Southeast Asia Mathematics Education Journal
Volume 15, No 1 (2025)

Examination of the Seventh-Grade Mathematics Textbook in Terms of Financial Literacy

[1]Recep Sozgun & [2]Ilyas Karadeniz

[1]*Faculty of Education, Siirt University*

[2]*Ph.D., Sultan Qaboos University, College of Education, P.O. Box 32, P.C. 123. Al-Khodh, Sultanate of Oman*
i.karadeniz@squ.edu.om

[2]*Ph.D., Siirt University, College of Education, Kezer Yerleşkesi Veysel Karani Mah. Üniversite Cad. No:1 56100 Merkez/SİİRT*
i.karadeniz@siirt.edu.tr

Abstract

It is of great importance for individuals to be educated effectively and to receive financial education so that they can make the right financial decisions. The OECD has included the financial literacy assessment in the PISA exams since 2012. This study aims to assess how the concept of financial literacy is integrated into seventh-grade mathematics textbooks based on the PISA framework. We conducted an in-depth examination of the questions and activities in the seventh-grade mathematics textbook, which has been in practice for five years since 2019. The document analysis technique was used for this case study by examining all the questions and activities in the textbook based on the keywords to determine financial content. The concept of financial literacy, as defined by PISA, content, process, and context dimensions and categories of these dimensions, was used for a seventh-grade mathematics textbook examination. According to the findings, the questions and activities in the textbook support the concept of financial literacy at a minimum level. In particular, the *Risk and Reward* and *Financial Landscape* and *Apply Financial Knowledge and Understanding* categories are significantly underrepresented or absent. Furthermore, the application of financial knowledge and societal contexts is minimal, limiting the potential to develop comprehensive financial literacy competencies. Therefore, it is suggested that the curriculum and course content should be developed to address these gaps, including real-life financial dilemmas, broader economic decision-making, and public financial literacy components.

Keywords: Financial literacy, PISA financial literacy dimensions, OECD.

Introduction

In today's world, constantly changing market conditions lead individuals to make continuous financial decisions and trigger global crises (Tural Sönmez, 2016). In particular, diversified bank loan transactions and decentralized cryptocurrencies have changed people's understanding of investment and increased their need for financial information. Therefore, the role of financial literacy in preventing future financial crises or fostering economic resilience is the focus of today's world (Klapper & Lusardi, 2020). With rising personal and public debt, public and private employers increasingly shifting financial responsibility to individuals, and an increase in both the number of financial investment options and predatory lending practices, today's students need to be financially literate (Sole, 2014). Financial literacy skills are the possession of a set of skills and knowledge that allows an individual to make informed and effective decisions with all of their financial resources. At the same time, financial literacy skills are one of the basic skills to achieve a better life (Mahmudi & Listayni, 2019). From an early age, children are faced with financial dilemmas and are expected to make effective financial decisions about money (Blue, Maker & O'Brien, 2017).

The concept of financial literacy can be considered as the set of financial knowledge, skills and strategies that individuals build throughout their lives (Mandell & Klein, 2009; OECD,

2011). Financial literacy has been associated with many concepts in the literature. Financial literacy is mostly affected by gender, the monthly income of the family, and socioeconomic factors. At the same time, education is an important predictor of financial literacy (Karaaslan, 2020). Mathematics teachers are encouraged to use realistic contexts to make mathematics more meaningful (White, 2011). It offered implications for teacher educators and curriculum developers (Sullivan, Askew, Cheeseman, Clarke, Mornane, Roche & Walker, 2014). Sawatzki (2017), together with fifth and sixth-grade students and 14 teachers, created tasks related to financial dilemmas and examined the effects of financial literacy teaching and learning on students and teachers. Sawatzki (2013) investigated sixth-grade students 'understanding of mathematics and their financial decision-making processes and stated that meaningful contexts containing mathematical concepts were effective in students' learning of finance.

Mathematics and financial literacy are inherently connected, as mathematical concepts and skills form the foundation of financial understanding and decision-making (Azizah & Mahmudi 2020). Financial literacy requires the ability to interpret numerical information, perform calculations, analyse data, and apply logical reasoning to real-world financial scenarios such as budgeting, saving, investing, and managing risks. Mathematics teaching strategies, such as problem-solving, modelling, and critical thinking, contribute significantly to the development of financial literacy (Özkale & Özdemir Erdoğan, 2022).

At the international level, the OECD (2020) provides a framework used by countries participating in the PISA assessments, which emphasizes the role of financial literacy in fostering informed decision-making among young people. However, disparities remain; while some countries have mandated financial education as a standalone subject, others integrate it through subjects like mathematics or social studies. This approach reflects differences in educational policy and perceived national priorities regarding youth financial capability.

A significant proportion of students in OECD countries lack essential financial literacy skills, with 18% unable to apply financial knowledge to real-life situations. Enhancing financial literacy is crucial not only for improving students' immediate money management abilities but also for enabling them to make informed and responsible financial decisions in adulthood (OECD, 2024).

Hopkins and O'Donovan (2021) revealed the importance of financial literacy and the need to address mathematical foundations by using approaches that constitute procedural fluency. Mahmudi and Listayni (2019), in their study with secondary school students in Gunung Kidul Regency Yogyakarta, categorized the students as good depending on the dimensions of confidence in financial planning, propensity to save and consume, as well as financial knowledge and skills in mathematics education, and had good financial understanding. They also found that students with good financial attitudes tend to have good financial attitudes. At the same time, Sole (2014) defined financial literacy in his article and justified its place in the mathematics curriculum. The students were given exercises and tasks. However, wrong answers have shown that students need financial education. Sawatszki (2017) in his study with 14 teachers and more than 300 fifth and sixth-grade students emphasized that adaptability, compelling but accessibility, and pedagogical architecture are important task design principles, and tasks involving unconventional, new, and imaginable problem contexts. Although it is pedagogically challenging for teachers, it can be considered useful by students and has the potential to broaden their horizons. Tanase and Lucey (2017), investigated pre-service teachers'

awareness of the interdisciplinary connections between mathematics, personal finance, and social justice in their study and found that the majority of pre-service teachers had narrow or intermediate concepts of mathematics and financial literacy, and that these concepts included Mathematics and financial terminology and suggested to understand their social connections. Moreover, studies indicate that children of families that provide financial guidance to their children and provide moderate communication about their economic expectations show conscious financial behavior (Seginer, Vermulst & Shoyer, 2004).

PISA is one of the most comprehensive education studies at the international level (Çelen, Çelik & Seferoğlu, 2011). According to the results of PISA, which is a student achievement evaluation project, it is possible to have an idea about the impact of the education policies of the countries on the students, the necessary steps to increase the quality of education, and what needs to be done to make the education system more functional (PISA, 2015). The evaluation of financial literacy, which is important for young people, is followed by an interest in PISA assessments. PISA financial literacy data gives an idea about how 15-year-old students experienced financial transactions, the reasons why students have difficulty in understanding the concepts related to financial literacy, and making decisions about it (OECD, 2020). PISA handled the financial literacy framework in three dimensions; content, context, and process (OECD, 2020).

Table 1
PISA Financial Literacy Structure (OECD, 2020)

Content	Content	Context
Money and transactions	Identify financial information	Education and work
Planning and managing finances	Analyse financial information and situations	Home and family
Risk and reward	Evaluate financial issues	Individual
Financial landscape	Apply financial knowledge and understanding	Societal

Countries give importance to increasing the financial literacy rate. For this, they became more aware of the necessity of financial literacy education. Among the remedial approaches, the interest in financial literacy education has also been addressed on a school basis. It is explained that financial literacy education will increase the welfare level of the country (Huston, 2010; Özdemir, 2020). Educating students about financial literacy at school has been perceived as necessary by many states, and incentives for financial literacy education have increased accordingly (Blue & Grootenberg, 2019; Iterberke et al., 2020).

The effective integration of financial education into the mathematics curriculum relies on various factors, such as the selection of appropriate learning resources and instructional approaches. Developing mathematical content can be enhanced by incorporating real-life financial scenarios (Salas-Velasco et al., 2021; Sawatzki & Sullivan, 2018; OECD, 2019).

Recently, Indonesia has enhanced its educational approach by adopting an independent curriculum. Key features of this new curriculum emphasize the use of project-based learning and the integration of financial literacy within mathematics instruction. In response to previous research recommendations, we aim to outline strategies for preparing teachers to incorporate financial literacy into mathematics lessons. Educators can apply these insights to develop math

teaching plans that embed financial literacy concepts (Sagita, Putri, Zulkardi, & Prahmana, 2022).

Apart from government policies in financial literacy education in Turkey, private institutions such as the Financial Literacy and Inclusion Association (FODER) give importance to financial literacy. FODER aims to increase the interest in financial literacy with the "Financial Literacy and Inclusion Summit" and various organizations every year. The Ministry of National Education (MNE) carries out financial literacy training with "Entrepreneurship module, accounting and finance teaching programs" to provide vocational education (MEB, 2016). In particular, the scope of financial literacy education for young people in our country should be expanded, and the level of financial literacy should be increased so that young people can make effective financial decisions (Çelikten, 2020).

There is a great deal of interaction between mathematics and the financial field. It has also been mentioned in studies involving both fields together (Lucey & Maxvell, 2011; Gold, 2021). Mathematics is an effective tool in understanding and solving financial problems. It can be said that financial concepts such as income-expenditure, profit/loss calculations, budget planning, and money conversion require effective mathematical thinking. It has been examined that Turkey entered the field of financial literacy under the title of "Conscious Consumption Arithmetic" in the mathematics curriculum in 2009, and as a result of the regulations in 2017, the concept of "financial literacy" took its place among the achievements of mathematics teaching (Özkale & Özdemir Erdoğan, 2017).

This study addresses a gap in the existing literature by providing a detailed analysis of how financial literacy is represented in a seventh-grade mathematics textbook, specifically through the lens of the PISA Financial Literacy framework. While previous research has emphasized the importance of integrating financial literacy into mathematics education, few studies have systematically examined the extent to which textbook content aligns with the three key dimensions of PISA: content, process, and context. By mapping the distribution of questions and activities across these dimensions, this research offers valuable insights into the strengths and shortcomings of current textbook materials, highlighting areas where curriculum development and instructional design can be improved to better prepare students for real-world financial decision-making.

The selection of the seventh-grade curriculum for this study is based on its critical role in laying the foundation for students' financial literacy development during early adolescence—a period when learners begin to encounter real-life financial concepts both inside and outside the classroom. As highlighted by Güvenç (2017), the seventh-grade mathematics curriculum is particularly suitable for such an investigation because it introduces key mathematical concepts—such as percentages, ratios, and proportional reasoning—that are directly applicable to financial contexts like budgeting, savings, and interest calculations. This grade level serves as a pivotal stage where abstract mathematical knowledge can be meaningfully connected to practical financial decision-making skills, which are essential for fostering financial literacy in line with the PISA framework. Furthermore, examining the curriculum at this stage provides insights into how effectively educational materials are preparing students for future financial challenges, thus contributing to the broader goal of equipping young learners with the competencies needed for responsible financial behaviour in adulthood. In this research, considering the seventh-grade mathematics textbook, which was decided to be taught for five

years starting from the 2019-2020 academic year with the decision of the Ministry of National Education-Board of Education and Discipline, answers to the following research questions were sought in line with the problem situation:

1. How do the questions and activities in the seventh-grade mathematics textbook distribute according to the **content** dimension of PISA Financial Literacy?
2. How do the questions and activities in the seventh-grade mathematics textbook distribute according to the **process** dimension of PISA Financial Literacy?
3. How do the questions and activities in the seventh-grade mathematics textbook distribute according to the **context** dimension of PISA Financial Literacy?

Methods

The primary objective of this study is to systematically examine how financial literacy is embedded within the seventh-grade mathematics textbook by analyzing its alignment with the PISA financial literacy framework. This research focuses on evaluating the extent to which the textbook content addresses the three key dimensions of PISA's financial literacy construct: content, process, and context. The rationale for selecting PISA's framework lies in its international recognition and comprehensive structure, which allows for a standardized assessment of financial literacy skills applicable across various educational systems.

To achieve this objective, a document analysis method (Yıldırım & Şimşek, 2005) was employed, enabling an in-depth review of all relevant questions and activities in the textbook. The coding process was guided by clearly defined categories derived from the PISA financial literacy assessment framework (OECD, 2012; 2020), ensuring consistency and comparability. Each item was examined for its relevance to the specific subcategories under the content (e.g., money and transactions, planning and managing finances), process (e.g., identifying or applying financial knowledge), and context (e.g., personal, societal) dimensions. The use of this rigorous coding scheme not only clarifies the scope of the analysis but also allows the identification of strengths and gaps in how financial literacy concepts are represented within the mathematics curriculum at this grade level.

Data Source

The Ortaokul ve İmam Hatip Ortaokulu Matematik 7. Sınıf Ders Kitabı (Altıntaş & Keskin, 2019), published by Eko Yay Eğitim Yayıncılık, was deliberately selected for this study because it is the officially approved mathematics textbook used in all public and religious secondary schools (Imam Hatip) across Turkey for the seventh-grade level. Its selection is highly relevant to the scope of this research, as the textbook represents the primary instructional resource through which mathematical concepts—including those related to financial literacy—are delivered to students at this critical stage of their education.

The Turkish Ministry of National Education (MoNE) formally approved this textbook for classroom use for a period of five years, starting from the 2019–2020 academic year, under the decision of the Board of Education and Discipline dated 18/04/2019 and numbered 8 (*Talim ve Terbiye Kurulu Başkanlığı Kararı, 2019*). This official approval ensures that the textbook

aligns with the national mathematics curriculum standards and reflects the ministry's educational goals, including the integration of practical life skills such as financial literacy, which became a more explicit focus in curriculum updates since 2017.

In terms of alignment with broader curriculum goals, the textbook reflects the Ministry's objective to connect mathematics instruction with real-life applications, including economic and financial contexts. The inclusion of topics such as percentages, ratio and proportion, simple interest calculations, and budget planning serves not only mathematical proficiency but also supports the development of students' financial literacy—a competency increasingly emphasized in both national and international education policy frameworks, such as the PISA Financial Literacy Framework. By analyzing this specific textbook, the study directly evaluates how well these intended curricular objectives are translated into actual teaching materials used in Turkish classrooms. First, questions and activities related to financial literacy were determined in the book based on Table 2 below, which are the keywords related to finance from the literature. The seventh-grade mathematics textbook was examined in terms of content, process, and context dimensions, which are the concept of "financial literacy" as defined for PISA (OECD, 2012; OECD, 2020).

Data Collection and Analysis

To identify questions and activities within the seventh-grade mathematics textbook that relate to financial literacy, a comprehensive list of keywords was collaboratively developed by two researchers. This joint effort ensured the validity and reliability of the keyword selection process, as it incorporated insights from both researchers and was grounded in relevant literature (Akhan & Kılıçoğlu, 2014; Güvenç, 2017; OECD, 2017; Özkale, 2018; Özkale & Özdemir Erdoğan, 2017). The researchers carefully reviewed prior studies and theoretical frameworks on financial literacy to compile a set of terms that accurately represent financial concepts suitable for analysis in a mathematics education context.

These keywords (as presented in Table 2) cover a broad spectrum of financial terms, including those related to transactions (e.g., payment, credit, debt), financial planning (e.g., saving, budgeting, investment), and economic concepts (e.g., interest, exchange rate, inflation). During the analysis process, the entire textbook was systematically examined for the occurrence of these keywords within the text of questions, problem statements, and activities. When a keyword appeared, the corresponding item was marked as potentially addressing financial literacy and was further analyzed to determine its alignment with the PISA financial literacy dimensions (content, process, context). This method allowed the researchers to objectively identify all relevant financial literacy content in the textbook, ensuring that the selection was not influenced by subjective judgment but was instead grounded in a clearly defined and collaboratively validated framework.

Within the scope of Table 2, it has been determined that there are 69 financial questions and two financial activities in the textbook. Based on each dimension (content, process, and context), categories were accepted from the OECD (2012; 2020). Then we explore and read about each of these categories. While investigating these categories in the literature, we have found some definitions and explanations of these categories under the content and process

dimensions. The categories of context dimension are apparent. Therefore, we have created the codes under the categories of content and process based on the literature. All questions and activities with financial content were analysed with the codes created depending on the categories. In this process, the determined questions and activities were analysed by two researchers independently at separate times. Then the final version of the analysis was created by coming together for different coding, and a consensus was achieved among researchers.

Table 2
Keywords Used to Determine Financial Content

receivable	bank account	exertion	financial security	claim	credit card	ratio
buyer	accumulation	retirement	requirement	imports	hire	payment
shopping	borrowing	interest	attempt	export	limit	money
supply	check	invoice	entrepreneur	discount	Turkish Lira	expensive
capital	producer	insurance	production	request	product	dividend
maturity	minimum	value	price	attachment	profit	financial
marketing	saving	tax	agreement	foreign currency	fund	spending
resource	deposit	market	frugal	investment	bank	distribution
income	remittance	earning	cost	in advance	consumer	raise
debt	dashboard	finance	stock	credit	customer	advertisement
trade	damage	budget	economy	receipt	need	exchange rate
salary	risk	consumption	exchange	inflation	financial choice	waste
famine	cash	buy	fee			

We also recognize that a question or an activity may include more than one of these categories or codes (OECD, 2020). Accordingly, for the coding process of questions or activities, if they are related to more than one category or code, we accept both categories or codes for all dimensions.

Coding Reliability in Analysis of Data

The coding process in this study was designed to ensure a systematic, transparent, and theoretically grounded analysis of the financial literacy content embedded in the seventh-grade mathematics textbook. To achieve this, the researchers first collaboratively reviewed relevant literature on financial literacy education (Akhan & Kılıçoğlu, 2014; Güvenç, 2017; OECD, 2017; Özkale, 2018; Özkale & Özdemir Erdoğan, 2017), as well as the PISA financial literacy assessment framework (OECD, 2012; 2020), which served as the theoretical foundation for categorization.

Based on this framework, financial literacy was analyzed across three main dimensions: content, process, and context. Each dimension was subdivided into specific, well-defined categories that reflect the competencies and knowledge areas deemed essential for financial literacy. For example, the content dimension includes categories such as "Money and

Transactions" and "Planning and Managing Finances," while the process dimension covers skills like "Identifying Financial Information" and "Applying Financial Knowledge." The context dimension relates to the situational use of financial knowledge (e.g., personal, family, or societal contexts). These categories were not arbitrarily selected but were directly adapted from the PISA financial literacy framework to ensure consistency with international educational standards.

Two researchers independently applied this coding scheme to the identified textbook questions and activities. Each item was evaluated to determine whether it aligned with one or more categories within the three dimensions. This independent coding was conducted at different times to reduce potential bias. Afterward, the researchers compared their coding results to assess intercoder reliability. Discrepancies were discussed in detail, and consensus was reached through negotiation to finalize the categorization of each item.

This rigorous coding approach ensures that the analysis captures not only the presence of financial literacy content but also the depth and complexity of its presentation within the textbook. By grounding the coding process in a widely accepted international framework and ensuring collaborative validation, this study enhances the reliability and validity of its findings on the integration of financial literacy in mathematics education.

The intercoder reliability in this study was assessed using the percentage of agreement formula proposed by Miles and Huberman (1994):

$$\text{Percentage of agreement} = \left[\frac{\text{Agreement}}{(\text{Agreement} + \text{Disagreement})}\right] \cdot 100 \quad (1)$$

The resulting reliability coefficients were 67.6% for content analysis, 70.2% for process analysis, and 84.5% for context analysis. According to the interpretation guidelines provided by Landis and Koch (1977), these values indicate substantial agreement for content and process analysis, and almost perfect agreement for context analysis. After the initial coding, any discrepancies between the researchers were identified, discussed, and resolved through consensus to ensure consistency and accuracy in the final coding decisions. This process enhanced the credibility and trustworthiness of the analysis.

Research Framework

This study employed the PISA Financial Literacy Framework as the primary analytical tool to examine the representation of financial literacy within the seventh-grade mathematics textbook. The framework categorizes financial literacy into three key dimensions—content, process, and context—each of which is further subdivided into specific categories that describe the knowledge, skills, and real-world applications relevant to personal finance. The use of this framework allowed for a structured and systematic interpretation of the textbook content by aligning the identified questions and activities with internationally recognized competencies in financial literacy.

The content dimension focuses on what students should know (e.g., money and transactions, planning and managing finances), the process dimension addresses the cognitive skills required to engage with financial issues (e.g., identifying financial information, applying knowledge), and the context dimension situates financial literacy tasks within personal, family, or societal

scenarios. This categorization enabled the researchers to map each textbook item to specific aspects of financial literacy, providing a detailed picture of how comprehensively the textbook addresses these essential skills.

The choice of the PISA framework is justified by its international credibility and its comprehensive, multidimensional structure, which is particularly suitable for assessing educational materials designed to prepare students for real-life financial decision-making. Since PISA evaluates financial literacy in various educational systems globally, its framework offers a valid benchmark for assessing the quality and scope of financial literacy content in the textbook under study.

However, the framework also presents certain limitations. First, it was developed primarily for assessment rather than curriculum evaluation, which means that some textbook activities may not fit neatly into the predefined PISA categories. Additionally, cultural and national differences in financial practices may not be fully captured by the framework, potentially overlooking region-specific financial literacy needs. To address these limitations, the researchers allowed for multiple coding of individual items, acknowledging that a single question could encompass more than one dimension or category. This flexibility ensured a more nuanced and accurate representation of the textbook content.

Furthermore, potential subjectivity in coding was mitigated through a collaborative coding process involving two independent researchers, followed by consensus discussions to resolve discrepancies. This approach enhanced the validity and reliability of the framework's application in this specific educational and cultural context. In conclusion, while the PISA Financial Literacy Framework provides a robust structure for analyzing the financial literacy content in the mathematics curriculum, careful adaptation and critical interpretation were required to ensure its relevance and applicability to the textbook materials examined in this study. The codes created according to the categories related to each financial literacy dimension (Akhan & Kılıçoğlu, 2014; Güvenç, 2017; Mammadova, 2020; Karaaslan, 2020; OECD, 2017; Özkale, 2018; Özkale and Özdemir Erdoğan, 2017; PISA, 2018) are presented in Table 3.

A total of 69 questions and two activities, which were determined to be related to financial literacy in the textbook, were analysed depending on the coding in the form in Table 3. Within the scope of the study, the analysis table of one of the questions and activities determined in the financial context is presented with an explanation.

Table 3
PISA Financial Literacy Content, Process, and Context Dimensions

Dimensions	Categories			
Content	**A) Money and Transactions**	**B) Planning and Managing Finances**	**C) Risk and Reward**	**D) Financial Landscape**
	A1. Payment, expenditure	B1. Types of income	C1. Financial gain and lump sum	D1. Consumer rights and responsibilities
	A2. Value of money	B2. Understanding taxes	C2. Financial balancing	D2. Government policy
	A3. Banking transactions	B3. Planned expenditures	C3. Financial loss and risk	D3. Economic conditions
	A4. Checks, bills	B4. Reducing expenses	C4. Loan contracted, interest	D4. Financial contracts
	A5. Unit of currency	B5. Saving	C5. Profit-loss uncertainty	D5. Information resources
	A6. Money transfer	B6. Effect of interest rate		D6. Financial theories, organizations
	A7. Exchange	B7. Return and risk on investment		
	A8. Different forms of money	B8. Financial welfare		

Dimensions	Categories			
Process	**A) Identify Financial Information**	**B) Analyse Financial Information and Situations**	**C) Evaluate Financial Issues**	**D) Apply Financial Knowledge and Understanding**
	A1. Advertising	B1. Analysis	C1. Recognition and configuration of the explanation	D1. Computations, including decision making
	A2. Agreement	B2. Interpretation	C2. Measurement, evaluation	D2. Problem solving
	A3. Form	B3. Comparison	C3. Generalization	
	A4. Chart-table	B4. Synthesis	C4. Connection	
	A5. Guidelines	B5. Guessing		

Dimensions	Categories			
Context	**A) Education and Work**	**B) Home and Family**	**C) Individual**	**D) Societal**

Sample Question:

The salary of a worker is 3160 TL. This worker spends 1/5 of his salary on house rent and 1/4 on education expenses. Let's find out how much TL is left from the salary of this worker (Altıntaş & Keskin, 2020, p.81).

Table 4
PISA Financial Literacy Content, Process, and Context Dimensions

Unit	Learning Area	Sub Learning Area	Dimension	Category	Code
2	Numbers and Transactions	Operations with Rational Numbers	Content	Money and Transactions	Payment, expenditure (A1)
				Planning and Managing Finances	Planned expenditures (B3)
			Process	Analyse Financial Information and Situations	Analysis (B1)
			Context	Home and Family	B

When the question is considered in terms of content, since payments and expenses such as house rent, education expenses are made from the employee's salary, we code the question as the *Payment, expenditure (A1)*. The question is also coded *Planned expenditures (B3)*, since the person in question had to plan his budget and expenditures of 3160 TL.

Considering the process, it is the case that the employee calculates his expenses depending on his salary, and analyses and separates each payment piece by piece. There is a need to analyse the part-whole relationship between salary and expenses. Therefore, it is coded as *Analysis (B1)*.

Considering the context, it is categorized as *Home and Family (B)* because the employee plans in line with his/her home and education expenses and arranges his/her salary considering this context.

Results and Discussion

In this section, the findings obtained in line with the purpose and research questions are presented in three parts.

Findings Regarding the Content Dimension

All of the questions and activities found to be related to financial literacy in the seventh-grade mathematics textbook were coded independently by the researchers, depending on the PISA financial literacy content dimension and the four categories of this dimension. Then, the coding was compared. Common coding was included in 67.6% of the questions. For the questions and activities with different coding, researchers came together, and the coding process in the examination was completed by achieving a consensus with common decisions. The results are obtained in Table 5.

Table 5
Coding of Questions- Activities Related to Financial Literacy in the Textbook based on Content Dimension

Category		Category		Category		Category	
A) Money and Transactions	**n**	**B) Planning and Managing Finances**	**n**	**C) Risk and Reward**	**n**	**D) Financial Landscape**	**n**
A1. Payment, expenditure	24	B1. Types of income	0	C1. Financial gain and lump sum	0	D1. Consumer rights and responsibilities	0
A2. Value of money	49	B2. Understanding taxes	1	C2. Financial balancing	0	D2. Government policy	0
A3. Banking transactions	7	B3. Planned expenditures	25	C3. Financial loss and risk	0	D3. Economic conditions	0
A4. Checks, bills	0	B4. Reducing expenses	0	C4. Loan contracted, interest	0	D4. Financial contracts	0
A5. Unit of currency	11	B5. Saving	3	C5. Profit-loss uncertainty	2	D5. Information resources	0
A6. Money transfer	0	B6. Effect of interest rate	0			D6. Financial theories, organizations	0
A7. Exchange	1	B7. Return and risk on investment	0				
A8. Different forms of money	0	B8. Financial welfare	0				

As a result of the examination of a total of 71 questions or activities found to be related to financial literacy in the seventh-grade mathematics textbook in terms of the categories of the content dimension in the PISA financial literacy framework, it was determined that only two questions were related to the *Risk and Reward (C)* category. These two questions are related to the *Profit-loss uncertainty (C5)* code, and both of these questions belong to the *Percentage Calculations* sub-learning area of the *Numbers and Transactions* learning area. In addition, it has been determined that there are no questions or activity examples related to the *Financial Landscape (D)* category of the PISA financial literacy content dimension in the textbook.

The PISA financial literacy content dimension was mostly seen in the *Money and Transactions (A)* category in the seventh-grade mathematics book. In this category, it was observed that the content related to the *Value of money (A2)* code was included the most, with 49 questions or activities. It was also seen that the content related to the *Planned expenditures (B3)* code was included the most, with 25 questions or activities under the *Planning and Managing Finances (B)* category. Moreover, it has been determined that only the contents related to *Saving (B5)* and *Understanding taxes (B2)* codes are included in this category in the textbook.

49 out of 71 questions or activities were found to be related to financial literacy in the textbook, since 69.01% of the questions or activities are related to the *Value of money (A2)*

code in the *Money and Transactions (A)* category, it has been determined that the highest level of code is in this category. Table 6 contains information about the frequency and percentage distributions of the questions in this unit, according to whether they are related to one or more categories.

Table 6
Distribution of the Questions- Activities in the Seventh-Grade Textbook by Categories in the Financial Literacy Content Dimension within the PISA Framework

Category	f	%
A) Money and Transactions	43	60.56
B) Planning and Managing Finances	9	12.67
C) Risk and Reward	1	1.4
D) Financial Landscape	0	0
*A) Money and Transactions & B) Planning and Managing Finances	17	23.94
**A) Money and Transactions & C) Risk and Reward	1	1.4
Total	**71**	**100**

*: Indicates those belonging to both “A” and “B” categories. **: Indicates those belonging to both "A" and "C" categories.

Based on Table 6, a total of 61 out of 71 questions or activities (85.9%) were related to *Money and Transactions*, 26 questions or activities (36.6%) were related to *Planning and Managing Finances*, and a total of two questions or activities (2.8%) were *Risk and Reward*. Therefore, it is seen that the highest concentration is in the *Money and Transactions* category. It is also seen that there is no question or activity example related to the *Financial Landscape* category.

The analysis indicates a significant concentration of financial literacy content within the Money and Transactions category of the PISA framework, with a substantial 85.9% of questions and activities falling into this area. In contrast, the Risk and Reward and Financial Landscape categories are notably underrepresented or absent. Only two activities in the entire textbook addressed the Risk and Reward dimension, and none pertained to the Financial Landscape category.

This imbalance may reflect intentional design choices within the national curriculum. In many education systems—including those similar to the context of this study—textbooks for lower secondary grades such as seventh-grade often prioritize practical and foundational financial skills (e.g., understanding money value, transactions, and basic budgeting) because these concepts are more concrete, relatable, and age-appropriate for young learners. Complex topics like risk assessment, investment decision-making, or understanding broader economic structures (which correspond to the Risk and Reward and Financial Landscape categories) typically require higher-order thinking skills, abstract reasoning, and contextual knowledge that students at this level may not yet possess.

Additionally, curriculum limitations such as teacher preparedness, available instructional time, and national education policy priorities may influence the exclusion of these more complex dimensions. Furthermore, these advanced financial literacy components may be scheduled for introduction in higher grade levels or addressed in other subjects such as social studies, economics, or civic education, which could explain their absence in this mathematics textbook.

The implications of this focus on practical financial skills should also be considered. While building competence in managing money, calculating expenses, and understanding value is essential, overemphasis on these basic skills risks neglecting the development of students' ability to critically evaluate financial risks or understand their roles within larger financial systems—skills that are increasingly important in modern, interconnected economies. Without exposure to these broader dimensions, students may enter adulthood with insufficient awareness of investment principles, credit risks, insurance products, or the influence of government fiscal policies on personal finance.

To provide a fuller picture of the curriculum's financial literacy scope, future research could investigate whether these underrepresented dimensions appear in textbooks for higher grades or in other school subjects. Understanding how the progression of financial literacy concepts is structured across the entire curriculum would clarify whether this observed imbalance in the seventh-grade textbook represents a temporary developmental focus or a broader gap in the national educational strategy for financial literacy.

Findings Regarding the Process Dimension

In this chapter, the analysis results of 71 questions or activities are presented according to the categories in the PISA financial literacy process dimension and the codes created according to each category. As can be seen in Table 7, there were no questions or activity examples related to the category of *Apply Financial Knowledge and Understanding* out of 71 questions or activities that were found to be related to financial literacy in the textbook.

Table 7
Coding of Questions- Activities Related to Financial Literacy in the Textbook Based on Process Dimension

Category		Category		Category		Category	
A) Identify Financial Information	**n**	**B) Analyse Financial Information and Situations**	**n**	**C) Evaluate Financial Issues**	**n**	**D) Apply Financial Knowledge and Understanding**	**n**
A1. Advertising	2	B1. Analysis	57	C1. Recognition and configuration of the explanation	8	D1. Computations, including decision making	0
A2. Agreement	1	B2. Interpretation	4	C2. Measurement, evaluation	7	D2. Problem solving	0
A3. Form	0	B3. Comparison	16	C3. Generalization	1		
A4. Chart-table	5	B4. Synthesis	9	C4. Connection	0		
A5. Guidelines	0	B5. Guessing	0				

The following is a potential problem for *Apply Financial Knowledge and Understanding* with *Decision-making and Problem-solving*:

Ali wants to buy a new bicycle that costs 1200 TL. He has already saved 700 TL. He can choose between two part-time job offers to earn the remaining money:

- **Option A:** Work at a bookstore for 25 TL per hour.
- **Option B:** Work at a grocery store for 30 TL per hour, but he must spend 10 TL per day on transportation.

Ali plans to work for only 3 days a week and cannot work more than 12 hours total in a week.

a) If Ali chooses Option A, how many hours must he work to earn the money he needs?

b) If Ali chooses Option B, what is the minimum number of hours and days he needs to reach his goal, considering the transportation cost?

c) Based on your calculations, which option is better for Ali to reach his goal in the least total working hours and cost? Justify your answer with reasoning.

This problem fits the *Apply Financial Knowledge and Understanding* category of the PISA Process Dimension because it requires students to perform multi-step computations involving earnings, transportation costs, and total working hours. Additionally, the task engages students in problem-solving and real-life decision-making as they must select the better job option based on their calculations. It reflects practical financial planning and introduces the concept of opportunity cost, requiring students to apply mathematical reasoning to an authentic personal finance scenario. Moreover, by asking students to justify their choice, the problem promotes the development of critical reasoning and argumentation skills, which are essential components of comprehensive financial literacy education.

In addition, in the seventh-grade mathematics book, the PISA financial literacy process dimension was mostly mentioned in the category of analysing information in the financial context. In this category, it was seen that the *Analysis (B1)* code was mostly included among the questions or activities. Moreover, except for *Guessing (B5)* code in this category, it was seen that there were questions or activity examples related to all codes.

In the evaluate financial issues category, the most common code is *Recognition and configuration of the explanation (C1)* with eight questions or activity samples. Moreover, it has been determined that there is no question or activity sample related to the *Connection (C4)* code. Since the questions are mostly in the form of graphics, the *Chart-table (A4)* code is seen five times, which is the most repeated in the category of identifying financial information. It has been determined that there is no question or activity sample related to *Form (A3)* and *Guidelines (A5)* codes. 57 out of 71 questions or activities found to be related to financial literacy in the textbook, *Analysis (B1)* code was included in 80.28%. Therefore, it can be said that the questions or activities are highly concentrated in this code. In Table 8, there is information about the frequency and percentage distributions of the questions or activities in this unit, depending on whether they are related to one or more categories.

In Table 8, the distribution of the questions and activity examples found to be related to financial literacy in the textbook is given in the categories of the process dimension. When a general evaluation is made, 97.1% (69 questions or activities) of all questions are to *Analyse Financial Information and Situations*, 15.4% (11 questions or activities) to *Evaluate Financial*

Issues, and 11.2% (8 questions or activities) to *Identify Financial Information*. It has been determined that it takes place on its own or about more than one category.

Table 8
Distribution of the Questions- Activities in the Seventh-Grade Mathematics Textbook by Categories in the Financial Literacy Process dimension within the PISA Framework

Category	**f**	**%**
A) Identify Financial Information	0	0
B) Analyse Financial Information and Situations	53	74.64
C) Evaluate Financial Issues	2	2.81
D) Apply Financial Knowledge and Understanding	0	0
*A) Identify Financial Information & B) Analyse Financial Information and Situations	7	9.85
**B) Analyse Financial Information and Situations & C) Evaluate Financial Issues	8	11.26
*** A) Identify Financial Information & B) Analyse Financial Information and Situations & C) Evaluate Financial Issues	1	1.4
Total	**71**	**100**

*: Indicates those belonging to both “A” and “B” categories. **: Indicates those belonging to both "B" and "C" categories. ***: Indicates those belonging to “A”, “B”, and "C" categories.

Findings Regarding the Context Dimension

In this study, a total of 71 questions or activities found to be related to financial literacy in the mathematics textbook were examined in depth according to the categories related to the context dimension in the PISA financial literacy framework, and it was determined that the textbook included question examples related to all categories of the context dimension. The data are presented in Table 9.

Table 9
Coding of Questions- Activities Related to Financial Literacy in the Textbook Based on Context Dimension

Category	n	Category	n	Category	n	Category	n
A) Education and Work	57	**B) Home and Family**	9	**C) Individual**	9	**D) Societal**	3

In the research, the PISA financial literacy context dimension was mostly mentioned in the education and work category in the seventh-grade mathematics book. In Table 10, there is information about the frequency and percentage distributions of the questions and activities in this unit, depending on whether they are related to one or more categories.

In Table 10, the distribution of the context dimension into categories and the percentages of all questions according to the categories are given. If a general evaluation is made depending on the categories; 80% (57 questions or activities) of the 71 questions and activities included in the scope of the study because they are related to financial literacy in the textbook, *Education and Work* category, 12.6% (9 questions or activities) *Home and Family*, 12.6% (9 questions or activities) *Individual*, 4.2% (5 questions or activities) *Societal* categories, alone or about another category or categories. The highest category is *Education and Work*, while the lowest is the *Societal* category.

Table 10
Distribution of the Questions- Activities in the Seventh-Grade Mathematics Textbook by Categories in the Financial Literacy Context dimension within the PISA Framework

Category	f	%
A) Education and Work	52	73.23
B) Home and Family	7	9.85
C) Individual	4	5.63
D) Societal	1	1.4
*A) Education & Work & C) Individual	4	5.63
**A) Education and Work & D) Societal	1	1.4
***B) Home & Family& C) Individual	1	1.4
****B) Home and Family & D) Societal	1	1.4
Total	**71**	**100**

*: Indicates those belonging to both “A” and “C” categories. **: Indicates those belonging to both "A" and "D" categories.
: Indicates those belonging to both "B" and "C" categories. *: Indicates those belonging to both "B" and "D" categories.

The underrepresentation of the *Societal* context dimension in the seventh-grade mathematics textbook is a notable finding of this study. Only 4.2% of the analyzed questions and activities addressed *Societal* financial issues, in contrast to the overwhelming emphasis on the *Education and Work* category, which accounted for 80% of the items. This imbalance highlights a potential gap in the curriculum’s ability to prepare students for understanding the broader economic systems and global financial challenges that influence their lives as future citizens. Financial decisions are not only personal but also have societal implications, such as government budgeting, taxation, public services funding, and economic policies, that shape the well-being of communities and nations.

To address this gap, it is recommended that project-based learning activities be incorporated into the curriculum (Sagita, Putri, Zulkardi, & Prahmana, 2022). For example, students could engage in projects analyzing how national economic policies (such as taxes or subsidies) affect different social groups, or simulate decision-making processes related to community budgeting or environmental investments. Additionally, classroom discussions could explore the societal impact of consumer behavior, debt accumulation, or global economic crises, thereby linking mathematical calculations to real-world societal issues. These instructional strategies would help students develop a more comprehensive understanding of financial literacy that goes beyond personal or work-related finances to include the societal and global dimensions critical for informed and responsible citizenship.

Conclusion

Questions and activities determined to be related to financial literacy in the textbook, the results obtained in terms of the PISA financial literacy content dimension, and the categories of the content dimension are presented. It should be noted that in this study, results were obtained depending on the situation that each question or activity could belong to one or more categories. In this context, 85.9% of all questions and activities determined to be related to financial literacy are related to money and transactions, 36.6% to planning and managing finances, and 2.8% to risk and return categories. In addition, it was concluded that there is no

question sample related to the category of financial landscape in this study. As it is related to financial literacy, Tural Sönmez (2019) associated each of the 117 questions included in the research with only one category and stated that the density of the questions was in the category of planning and managing finances (59%). There was a difference in the categories with the highest frequency in both studies. While Tural Sönmez (2019) stated that there was no content related to the risk and return category, it was concluded that there was no question sample related to the financial landscape category in this study.

Frequency of the codes created according to the categories in the examination of the textbook, value of money (69.01%), planned expenditures (35.21%), payment, expenditure (33.80%), exchange (15.49%), banking transactions (9.85%). The percentage of the remaining codes is below 2. Therefore, from the perspective of financial literacy in the textbook, it has been seen that the type of questions that are mostly related to the value of money, daily or monthly payments, planning, currency calculations, and banking transactions.

The results of the questions and activities determined to be related to financial literacy in the textbook, in terms of PISA financial literacy process dimension and its categories, are presented. Moreover, results were obtained depending on the situation that each question or activity could belong more than one category. All of the questions and activities determined to be related to financial literacy, it was revealed that 97.1% supported the category of analysing information in the financial context. At the same time, there were no questions or activity examples related to the category of applying financial knowledge and understanding. By associating each question with only one category, Tural Sönmez (2019) stated that the frequency of analysing information is 61.5% in the process dimension in the financial context, and there were also examples of questions supporting each category.

In the questions that were found to be related to financial literacy, analysis (51.8%) and comparison (14.5%) codes came to the fore in the frequency order of the identified codes, while the remaining codes were below 10%.

Questions and activities determined to be related to financial literacy in the textbook, the results obtained in terms of the PISA financial literacy context dimension and its categories are presented. Since it is related to financial literacy in the textbook, the category with the highest intensity in the 71 questions and activities included in the research is education and work, and the least mentioned category is social. In the study of Tural Sönmez (2019), it was seen that the highest intensity was in education and work (39.3%), and the least intensity was in the category of home and family (12.8%). It can be said that there is partial agreement in both studies.

If a general evaluation is made about the 71 question or activity samples analysed in the seventh-grade mathematics textbook, it has been determined that the questions-activities in the textbook consist of questions that require simple mathematical operations, and there are examples of questions and activities that only measure the basic concepts of the subjects and touch on the concept of financial literacy superficially. It has been determined that there are no questions or activities that are rich in financial literacy, require reasoning and high-level reasoning ability, fully cover daily life situations, and have the potential to examine the concept of financial literacy in depth. At the same time, it is seen that the question types are constantly repeated in the textbook analysis.

In line with the analysis of the textbook, it is possible to say that the financial literacy dimensions of PISA are not supported very well. Özkale and Özdemir Erdoğan (2017) stated in their study that the 2017 curriculum was weaker than the 2013 curriculum in terms of content, process, and context. In the literature, many studies emphasize the necessity of developing financial literacy (Çelikten, 2020).

In light of all these findings and the literature review, it is seen that there are many different variables related to financial literacy and financial literacy education. However, the necessity of developing studies on financial literacy education in our country emerges with an undeniable importance. For instance, financial education not only increases the level of financial literacy but also covers all of the teaching activities that constitute the financial culture (Mammadova, 2020). Taking into account the studies of countries that include the concept of financial literacy by OECD and PISA exams, discussing the issue of financial literacy in a way that includes all stakeholders of education and relevant institutions, and creating a new education policy in this direction. At the same time, the existing curriculum and textbook contents need to be improved with a new perspective. Day and Ballard (1996) stated that it is easy to use the mathematics curriculum to help teach finance and that economic themes can be used with problems.

In curricula, it may be beneficial to try various teaching sources for the transfer of financial gains, and effective studies can be carried out on the transfer of financial gains to students. The level of financial awareness of students can be increased by enriching the content of the seventh-grade textbook within the scope of financial literacy. Financial literacy can be integrated into any course content, offered as an optional course, or planned as a stand-alone financial literacy course. For financial literacy topics to be integrated into mathematics lessons, mathematics teachers must be knowledgeable enough to discuss mathematical and financial terminology and their social connections (Makonye, 2020; Tanase & Lucey, 2017). Lucey (2007) stated that financial education may not meet the needs of all children because the economic contexts and environments in which children live may differ from each other. Therefore, Makonye (2020) proposed a framework that includes information compatible with students' cultures and backgrounds to teach financial concepts. Moreover, Grody, Grody, Kroman and Sutliff (2008) simply teaching children savings techniques through piggy banks will not be enough; they are taught to understand business relationships, money and investments, credit cards and purchases of tangible items, bill payment mechanisms, monthly statements, retirement savings, taxes, etc. It suggests teaching basic concepts that may be needed in the new age. Schug and Hagedorn (2005) mentioned that concepts such as money, investment, savings, and inflation can be taught at early stages with well-designed financial education programs.

In new research to be carried out in this context, at the secondary school level, mathematics textbooks belonging to different grade levels can be compared in terms of financial literacy. Within the scope of financial literacy, studies including the opinions of teachers can be carried out together with the textbook analysis. Because there is a large gap in the literature regarding financial literacy, it is recommended that various studies and examinations be carried out in this area.

The findings of this study suggest important implications for curriculum development, particularly in addressing the need for a more interdisciplinary approach to financial literacy education. While mathematics plays a central role in building essential computational and

problem-solving skills for personal finance, the development of well-rounded financial literacy requires integration across multiple subject areas. For example, social studies or civics education could provide students with an understanding of government budgets, taxation systems, and economic policies, helping them grasp how financial decisions impact society at large. Science and environmental studies could introduce the economic aspects of sustainability, such as the financial implications of energy consumption or resource management. Likewise, language arts classes could enhance critical thinking by engaging students in analyzing media messages about financial products, advertisements, and consumer rights.

Embedding financial literacy into various disciplines ensures that students not only learn to perform financial calculations but also understand the ethical, social, and global implications of financial decision-making. This cross-curricular approach aligns with the broader educational goal of fostering informed, responsible, and financially capable citizens who can navigate complex economic environments. Future curriculum reforms should, therefore, encourage collaboration between subject teachers and curriculum developers to design learning experiences that reflect the multifaceted nature of financial literacy.

Acknowledgements

This study is based on the dissertation submitted by the first author under the supervision of the second author to the Department of Mathematics Education at Siirt University for a master's degree.

References

Akhan, N., & Kılıçoğlu G. (2014). Ortaokul 8. sınıf öğrencilerinin sosyal bilgiler programında yer alan ekonomi kavramlarını anlama düzeyleri. *Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 16*(2), 24-47.

Altıntaş, Ş., & Keskin, C. (2019). *Ortaokul ve imam hatip ortaokulu matematik 7. sınıf ders kitabı.* Ankara: Eko yay Eğitim Yayıncılık.

Azizah, L. N., & Mahmudi, A. (2020). How does guided inquiry enhancing students' mathematical literacy? An experimental study for mathematics learning. *Southeast Asian Mathematics Education Journal*, *10*(2), 87-96.

Blue, L.E., Maker K. & O'Brien M., (2017). Exploring the classroom practices that may enable a compassionate approach to financial literacy education. *Mathematics Education Research Journal, 30*(2):143-164.

Blue, L. E., & Grootenboer, P. (2019). A praxis approach to financial literacy education. *Journal of Curriculum Studies, 51*(5), 755-770.

Çelen, F. K., Çelik, A., & Seferoğlu, S. S. (2011). Türk eğitim sistemi ve PISA sonuçları. *Akademik Bilişim*, *2*(4), 1-9.

Çelikten, L. (2020). *Marmara finansal okuryazarlık programının geliştirilmesi ve ilkokul 4. sınıf öğrencilerinin finansal okuryazarlık becerilerine etkisinin incelenmesi.* (Doktora tezi). Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.

Day, H. R. & Ballard, D., (1996). The Classroom Mini-Economy: Integrating Economics into the Elementaryand Middle School Curriculum. https://files.eric.ed.gov/fulltext/ED425112.pdf

Gold, L. A. (2021). Financial literacy in the ohio k-2 classroom: A mixed methods study. *International Journal of Primary, Elementary and Early Years Education, 50*(6), 722-736.

Grody, A. D., Grody, D., Kromann, E., & Sutliff, J., (2008*). A financial literacy and financial services program for elementary school grades-results of a pilot study*. http://dx.doi.org/10.2139/ssrn.1132388

Güvenç, H. (2017). Öğretim programlarımızda finansal okuryazarlık. *Elementary Education Online, 16*(3), 935-948.

Hopkins, S., & O'Donovan, R. (2021). Using complex learning tasks to build procedural fluency and financial literacy for young people with intellectual disability. *Mathematics Education Research Journal,3,*163-181.

Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumeraffairs, 44*(2), 296-316.

Iterbeke, K., De Witte, K., Declercq, K., & Schelfhout, W. (2020). The effect of ability matching and differentiated instruction in financial literacy education. Evidence from two randomised control trials. *Economics of Education Review,* 78, 101949.

Karaaslan, H. (2020). *Ortaokul öğrencilerinin finansal okuryazarlık düzeylerinin belirlenmesi*. (Yayımlanmamış yüksek lisans tezi). Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Klapper, L. F., Lusardi, A., & Panos, G. A. (2012). Financial literacy and the financial crisis. *National Bureau of Economic Research.* (No. w17930).

Klapper, L., & Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management, 49*(3), 589-614.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 159-174.

Lucey, T. (2007). The art of relating moral education to financial education: An equity imperative. *Social Studies Research and Practice*, *2*(3), 486–500. https://doi.org/10.1108/SSRP-03-2007-B0015

Lucey, T. A., & Maxwell, S. A. (2011). Teaching mathematical connections to financial literacy in grades k–8: Clarifying the issues. *Investigations in Mathematics Learning, 3*(3), 46–55.

Mahmudi A., Listayni D.H. (2019). Analysis of students' financial literacy skills on mathematics teaching and learning. *Journal of Physics Conference Series 1320(1)*:012044.

Makonye, J. P. (2020). Towards a culturally embedded Financial Mathematics PCK framework. *Research in Mathematics Education, 22*(2), 98-116. https://doi.org/10.1080/14794802.2020.1752788

Mandell, L., & Klein, L. S. (2009). The impact of financial literacy education on subsequent financial behavior. *Journal of Financial Counselingand Planning, 20*(1).

Mammadova, G. (2020). *İlkokul ve ortaokul öğretim programlarındaki kazanımlarda finansal okuryazarlıkla ilgili öğrencilerin tutum ve görüşleri*. (Yüksek lisans tezi). Gazi Üniversitesi Eğitim Enstitüsü, Ankara.

MEB. (2016). Bütçemi yönetebiliyorum projesi eğiticilerin eğitimi. http://hbogm.meb.gov.tr/www/butcemiyonetebiliyorum-projesinde-81-ilimizin-egitici-egitimi-gerceklestirildi/icerik/500.

Miles, M, B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook. (2nd ed)*. Thousand Oaks, CA: Sage.

OECD. (2011). Education at a glance 2011*: OECD Indicators, OECD Publishing.*

OECD. (2012). PISA 2012 financial literacy framework.

OECD. (2017). "PISA 2015 Financial Literacy Framework", in PISA 2015 Assessment and Analytical Framework: Science, Reading, Mathematics and Financial Literacy and Collaborative Problem Solving*, OECD Publishing*, Paris, https://doi.org/10.1787/9789264281820-en.

OECD. (2019). PISA 2018 Assessment and Analytical Framework. OECD Publishing.

OECD. (2020). PISA 2018 results (Volume IV): Are students smart about money?*,PISA, OECD Publishing,* Paris, https://doi.org/10.1787/48ebd1ba-en.

OECD. (2024), PISA 2022 Results (Volume IV): How financially smart are students?, *PISA, OECD Publishing,* Paris, https://doi.org/10.1787/5a849c2a-en.

Özdemir, B. (2020). *Lise öğrencileri için finansal okuryazarlık programı geliştirilmesi ve etkilerinin değerlendirilmesi.* (Yayımlanmamış yüksek lisans tezi). Sakarya Üniversitesi Eğitim Bilimleri Enstitüsü, Sakarya.

Özkale, A. (2018). *Finansal okuryazarlık ve matematiksel okuryazarlık perspektifinde Türkiye ve Kanada (Ontario) öğretim programlarının incelenmesi ve bir model önerisi*. (Doktora tezi), Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü*,* Eskişehir.

Özkale, A. & Özdemir Erdoğan, E. (2017). Finansal okuryazarlık ve Türkiye matematik öğretim programlarındaki konumu*. International Journal of Human Sciences, 14*(4), 4869-4883.

Özkale, A., & Özdemir Erdoğan, E. (2022). An analysis of the interaction between mathematical literacy and financial literacy in PISA. *International Journal of Mathematical Education in Science and Technology*, *53*(8), 1983-2003.

PISA. (2018). Insightsand interpretations. Andreas Schleicher.

PISA. (2015). PISA results in focus. *OECD Better Policies for Better Lives,* 1-31. https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf.

Sagita, L., Putri, R. I. I., Zulkardi, & Prahmana, R. C. I. (2022). Promising research studies between mathematics literacy and financial literacy through project-based learning. *Journal on Mathematics Education, 13*(4), 753-772. http://doi.org/10.22342/jme.v13i4.pp753-772

Salas-Velasco, M., Moreno-Herrero, D., & Sánchez-Campillo, J. (2021). Teaching financial education in schools and students' financial literacy: A cross-country analysis with PISA data. *International Journal of Finance & Economics, 26*(3), 4077-4103. https://doi.org/10.1002/ijfe.2005

Sawatzki, C. M., & Sullivan, P. A. (2018). Shopping for shoes: Teaching students to apply and interpret mathematics in the real world. *International Journal of Science and Mathematics Education, 16*(7), 1355–1373. https://doi.org/10.1007/s10763-017-9833-3

Sawatzki, C. (2013). What financial dilemmas reveal about students' social and mathematical understandings. In V. Steinle, L. Ball, & C. Bardini (Eds.), *Proceedings of the 36th Annual Conference of the Mathematics Education Research Group of Australasia* (pp. 602–609). Melbourne: MERGA.

Sawatzki, C. (2017). Lessons in financial literacy task design: authentic, imaginable, useful. *Mathematics Education Research Journal, 29*, 25–43. https://doi.org/10.1007/s13394-016-0184-0

Seginer, R., Vermulst, A., & Shoyer, S. (2004). The indirect link between perceived parenting and adolescent future orientation: A multiple-step model. *International Journal of Behavioral Development*, *28(*4*),* 365-378. https://doi.org/10.1080/01650250444000081

Sole, M. A. (2014). Financial literacy: An essential component of mathematics literacy and numeracy. *Journal of Mathematics Education at Teachers College*, *5*(2*),* 55-62.

Sullivan, P. A., Askew, M., Cheeseman, J., Clarke, D.M., Mornane, A., Roche, A., & Walker, N. (2014). Supporting teachers in structuring mathematics lessons involving challenging tasks. *Journal of Mathematics Teacher Education*. doi:10.1007/s10857-014-9279-2.

Tanase, M. F., & Lucey, T. A. (2017). Pre-service teachers' awareness of interdisciplinary connections: Mathematics, financial literacy, and social justice issues. *Investigations in Mathematics Learning, 9*(1), 2-18. https://doi.org/10.1080/19477503.2016.1245027

Tural Sönmez, M. (2016). *Yedinci sınıf öğrencilerinin matematiksel modelleme etkinlikleriyle matematikselleştirme süreçlerinin ve finansal okuryazarlıklarının incelenmesi.* (Doktora tezi). Hacettepe Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Tural Sönmez, M. (2019). Yedinci sınıf matematik ders kitabında yer alan problemlerin finansal okuryazarlığı bağlamında incelenmesi. *Cumhuriyet International Journal of Education, 8*(1), 1-23.

White, A. L. (2011). School mathematics teachers are super heroes. *Southeast Asian Mathematics Education Journal*, *1*(1), 3-17.

Yıldırım, A., Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık.