showed that the Mean performance was 53.09% for financial literacy and 47.43% for problem-solving ability. Students demonstrated a stronger understanding of concrete financial concepts but experienced difficulty prioritizing needs under budget constraints. In problem-solving, performance was strongest in devising a plan, whereas looking back was the most challenging stage. Financial literacy was positively and significantly associated with problem-solving ability (r_s = .312, $p < .001$), although the association was modest.
Conclusions: The findings provide preliminary evidence that the competencies are related but distinct and do not establish causality or actual food-choice behavior. Primary education may benefit from integrating financial literacy with contextual health-related problems while placing greater emphasis on students' evaluative and reflective abilities.

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1. Introduction

Financial literacy has become an increasingly important life competency as children grow up in an economic environment characterized by consumer promotions, digital transactions, diverse product choices, and increasingly complex decision-making. Although primary school

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students do not yet bear the same financial responsibilities as adults, they already interact with money through allowances, saving activities, food purchases, social activities, and simple transactions at school. These experiences position students as emerging economic actors who need to understand how to use, save, and manage resources responsibly. Financial literacy should therefore not be limited to recognizing money or performing calculations; rather, it encompasses the knowledge, skills, attitudes, and ability to apply financial considerations in everyday life (Amagir et al., 2018; Murugiah et al., 2023).

Financial education should begin in primary school because financial values, habits, and decision-making patterns start to develop during childhood. Children acquire financial experience by receiving allowances, discussing money, observing their parents' behavior, and having opportunities to make independent decisions. Financial discussions, parental role-modelling, and parent-child interactions provide learning experiences and contribute to children's financial autonomy (Loke, 2022). Financial education provided by parents during childhood is also associated with healthier financial management behaviors in emerging adulthood (LeBaron et al., 2019). However, children's financial experiences at home vary considerably; schools therefore remain essential in providing systematic, inclusive, and developmentally appropriate financial education.

The Financial Literacy Education Guide published by the Indonesian Board of Educational Standards, Curriculum, and Assessment conceptualizes financial literacy as an integration of the knowledge, skills, behaviors, and attitudes required to make responsible financial decisions. The guide organizes financial literacy into four core elements: earning income; managing budgets, spending, and debt; setting aside income; and managing risks and preparing for emergencies. During Phase C, students are expected to manage personal and collective funds and understand the consequences of their financial decisions (BSKAP Kemdikbudristek, 2024). This policy direction emphasizes that financial literacy should be learned and assessed through contextual problems requiring the application of knowledge rather than solely through questions about financial terminology.

1.1 Financial Literacy among Primary School Students

Previous research indicates that students' financial literacy development is influenced by school education, experience in managing money, family socialization, and opportunities to make decisions. A review of financial education programs for children and adolescents found that school-based instruction can improve financial knowledge and attitudes, particularly when the content is developmentally appropriate and connected to students' real-life experiences. However, evidence of changes in actual financial behavior remains limited, indicating that students need opportunities to apply what they have learned (Amagir et al., 2018). Research involving Malaysian primary school students has similarly highlighted the importance of schools, teachers, and parental involvement, as well as the use of classroom activities and interactive financial games (Murugiah et al., 2023). Collectively, these findings suggest that financial literacy is more likely to develop when students participate in concrete and meaningful learning experiences.

Financial literacy does not necessarily develop evenly across all competencies. A study conducted in Bandung found that primary school students were not yet fully able to manage money independently, distinguish needs from wants, or plan and evaluate the use of their

allowances (Puspitarona et al., 2019). Nevertheless, these abilities are required when students establish priorities, prepare budgets, save toward specific goals, select products, and respond to financial risks. Financial literacy therefore cannot be inferred solely from students' ability to answer factual questions about money. It becomes evident when students use information to determine an appropriate course of action under conditions involving limited resources, multiple alternatives, and different consequences. Accordingly, financial literacy should be assessed through students' ability to apply concepts in decision-making rather than merely through the amount of financial knowledge they can recall.

1.2 Financial Literacy and Problem-Solving Ability

Financial decision-making inherently involves problem-solving processes. When students prepare a budget, establish priorities, compare products, select a saving strategy, or anticipate risks, they must understand the situation, identify relevant information, formulate alternative actions, implement a strategy, and evaluate its consequences. These processes overlap with the four stages of problem-solving: understanding the problem, devising a plan, carrying out the plan, and looking back. When understanding a problem, students identify the objectives, resources, and constraints involved. Devising a plan requires them to compare possible alternatives, whereas carrying out the plan involves applying relevant knowledge and calculations. Looking back requires students to examine the appropriateness of the outcome, consider its consequences, and revise the decision when necessary.

Problem-solving ability does not develop solely through conceptual mastery; it is also influenced by context, information representation, language comprehension, cognitive strategies, metacognition, and self-regulation. Problems grounded in students' everyday lives help them connect concepts with experience and construct more meaningful understanding (Ayuningtyas et al., 2024). Conversely, linguistic complexity and information structure can create difficulties even when students possess the necessary knowledge (Ester et al., 2021). Metacognitive strategies, self-regulation, and feedback that supports planning, monitoring, and reflection also contribute to primary students' problem-solving performance (Arianto & Hanif, 2024; Van Gog et al., 2020; Huang et al., 2024). Project-based and STEM learning produce similar benefits because they engage students in identifying problems, designing solutions, implementing strategies, and evaluating outcomes (Coufal, 2022; Ndiung & Menggo, 2024). Thus, the purposeful, planned, and reflective use of knowledge constitutes a point of convergence between financial literacy and problem-solving ability.

1.3 Healthy Food as an Assessment Context

Healthy food provides an authentic context for assessing financial literacy and problem-solving ability in an integrated manner. In everyday life, students use their allowances to purchase food and beverages. Such situations involve multiple considerations, including health knowledge, price, available funds, taste, appearance, packaging, promotion, peer habits, and product availability. Problems situated in healthy food contexts therefore require students to consider benefits, costs, risks, bodily needs, and the consequences of available alternatives.

Providing allowances can serve as an informal educational opportunity through which children learn to manage money, prepare budgets, identify needs, and plan purchases (Sadeghi et al., 2015; Sansone et al., 2019). However, allowances may also create risks when their use is not accompanied by adequate knowledge and judgment. Research involving children in several

large Chinese cities found that allowance amounts were associated with the consumption of sugar-sweetened beverages, snacks, fast food, and food purchased outside the home (Li et al., 2017). A subsequent longitudinal study found that children who received larger allowances were more likely to consume unhealthy foods and to be overweight or obese (Ma et al., 2020). Research on children's spending decisions also found that sweets and toys were prominent uses of allowance money and recommended integrating financial and health education (Gotwald, 2023).

In this study, healthy food knowledge was linked to primary school content concerning the digestive system. When evaluating food alternatives, students needed to apply their knowledge of bodily needs, food content, hygiene, storage, additives, and the effects of consumption on the digestive system. At the same time, they needed to consider price, budget, product quantity, potential profit or loss, and financial risk. For example, the least expensive option is not necessarily the healthiest, while the most attractive product is not necessarily safe or appropriate. These problems enabled students to use Natural and Social Sciences knowledge to evaluate food, mathematics to calculate prices and budgets, and financial literacy to establish priorities and manage risk. Integrating financial literacy and health education can also support the application of knowledge through problems that are relevant to students' everyday lives (BSKAP Kemdikbudristek, 2024; Ryan, 2020).

In this study, healthy food served only as the context in which the test items were presented. The study did not measure students' actual purchasing, food-selection, or consumption behavior. The findings therefore represent students' financial literacy and problem-solving performance on problems situated in healthy food contexts rather than their eating behavior in everyday life.

1.4 Research Gap and Novelty

Previous research reveals three major tendencies. First, studies of children's financial literacy have predominantly focused on profiles of financial knowledge and behavior, the effectiveness of financial education, family socialization, and experiences of using allowances (Amagir et al., 2018; LeBaron et al., 2019; Loke, 2022; Murugiah et al., 2023; Puspitarona et al., 2019). School-based financial education and savings programs can improve students' financial knowledge, particularly when learning is accompanied by meaningful financial experiences (Sherraden et al., 2011). Financial literacy among children and adolescents is also associated with parent-child communication, socialization agents, bank-account ownership, allowance use, and attitudes toward money (Sohn et al., 2012; Zhao & Zhang, 2020). Receiving and managing allowances from childhood can foster budgeting, planning, and the development of financial habits (Sadeghi et al., 2015; Sansone et al., 2019).

Other research indicates that primary school students become familiar with cash transactions, canteen purchases, allowance management, saving, and digital payments through everyday experience (Sagita et al., 2025). Financial literacy should therefore be developed through contextual learning involving both schools and families (Krisdayanthi et al., 2023). Nevertheless, these studies have generally treated financial literacy as financial knowledge, experience, attitudes, or behavior. Its relationship with students' ability to understand and solve contextual problems remains underexplored.

Second, research on primary school students' problem-solving ability has predominantly been conducted in mathematics, STEM, technology, and project-based learning contexts (Ayuningtyas et al., 2024; Coufal, 2022; Huang et al., 2024; Ndiung & Menggo, 2024). This body of research emphasizes understanding problems, formulating strategies, implementing solutions, and evaluating outcomes. Financial literacy has also begun to be integrated into mathematics, STEM, and contextual learning media (Sagita et al., 2025; Sumarno et al., 2024; Yin et al., 2025). However, these studies have generally evaluated improvements in financial literacy or instructional effectiveness. Financial knowledge and budget constraints have rarely been examined as cognitive resources that primary school students use to solve problems.

Third, research on children's allowances and food has generally focused on purchasing patterns, eating behavior, weight status, and health risks (Gotwald, 2023; Li et al., 2017; Ma et al., 2020). Students also allocate a substantial proportion of their allowances to food and beverages, while their money management is influenced by family, peers, and self-control (Vhalery & Aimon, 2018). These studies demonstrate that access to and use of money are associated with children's food choices. However, previous research has paid limited attention to the cognitive processes through which students interpret information, consider budget constraints, compare food alternatives, and evaluate the consequences of their choices.

Comparing these three strands reveals a more specific research gap. Financial literacy research has rarely treated problem-solving ability as a related cognitive competency. Conversely, problem-solving research has seldom incorporated financial knowledge and considerations into contextual problems. Meanwhile, studies of children's money use and food have focused more on consumption behavior and health outcomes than on problem-solving processes. Consequently, empirical evidence remains limited regarding the relationship between financial literacy and problem-solving ability when both competencies are assessed within the same healthy food context.

Conceptually, financial literacy and problem-solving ability involve overlapping cognitive processes. Financial literacy requires students to identify and interpret information, distinguish needs from wants, establish priorities, prepare budgets, compare alternatives, and consider risks and consequences. These abilities are related to complex financial planning and decision-making processes (Yeh, 2023). Similar processes are required when students understand a problem, devise a solution, carry out the plan, and review the result. These shared cognitive processes provide the theoretical basis for hypothesizing a positive association between financial literacy and problem-solving ability. Nevertheless, this relationship may also be influenced by other factors, including numeracy, reading comprehension, financial experience, health knowledge, and family background.

This study addresses the gap through a contextual assessment integrating financial literacy and problem-solving ability in healthy food situations among sixth-grade primary school students. Financial literacy was assessed using ten items representing sources of income, obligations associated with income, prioritization of needs, budgeting, shopping behavior, social expenditure, borrowing and lending, saving, inflation, and risk and uncertainty. Problem-solving ability was assessed using ten items based on the stages of understanding the problem, devising a plan, carrying out the plan, and looking back. The items were situated in contexts involving school canteens, menu and budget planning, label reading, product improvement, food sales, packed-lunch programs, and digestive disorders. These contexts served as

assessment situations and were not intended to measure students' actual food-purchasing or consumption behavior.

The novelty of this study lies in examining the relationship between two established competencies through a shared assessment context. Unlike previous research that has examined financial literacy, problem-solving, or food choices separately, this study employed authentic problems combining economic and health considerations. Healthy food was not merely a background for the items; it created interdisciplinary problems requiring students to integrate financial, mathematical, and health-related information. The study does not propose a new construct or seek to establish causality; rather, it provides preliminary evidence regarding the direction and strength of the association between financial literacy and problem-solving ability among primary school students.

On the basis of this gap, the study aimed to: (1) describe sixth-grade students' financial literacy across the assessed indicators; (2) describe their problem-solving ability across the stages of understanding the problem, devising a plan, carrying out the plan, and looking back; and (3) examine the relationship between financial literacy and problem-solving ability in healthy food contexts.

2. Methods

2.1 Research design

This study employed a quantitative approach with a correlational design. The design was used to describe students' financial literacy and problem-solving ability and to examine the relationship between the two variables without introducing an intervention or manipulating learning conditions. Financial literacy was treated as the first variable and problem-solving ability as the second. Both variables were measured concurrently using tests situated in healthy food contexts. A correlational design was selected because the purpose was not to establish causality but to identify the direction, strength, and statistical significance of the association between financial literacy and problem-solving ability among primary school students (Cohen et al., 2007).

The unit of analysis was the individual student. Each student's financial literacy and problem-solving scores were paired using a respondent code, and the relationship between the two scores was then analyzed across the full sample. Because the participants came from four schools, supplementary analyses compared descriptive patterns and correlations within each school as a sensitivity check for possible school-context variation. The school-level results were not used to infer causal differences between schools but to examine whether the direction of the association was consistent across groups.

2.2 Research procedures

The study was conducted in four stages. The first stage involved developing the assessment framework. The financial literacy indicators were adapted from the Financial Literacy Education Guide: Implementation Guidelines for Educational Institutions and Stakeholders, particularly the Phase C competencies. The indicators covered earning income; managing budgets, spending, and debt; setting aside income; and managing risk and preparing for emergencies (BSKAP, 2024). The problem-solving indicators were organized around four

processes: understanding the problem, devising a plan, carrying out the plan, and looking back at the solution (Yayuk & Husamah, 2020).

The second stage involved developing the test items. All indicators were operationalized as multiple-choice items situated in contexts involving healthy food, school canteens, Market Day, nutrition labels, environmentally friendly packaging, budgeting, food sales, and digestive disorders. Using shared contexts enabled financial literacy and problem-solving ability to be assessed through situations relevant to students' everyday lives.

The draft instruments were subsequently reviewed by two experts in primary education and learning assessment. The review addressed item-indicator alignment, conceptual accuracy, language readability, the plausibility of response options, and the developmental appropriateness of the contexts. The instruments were revised in response to the experts' recommendations before data collection.

The third stage involved administering the tests in May 2025. Before administration, the researchers coordinated with the school principals and classroom teachers to schedule the sessions, prepare the rooms, and explain the procedures. Students were informed that the tests were administered for research purposes and would not affect their final subject grades. The paper-based tests were completed in approximately 30 minutes under the supervision of the researchers and/or teachers. The final stage comprised checking responses, scoring, verifying the data, and conducting the statistical analyses.

2.3 Participants

The participants were 265 sixth-grade students from four public primary schools in Bandung, Indonesia. They were recruited through convenience sampling based on school accessibility and willingness to participate. The inclusion criteria were: (1) enrollment in Grade 6 during the 2024-2025 academic year; (2) participation in the complete test administration; and (3) complete response data for both instruments.

2.4 Data collection

Data were collected using two multiple-choice tests. The financial literacy test comprised 10 items assessing students' understanding of income patterns, obligations associated with income, prioritization of needs and budgeting, responsible shopping, allocation of social expenditure, responsible borrowing and lending, saving methods, inflation, and preparedness for risk and uncertainty (BSKAP Kemdikbudristek, 2024).

The problem-solving test also comprised 10 items: two assessing understanding the problem, three assessing devising a plan, two assessing carrying out the plan, and three assessing looking back. The multiple-choice format was used to assess students' ability to identify information, select strategies, apply knowledge, and choose an appropriate evaluation or revision in structured situations. The instrument was not intended to capture students' complete cognitive and metacognitive processes directly.

2.5 Data analysis

Data analysis proceeded in three stages. First, the dataset was screened for incomplete responses, duplicate records, out-of-range scores, and inconsistencies between the number of correct responses and total scores. Second, descriptive statistics were calculated, including sample size, mean, standard deviation, median, score range, and percentage of correct

responses. Item-level percentages were used to identify competencies that students had relatively mastered and aspects that remained difficult. Problem-solving ability was also summarized across the four stages of understanding the problem, devising a plan, carrying out the plan, and looking back.

Third, score distributions were examined using the Shapiro-Wilk test and skewness statistics. The results indicated that the financial literacy and problem-solving scores were not normally distributed. The relationship between the two variables was therefore examined using Spearman's rank-order correlation. Spearman's correlation is a rank-based nonparametric technique appropriate when the assumptions of Pearson's correlation are not met and is less sensitive to extreme scores (Field, 2018).

All tests were two-tailed with a significance level of .05. Correlation coefficients were interpreted in terms of direction, strength, and statistical significance. The value of r_s^2 was also calculated as a descriptive estimate of the proportion of shared rank variance between the variables. It was not interpreted as a causal coefficient of determination. All findings were understood as statistical associations rather than evidence that financial literacy causes changes in problem-solving ability.

3. Results

Preliminary screening was conducted to verify response completeness, score consistency, and the distributional characteristics of the data. The screening results and descriptive statistics for both variables are presented in Table 1.

Table 1. Overview of the Research Data

Variable	N	Mean	SD	Min.	Max.	Shapiro-Wilk	p
Financial Literacy	265	5.31	1.80	1	9	0.965	<0.001
Problem-Solving Ability	265	4.74	2.03	0	9	0.963	<0.001

Table 1 indicates that students' performance in both competencies was approximately half of the maximum possible score. Financial literacy appeared to be slightly more developed than problem-solving ability, although the difference was small. The wide score ranges indicate substantial variation among students. The absence of perfect scores on either test also suggests that the items remained challenging for higher-performing students. Both score distributions deviated significantly from normality; consequently, Spearman's correlation was used for the primary analysis.

3.1 Financial Literacy Performance

An item-level analysis was conducted to identify the aspects of financial literacy that students had relatively mastered and those that remained challenging. The results are presented in Figure 1.



Figure 1. Students' Financial Literacy Performance

The pattern shown in Figure 1 indicates that students more readily understood financial decisions involving a direct and concrete relationship between an action and its consequences. This pattern was evident in responsible borrowing and lending and in selecting appropriate saving strategies. In contrast, students experienced greater difficulty when required to prioritize multiple needs within a limited budget. Difficulties also arose when decisions required them to consider financial obligations, social interests, health, environmental concerns, and affordability simultaneously.

Differences in performance across components indicate that students' financial literacy had not developed evenly. Understanding one financial concept did not necessarily correspond with the ability to prioritize expenditures or evaluate the quality of purchasing decisions. Planning and multidimensional judgment therefore appeared more challenging than recognizing financial principles with direct and observable consequences.

3.2 Problem-Solving Performance

Problem-solving ability was analyzed across four stages: understanding the problem, devising a plan, carrying out the plan, and looking back. The item-level results and average performance at each stage are presented in Figure 2.

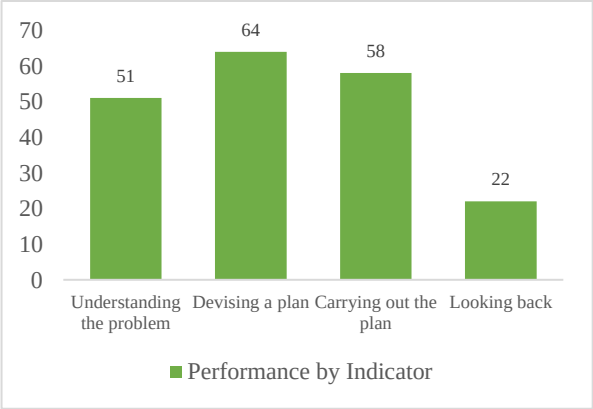


Figure 2. Students' Problem-Solving Performance

Figure 2 shows that students were more successful when asked to devise solutions involving relatively concrete steps. Their performance declined when implementation required consideration of more than one objective. Differences in the understanding stage further suggest that success depended on the complexity of the information to be compared. Identifying an explicitly stated problem was easier than determining product inefficiency from a combination of ingredients, price, and packaging.

Looking back was the most challenging stage. Students did not consistently use implementation data to evaluate success, identify the causes of problems, and formulate recommendations for improvement. This pattern suggests that students were more proficient in generating an initial plan than in evaluating its quality and consequences. Their reflective and evaluative abilities therefore appeared to be less developed than their ability to devise an initial course of action.

3.3 Relationship Between Financial Literacy and Problem-Solving Ability

The relationship between financial literacy and problem-solving scores was examined using Spearman's rank-order correlation. The results are presented in Table 2.

Table 2. Relationship Between Financial Literacy and Problem-Solving Ability

Spearman's Correlation			
N	r_s	p	r_s^2
265	.312	< .001	.097

Table 2 supports the research hypothesis that financial literacy is positively and significantly associated with problem-solving ability. Students with stronger financial literacy tended to demonstrate stronger problem-solving ability. However, the association was modest, indicating that the competencies were related but did not represent the same underlying ability. Most variation in problem-solving ability was likely associated with factors not measured in this study. Moreover, the result represents a statistical association and cannot be used to infer causality.

4. Discussion

4.1 Financial Literacy in Healthy Food Contexts

The first finding indicates that students' financial literacy had not developed optimally and was uneven across its components. Students were relatively more successful in solving problems involving direct relationships between financial actions and their consequences, such as borrowing responsibly and saving toward a specific goal. In contrast, they encountered greater difficulty when required to prioritize needs, prepare a limited budget, select products wisely, and allocate funds for social purposes. This pattern suggests that knowledge of basic financial principles does not necessarily translate into the ability to apply those principles to decisions involving multiple considerations. This interpretation is consistent with the conceptualization of financial literacy as a combination of knowledge, attitudes, behavior, and the ability to use information in decision-making rather than merely mastery of financial terms or calculations (Amagir et al., 2018; BSKAP Kemdikbudristek, 2024; Kaiser & Menkhoff, 2020).

Students' stronger performance on borrowing and saving concepts may be explained by the concrete and familiar nature of these problems. In borrowing scenarios, the relationship among receiving money, the obligation to repay it, and the borrower's responsibility can be recognized directly. Similarly, saving problems present relatively clear goals, amounts, and time periods. These structures help students focus on one primary relationship. Murugiah et al.,

(2023) showed that primary school students can develop financial understanding when learning content is connected to familiar experiences and delivered through interactive activities. Loke (2022) also explained that managing allowances and gift money provides experiential learning that can foster children's financial autonomy. Thus, familiarity with the problems may have helped students activate their existing financial knowledge (Loke, 2022; Murugiah et al., 2023; Sadeghi et al., 2015; Sansone et al., 2019).

In contrast, establishing budget priorities required students to compare several expenditure components, distinguish needs from wants, calculate total costs, and ensure that their decisions remained aligned with the intended purpose of an activity. Difficulties in this area are consistent with Puspitarona et al. (2019), who found that primary school students were not yet fully able to manage money independently, distinguish needs from wants, or plan and evaluate the use of their allowances. This finding suggests that experience in using money does not necessarily develop budgeting ability unless students are given opportunities to justify their choices, compare alternatives, and evaluate the consequences of their decisions.

The gap between students' understanding of concrete concepts and their ability to establish priorities also has implications for the attainment of Phase C competencies. At this stage, students are expected to manage personal and collective funds, establish priorities, spend responsibly, and understand the consequences of financial decisions (BSKAP Kemdikbudristek, 2024). The importance of integrating financial education into school curricula is also supported by evidence of its contribution to students' financial understanding and management behavior (Senduk et al., 2024).

The findings indicate that students' performance had not yet fully met these expectations, particularly when problems could not be solved using a single straightforward rule. This pattern is consistent with evidence that school-based financial education is more meaningful when students have opportunities to apply financial knowledge through authentic activities (Amagir et al., 2018; Sherraden et al., 2011). However, improvements in knowledge and attitudes do not necessarily translate into changes in actual behavior. This reinforces the need for learning activities that require students to apply financial concepts through simulations, projects, and contextual problems.

The healthy food context further increased the complexity of financial decision-making. When addressing food-related problems, students had to consider not only price but also nutritional content, hygiene, safety, packaging, shelf life, bodily needs, and potential effects on the digestive system. They therefore needed to balance affordability with product quality and safety. Empirical evidence indicates that financial autonomy does not necessarily lead to healthy consumption decisions. Li et al. (2017) found that the amount of allowance received was associated with the frequency of consuming sugar-sweetened beverages, snacks, fast food, and food purchased outside the home. A similar relationship was identified longitudinally by Ma et al. (2020), who found that children receiving larger allowances were more likely to consume unhealthy foods and to be overweight or obese. Gotwald (2023) further reported that children tended to spend their allowances on sweets and other appealing products. Collectively, these findings suggest that education about money management should be connected with health education so that children’s financial autonomy is accompanied by the ability to evaluate the consequences of their consumption choices.

Lower performance on prioritization and budgeting problems should therefore not be interpreted solely as a weakness in financial calculation. It may also indicate that students were not yet able to integrate economic, health, social, and environmental considerations into a single decision. Financial practices grounded in values and sustainability require individuals to consider the long-term use of resources rather than only the immediate benefits of a purchase (Kurniadi et al., 2025). Among primary school students, this integration should be developed gradually through situations requiring them to compare price and quality, justify their choices, predict consequences, and consider alternative decisions when available resources change.

4.2 Problem-Solving Ability in Healthy Food Contexts

The second finding indicates that students' problem-solving ability was not equally developed across the four stages. Students were relatively more successful when devising solutions involving concrete steps but experienced difficulty when required to look back, evaluate outcomes, identify the sources of problems, and formulate data-based improvements. This pattern suggests that students were better prepared to generate an initial course of action than to determine whether that action was effective, safe, and consistent with the intended objective. In other words, problem-solving appeared to be understood primarily as selecting an action rather than as a cyclical process involving examination and revision.

Students' stronger performance in devising a plan may have been influenced by the multiple-choice format, which explicitly provided several possible courses of action. Students could identify a seemingly logical plan by matching the problem with an appropriate sequence of steps. Looking back, however, required more complex processing because students had to relate outcomes to the initial objectives, identify discrepancies, determine possible causes, and propose necessary changes. Huang et al. (2024) showed that primary school students' problem-solving performance is related to self-regulation during the solution process. Feedback supporting planning, monitoring, and reflection can improve problem-solving performance. Explicit strategy instruction in self-regulation has likewise been shown to help primary school students use learning strategies more effectively and improve their academic performance (Lee et al., 2023). This interpretation is also supported by research identifying metacognitive strategies, monitoring, and evaluation as important contributors to successful problem-solving (Arianto & Hanif, 2024; Van Gog et al., 2020). From this perspective, difficulty in looking back may reflect limitations in monitoring and reflective strategies rather than merely insufficient knowledge of food or financial concepts.

Differences across the items assessing problem understanding also indicate that students' success was influenced by how information was represented. Students found it easier to identify a problem when the essential information was explicitly stated in the narrative. In contrast, they experienced difficulty when required to compare production costs, ingredients, coloring agents, and packaging types to determine which product was less efficient. Such problems require the simultaneous integration of several pieces of information and the application of multiple evaluative criteria. Research has shown that performance on verbal problems is influenced by linguistic structure and students' ability to construct an appropriate representation of the problem (Ester et al., 2021). Other evidence indicates that authentic contexts can facilitate understanding, although their effectiveness depends on students' ability to connect contextual information with relevant concepts (Ayuningtyas et al., 2024). Understanding a problem should

therefore encompass not only identifying an explicit problem statement but also organizing information and recognizing relationships among its components.

The substantial difficulty encountered during looking back indicates that problem-solving instruction should devote greater attention to evaluative activities. In classroom practice, the process often ends once students have obtained an answer or produced an output. However, the quality of problem-solving also depends on the ability to examine the underlying reasoning, test the suitability of a solution, and revise it when necessary. A systematic review similarly indicates that instructional support should encompass all phases of self-regulation-planning, performance, and reflection-rather than focus only on the final solution (Heikkinen et al., 2023). Piñeiro et al. (2021) identified intervention when students reach an impasse, discourse during problem-solving, resource selection, and process assessment as important components of pedagogical knowledge for teaching problem-solving. Teachers should therefore design activities that require students not only to provide answers but also to question the basis of their decisions and reassess their effectiveness.

Evaluation is particularly important in the context of healthy food because an economically profitable solution is not necessarily healthy, safe, or sustainable. High sales of a product, for example, do not automatically indicate that the product should be maintained when it contains unhealthy ingredients, is handled unhygienically, is stored improperly, or causes digestive problems among consumers. Conversely, a healthy product must also be evaluated in terms of price, shelf life, packaging, and affordability. Students should therefore be given opportunities to compare outcomes with objectives, analyze data, identify unintended consequences, and revise their decisions accordingly.

The healthy food context also demonstrates that problem-solving ability can be developed through cross-curricular integration. Students can apply their Natural and Social Sciences knowledge to evaluate food and its relationship with the digestive system, mathematical knowledge to calculate costs and profits, and financial literacy to establish priorities and manage risks. Project-based learning can provide an appropriate environment for such integration. Ndiung & Menggo (2024) found that project-based learning improved primary school students' mathematical problem-solving ability by engaging them in investigation and solution development. Coufal (2022) similarly demonstrated that STEM projects can develop problem-solving competencies applicable both to academic learning and everyday life. Projects involving healthy menu planning, school canteen budgeting, or food product evaluation could therefore be used to develop all stages of problem-solving in an integrated manner.

4.3 Relationship Between Financial Literacy and Problem-Solving Ability

The principal finding indicates that students who were better able to understand and apply financial concepts also tended to perform better on problems situated in healthy food contexts. This pattern supports the proposition that applying financial knowledge involves problem-solving because students must identify objectives and constraints, select relevant information, compare alternatives, implement strategies, and evaluate consequences. Financial planning and decision-making also require individuals to consider objectives, alternatives, resources, and consequences in an integrated manner (Yeh, 2023). Definitions of financial literacy that emphasize applying knowledge to manage resources and make decisions similarly point to cognitive processes that overlap with problem-solving (Zhu, 2025).

The relationship between the two competencies may be explained by their shared cognitive processes. Financial literacy requires students to read information, perform calculations, interpret data, consider risks, and select an appropriate course of action. Problem-solving involves similar processes, particularly when problems are situated in economic contexts. Students who understand budgeting, saving, inflation, borrowing, and risk possess a stronger knowledge base for comparing possible solutions. Conversely, students who can organize information, devise strategies, monitor implementation, and evaluate outcomes may be better able to apply their financial knowledge purposefully. Huang et al. (2024), in examining self-regulation in problem-solving, and Pitthan & De Witte (2025), in examining awareness of cognitive biases in financial education, both demonstrated that decision quality is influenced by students' ability to monitor and evaluate their thinking.

Although statistically significant, the observed association has limited practical significance. This indicates that financial literacy and problem-solving ability are related but distinct competencies. Problem-solving performance is also likely associated with reading comprehension, numeracy, knowledge of food and the digestive system, experience with contextual problems, and metacognitive strategies. Linguistic complexity and information presentation can further affect students' success in understanding a problem (Ester et al., 2021). The relationship should therefore be understood within a broader network of knowledge, skills, and experience rather than as a causal relationship.

Family and school factors may also help explain the modest strength of the association. Children acquire different financial experiences through allowances, financial conversations, parental role modeling, and the degree of autonomy granted by parents (Loke, 2022; Sohn et al., 2012; Zhao & Zhang, 2020). Loke (2022) showed that financial discussions, role modeling, and parent-child interactions contribute to experiential financial learning. LeBaron et al. (2019) likewise found that parental financial education during childhood was associated with healthier financial management behavior in emerging adulthood. At school, opportunities to engage with authentic problems and the quality of teacher support may influence the development of students' problem-solving strategies (Huang et al., 2024; Ndiung & Menggo, 2024). Variation in family experiences, learning opportunities, and foundational abilities may therefore have limited the strength of the association between financial literacy and problem-solving scores.

This study extends previous research that has generally examined financial literacy and problem-solving separately. Amagir et al. (2018) focused on the effectiveness of financial education programs in improving financial knowledge, attitudes, intentions, and behavior. Studies by Puspitarona et al. (2019), Loke (2022), and (Murugiah et al., 2023) primarily described financial literacy profiles, experiences of using money, and the roles of families and schools. In contrast, Coufal (2022), Huang et al. (2024), Ayuningtyas et al. (2024), and Ndiung & Menggo (2024) investigated problem-solving in mathematics, STEM, technology, or project-based learning contexts. The present study connects these areas by showing that financial literacy is associated with how students solve problems that integrate prices, budgets, food quality, health, and risk.

The healthy food context makes a distinctive contribution by providing interdisciplinary problems that combine financial and health considerations. Li et al. (2017) and Ma et al. (2020) showed that the receipt and amount of allowances were associated with children's food choices and health risks. However, those studies focused primarily on relationships among allowances,

consumption behavior, and weight status. The present study complements this literature by examining the association between financial literacy and problem-solving ability through problems situated in healthy food contexts. Nevertheless, because the study employed a correlational design and hypothetical test situations, the findings do not establish that financial literacy causes healthier food choices or stronger problem-solving ability.

4.4 Implications for Learning and Assessment

The association between financial literacy and problem-solving ability suggests potential value in integrating financial literacy into Natural and Social Sciences, mathematics, character education, and project-based activities. Such integration requires cross-curricular collaboration and teachers' readiness to teach financial literacy as a twenty-first-century competency (Ranta et al., 2022). In healthy food contexts, students could be asked to design menus within a specified budget, compare prices and food content, calculate production costs, determine selling prices, manage profits, and evaluate product safety and sustainability. These activities could provide opportunities to apply financial concepts while practicing how to understand problems, devise strategies, carry out plans, and evaluate outcomes. The integration of financial literacy into mathematics, STEM, and health contexts is also supported by previous contextual-learning research (Ryan, 2020; Sumarno et al., 2024; Yin et al., 2025). Meta-analytic evidence indicates that problem-based learning can support cross-disciplinary problem-solving through cognitive engagement and the application of knowledge in contextual situations (Yuhana & Fajari, 2025). Experiential approaches are consistent with the recommendations of Amagir et al. (2018), while the use of projects is supported by Coufal (2022) and Ndiung & Menggo (2024).

Instruction should also place greater emphasis on looking back. After students make a decision, teachers can ask them to explain the basis for their choice, compare the outcome with the intended objective, anticipate consequences, and revise their strategy. Questions such as 'Would this choice remain appropriate if ingredient prices increased?', 'What if the product did not sell out?', and 'Is the least expensive option also safe for the digestive system?' can activate monitoring and reflection. Feedback directed toward self-regulatory processes can help students examine their thinking and improve their solution strategies (Huang et al., 2024). Such activities may help extend financial literacy beyond calculation to include critical and responsible judgment.

Family involvement should also be incorporated into financial literacy instruction. Teachers could assign simple activities in which students discuss budgets, allowances, needs, and food choices with their parents. These activities should not be intended to compare families' economic circumstances but rather to provide students with experience in explaining their reasoning and considering consequences. This recommendation is supported by evidence regarding the role of financial discussions, role-modelling, and parent–child interactions in financial socialization (LeBaron et al., 2019; Loke, 2022). Given the diversity of students' family circumstances, schools should ensure that such activities do not require students to possess a particular amount of money or access specific financial products.

In assessment, multiple-choice questions can support initial competency mapping but are insufficient for revealing students' reasoning, strategies, and error patterns. Assessments should therefore be supplemented with open-ended questions, written justifications, interviews, reflective journals, or performance tasks. Project-based assessments, such as healthy menu

planning or Market Day activities, can evaluate students' ability to manage budgets, compare alternatives, collaborate, respond to changing conditions, and evaluate outcomes. In addition to final answers, assessment rubrics should address the accuracy of problem identification, relevance of selected information, coherence of the strategy, consistency of implementation, and quality of evaluation and revision. This approach is consistent with financial literacy education that integrates knowledge, skills, behavior, and attitudes in both curricular and co-curricular activities (BSKAP Kemdikbudristek, 2024).

5. Limitations

This study has several limitations. First, its cross-sectional design identifies statistical associations but cannot establish that financial literacy causes improvements in problem-solving ability. Second, participants were drawn from four schools within a single geographical context, so generalization to the wider population of primary school students should be undertaken cautiously. Third, each variable was measured using only ten multiple-choice items. The limited number and breadth of the items, together with the instruments' relatively weak internal consistency, may have reduced measurement precision and attenuated the estimated association. Fourth, the multiple-choice format could not reveal students' reasons for selecting responses, the strategies they used, or the types of errors they made. Fifth, both variables were measured using the same instrument format, item context, and data-collection occasion. This methodological similarity may have introduced shared-method bias, such that part of the association between scores may reflect measurement characteristics rather than the relationship between the competencies themselves. Sixth, the healthy food contexts were hypothetical, and students' responses may not represent their actual purchasing and consumption behavior. Seventh, the study did not control for other factors, including numeracy, reading comprehension, nutritional knowledge, socioeconomic status, experience in managing money, family financial socialization, and prior financial education.

Future research should employ instruments with a larger and more representative set of items, recruit broader samples, combine tests with performance tasks or interviews, and account for relevant individual and contextual variables. Longitudinal or experimental studies are also needed to determine whether financial literacy education can improve problem-solving ability over time. In light of these limitations, the findings are primarily generalizable to upper-primary students whose characteristics are relatively similar to those of the participants. The study provides preliminary evidence that financial literacy and problem-solving ability are associated when assessed through healthy food contexts, but the strength and form of this relationship require further examination across more diverse populations, contexts, and measurement methods.

6. Conclusion

This study shows that primary school students' financial literacy and problem-solving ability were not yet optimally or evenly developed across the assessed indicators. Students demonstrated greater competence on financial problems involving direct relationships between actions and consequences, such as responsible borrowing and goal-oriented saving. In contrast, they experienced difficulty prioritizing needs, preparing limited budgets, and simultaneously considering economic, health, social, and environmental factors. In problem-solving, students

performed better in devising solutions than in evaluating outcomes and proposing improvements. Financial literacy was positively and significantly associated with problem-solving ability, although the association was modest. These findings indicate that financial literacy and problem-solving are distinct but related competencies when assessed through healthy food contexts. The observed association suggests potential value in integrating financial literacy with Natural and Social Sciences, mathematics, health education, and project-based activities involving budgeting, comparison of alternatives, consideration of consequences, and review of solutions. However, the findings do not demonstrate that financial literacy causes improvements in problem-solving ability or leads to healthier food choices. Future research should employ more comprehensive instruments, include more diverse school contexts, and combine tests with performance tasks, open-ended questions, or interviews to provide deeper insight into students' reasoning processes.

Author Contributions

Author A conceived and designed the study. Author B, C, and D collected and analyzed the data. Author A and Author E wrote and revised the manuscript. All authors have read and approved the final version of the manuscript.

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