



The impact of educational digital games on financial literacy in 4th grade social studies courses *

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Abstract

In a rapidly digitizing world, technological developments offer significant opportunities in all areas, including education. The purpose of this study is to examine the effect of educational digital games on the acquisition of financial literacy skills in social studies courses. A mixed research method involving an embedded experimental design was used in this study. The study group consisted of a total of 54 fourth-grade elementary school students attending a public school, selected using criterion sampling and simple random sampling methods. Of these students, 27 were assigned to the experimental group and 27 to the control group. Quantitative data were collected using the Financial Literacy Scale for Elementary School Students and the Financial Literacy Academic Achievement Test, while qualitative data were collected through student journals, field notes, researcher journals, and semi-structured interviews. Because the quantitative data showed a normal distribution, parametric tests were used: t-tests for dependent and independent samples and one-way analysis of variance (ANOVA). Effect sizes were calculated for the results obtained from the paired-sample t-test. Qualitative content analysis was used to analyze the qualitative data. The findings show that teaching through educational digital games increases students' academic achievement, positively affects the sustainability of learning, and improves financial literacy. Furthermore, the qualitative results reveal that students understand the courses better, enjoy themselves during class, enjoy the time they spend in class, and are more motivated when courses are taught using educational digital games. In this study, educational digital games were used in the financial literacy education process. For future research, it is recommended that comprehensive studies be conducted to comparatively evaluate the effectiveness of different teaching methods. Such studies can contribute to determining the most effective teaching strategies for imparting financial literacy skills, especially for educators and policymakers.

Keywords

Elementary school
Social studies
Educational digital games
Digital games
Financial literacy skills

Article Info

Received: 08.08.2024
Accepted: 12.22.2025
Published Online: 04.30.2026

DOI: 10.15390/ES.2026.2512

* This article is derived from Sinan Özer's PhD dissertation entitled "The effect of educational digital games on financial literacy in the 4th grade social studies course", conducted under the supervision of Ali Ersoy.

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Introduction

Financial concepts are an integral part of economic life. These concepts are terms that individuals frequently encounter but often struggle to fully understand. These terms can be used in various contexts, both in daily life and in economic discussions. Terms such as borrowing, saving, financial asset management, investment, and income can be given as examples of financial concepts (Öztürk, 2021). Financial literacy refers to the skills necessary for individuals to make informed decisions when faced with increasingly complex financial issues in today's world. It requires knowledge about topics such as credit cards, debt management, investments, and retirement planning, as well as the ability to use this knowledge effectively. Financial literacy is becoming increasingly important and is globally recognized in terms of coping with changes in financial markets and economic difficulties (Adalar, 2019; Organisation for Economic Co-operation and Development [OECD], 2020). Individuals who benefit themselves and the country's economy use financial products correctly, make smart investments, and manage risks effectively. On the other hand, individuals lacking financial knowledge may encounter difficulties and contribute to economic instability. Therefore, conducting risk and return analysis before making investment decisions is crucial (Bayrakdaroğlu & Bilge, 2018). Conducting risk and return analysis also requires the effective use of financial literacy skills.

Today's youth are increasingly forced to take more responsibility for their financial future in an increasingly complex world. Young adults learning to live independently and actively participate in social life must also acquire skills such as budgeting, making sound financial decisions, managing risks, and saving for future uncertainties in their daily lives. Financial literacy is a fundamental life skill for both individuals and societies. It is necessary for making informed financial decisions in daily life and retirement planning. Individuals with high financial literacy skills can make more informed and accurate decisions on financial matters such as money management, bill payments, credit card use, money transfers, budgeting, savings, and retirement savings. Therefore, increasing individuals' level of financial literacy is of great importance for both their personal development and the welfare of societies (Fidancı, 2021).

Financial literacy is recognized as a fundamental life skill for individuals to successfully integrate into society, and financial literacy education plays an extremely important role in helping individuals acquire this skill. Financial literacy education is a process that aims to develop the knowledge, skills, and attitudes necessary for individuals to make informed decisions about financial matters. Government agencies take various steps to protect individuals, include them in the formal financial market, and facilitate their access to this market. One of these steps is to impart financial literacy skills through financial education. Promoting financial literacy has two main objectives: to increase individuals' participation in the financial system and to ensure that they effectively protect themselves when using their financial access. Today, children encounter financial products and services at an earlier age than expected (OECD, 2020). This situation shows that financial literacy can shape children's financial attitudes and behaviors, which can positively affect their financial decision-making skills in adulthood (Zhu et al., 2021). However, it is also emphasized that financial literacy levels among young people are low and that acquiring financial literacy at an early age is important (Amagir et al., 2022; Lusardi, 2019). Without education to increase financial literacy, individuals in society may be unable to use financial products and services adequately due to a lack of financial knowledge. Furthermore, they may not understand the positive contribution these financial products can make to their lives. This situation may lead them to avoid using financial products, negatively affecting the financial market structure of countries (Er & Çetintaş, 2018).

It is stated that the most learning outcomes related to financial literacy belong to social studies, and that this course has the most comprehensive content in this area among compulsory courses (Güvenç, 2017). Social studies education focuses on helping students understand how events unfold and how people relate to each other, rather than just memorizing facts. This education also enables children to discover how to respond to the desires and needs of others. Furthermore, it teaches ways to respect different opinions and cultures. In summary, social studies is a discipline that examines the

political, cultural, economic, and geographical aspects of societies from the past to the present and into the future (Farris, 2004). The social studies course aims to cultivate citizens who have embraced fundamental democratic values, respect human rights, are environmentally conscious, possess critical thinking skills, can make sound decisions, have developed social participation skills, are productive, and are aware of both their rights and responsibilities. One of the most important goals of this course is to cultivate individuals with financial literacy skills. Although financial literacy is a subfield of economics, social studies is one of the most suitable subjects for teaching these skills at the elementary and middle school levels (Arıkan, 2021). Various technology-supported teaching strategies are effectively used in social studies courses. The discipline of social studies is a multifaceted field covering areas such as history, geography, anthropology, archaeology, and politics, and it is of great importance in terms of raising effective citizens with critical thinking and decision-making skills in democratic societies. The use of technology contributes to students' academic skills as well as their awareness of democracy. In this context, technology supports the development of students' higher-order cognitive skills in social studies courses, such as reflective thinking, research, problem solving, critical thinking, and decision making (Baloğlu Uğurlu, 2012; Dai et al., 2022).

Considering the importance of technology use in social studies courses, educational digital games stand out as an effective tool for developing skills within the scope of social studies. Educational digital games aim to develop students' cognitive and affective skills through the use of various technological tools (Aksoy, 2014). Educational digital games can significantly contribute to learning success in education (Coleman & Money, 2019; Mandouit & Hattie, 2023). Some studies show that educational digital games are an effective teaching approach and have positive effects on improving students' academic achievement in various subject areas (Clark et al., 2016). Educational digital games stand out as an important tool in increasing students' learning motivation (Fadda et al., 2022) and in imparting financial literacy skills (Samur, 2016). By providing an interactive learning experience, educational digital games can increase student motivation while also facilitating progress toward specific educational goals.

Consequently, conducting studies in Türkiye to improve students' financial literacy through educational digital games is important in terms of ensuring the effective use of technology in education and imparting financial literacy skills. Educational digital games help students learn abstract financial concepts in a concrete and lasting way (Cheng et al., 2015). These games increase academic achievement while enabling students to be more conscious when making financial decisions (Sabırlı, 2018). It can be said that digital games are particularly effective learning tools for topics such as income, expenses, budgeting, and balance.

Social studies at the elementary school level is one of the most suitable subjects for teaching financial literacy skills. This subject covers historical, social, economic, and political topics, providing students with a multifaceted and holistic perspective. It also facilitates students' connection to the real world through extracurricular activities. Field trips to historical marketplaces, visits to economic zones, and fieldwork conducted with banks contribute to the development of students' financial skills (Akengin & Ersoy, 2015). Teaching financial literacy in social studies courses enables students to acquire skills such as making financial decisions and saving money (Akhan, 2009). It is emphasized that teaching financial literacy as a separate subject in schools or incorporating it into existing curricula provides students with an effective learning opportunity (OECD, 2012). The reason for choosing educational digital games to impart financial literacy skills in this study is the impact of technological developments and digital games on teaching processes. This will help understand the role of technological innovations in equipping students with the targeted knowledge and skills and evaluate the impact of educational digital games on imparting financial literacy skills.

This study, which aims to examine the effect of educational digital games on the acquisition of financial literacy skills in 4th grade social studies courses, seeks to answer the following questions:

1. What is the effect of educational digital game-supported teaching activities on students' academic achievement in financial literacy?
2. What is the effect of educational digital game-supported teaching activities on students' attitudes and behaviors towards financial literacy?
3. What are the views of students on educational digital game-supported teaching activities in terms of gaining financial literacy awareness?

Method

Research Model

This study, which examines the effect of educational digital games on developing financial literacy skills in fourth-grade social studies courses, employed a mixed-methods design. The purpose of mixed-methods research is to combine multiple data sources to provide a deeper understanding of the research problem than studies using a single approach (Guest & Fleming, 2015). Mixed methods are preferred when there is only one data source and the data cannot reflect all aspects of the research, and when more data is needed (Creswell & Plano Clark, 2018). One of the four designs mentioned by Creswell and Plano Clark (2018) for mixed methods research is the embedded experimental design. In this design, the quantitative data collected form the core data set of the research, while the qualitative data are used to support the collected quantitative data set. In some cases, the opposite is true, and quantitative data are used to support qualitative data. The research process is schematically presented in Figure 1.

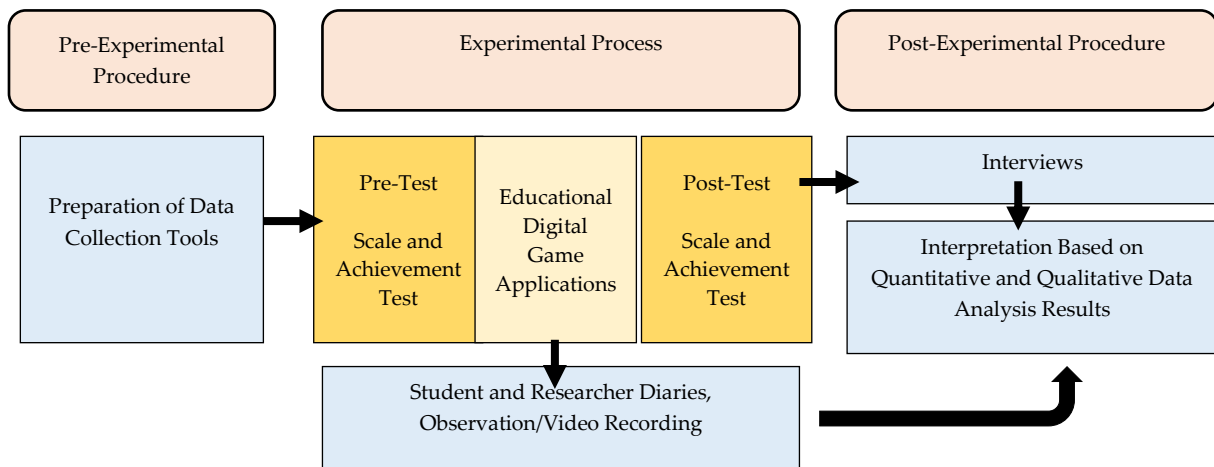


Figure 1. Embedded Experimental Design Research Process

Study Group

Due to the mixed-methods design of the study, different sampling techniques were utilized in the sample selection process. Although financial literacy is an important skill for all age groups, acquiring it at an early age enables individuals to establish a more solid financial foundation in their later lives. Given the importance of acquiring financial literacy skills at an early age, the sample group for the study consists of fourth-grade elementary school students. A criterion sampling technique was used to determine the school where the implementation would be carried out. Yıldırım and Şimşek (2013) stated that the criteria mentioned in criterion sampling can be prepared in advance by the researcher in the form of a list and that all these criteria should be met. The main criteria in this study are the availability of an internet network in the school and the connection speed of this internet network being good when multiple computers are connected at the same time, and the availability of a sufficient number of computers in the school to carry out the a implementation. In accordance with the defined

criteria, a public school located in the district center of A Province was selected for the implementation. To determine the experimental and control group students for the implementation, the Financial Literacy Academic Achievement Test prepared by the researcher (first author) and the Financial Literacy Scale for Primary School Students developed by Özer and Ersoy (2022) were administered as pre-tests to fourth-grade students at the school. According to the results of the tests and scales administered, there was no significant difference between the classes. A lottery was held to determine the experimental and control groups. According to the lottery results, class 4/B (14 girls and 13 boys) was determined as the experimental group, and class 4/D (15 girls and 12 boys) was determined as the control group. The age statistics of the experimental and control group students are given in Table 1. The pre-test results are presented in the findings section.

Table 1. Age Statistics of the Experimental and Control Groups

Grade	AR	\bar{X}	S
Experimental Group	9~11	9.81	0.48
Control Group	9-11	9.92	0.47

According to the data presented in Table 1, the age range of the experimental and control group students varies between 9 and 11. The mean age of the experimental group is $\bar{X} = 9.81$, while that of the control group is $\bar{X} = 9.92$.

Data Collection Tools

Quantitative data collection tools

To collect quantitative data in the study, the Financial Literacy Academic Achievement Test and the Financial Literacy Scale for Primary School Students (Özer & Ersoy, 2022) were used from the social studies course "Production, Distribution, and Consumption" learning domain.

Financial Literacy Academic Achievement Test

In order to measure students' success in the study, the Financial Literacy Academic Achievement Test was developed for the social studies course learning domain "Production, Distribution, and Consumption." During the development of this test, the 4th grade Social Studies Course Curriculum was examined to determine the appropriate subject area and learning outcomes for the use and implementation of financial literacy skills within the scope of the study. As a result of the review, it was decided that the learning domain "Production, Distribution, and Consumption," which is directly related to the acquisition of financial literacy skills in the 4th grade Social Studies Course Curriculum, would be selected as the subject domain for the academic achievement test.

Social Studies Course "Production, Distribution, and Consumption" learning domain while preparing the Financial Literacy Academic Achievement Test, the researcher analyzed all the learning outcomes in the unit. These analyses were based on Bloom's Taxonomy, a descriptor table was prepared, and expert opinions were sought. After the learning outcomes were determined, five core learning outcomes were selected, and a total of 40 multiple-choice questions with four options were drafted, with eight questions for each learning outcome. These learning outcomes are: "Makes conscious choices by distinguishing between wishes and needs, recognizes basic economic activities within their family and immediate environment, exhibits conscious consumer behavior as a responsible individual, creates their own budget, and uses resources in their environment without waste." In preparing the question pool, 4th grade social studies textbooks, the Education Information Network (EIN), and other supporting resources were utilized. The draft questions were reviewed by a group consisting of social studies education experts, assessment and evaluation experts, curriculum development experts, and classroom teachers, and feedback was obtained from experts regarding the scope, clarity, and level appropriateness of the questions. Based on the feedback from the experts, distractors in four questions were corrected, and the root of one question was changed. With these adjustments, the 40 draft questions were finalized as. A pilot implementation was conducted with 31 students in the 4th grade to determine the time required for students to answer the test and its level of comprehensibility. Before

the implementation, students were asked to indicate any parts they did not understand, and after the implementation, they were asked to provide feedback on the adjustments that should be made to the test. Students were given 30 minutes for the pilot test (the course duration was set at 30 minutes during the pandemic), and the fastest student completed the test in 21 minutes, while the slowest student completed it in 35 minutes (the second-to-last student completed it in 30 minutes). No intervention was made until the students completed the test, and most students completed the test within 30 minutes: This shows that the time given was sufficient. Feedback from students revealed that there were no problems in understanding the questions and options in the test. In light of these data, it was decided to conduct a reliability study of the draft achievement test. The draft achievement test was administered to 200 students (girls: 105, 52.5%; boys: 95, 47.5%) in the 4th grade of three elementary schools located in the center of District A, Province A, during the 2021-2022 academic year. The test was scored as "1 (one)" for correct answers and "0 (zero)" for incorrect answers. After the implementation, the students' answers were analyzed using the Test Analysis Program (TAP). As a result of the analysis, the students' scores were ranked from highest to lowest, and the top and bottom 27% groups were determined. In the analysis, the discriminative value ("r") and item difficulty indices ("p") of the students' answers to each question were calculated. These analysis results are presented in Table 2.

Table 2. Financial Literacy Academic Achievement Test Item Analysis

Question Number	Difficulty (p)	Item Discrimination (r)	Question Number	Difficulty (p)	Item Discrimination (r)
1	0.25*	0.06*	21	0.79	0.56
2	0.69	0.46	22	0.67	0.68
3	0.82*	0.24*	23	0.51	0.79
4	0.79	0.45	24	0.72	0.64
5	0.72	0.66	25	0.72	0.58
6	0.87*	0.29*	26	0.55	0.68
7	0.77	0.47	27	0.54	0.73
8	0.77*	0.24*	28	0.44	0.35
9	0.53	0.62	29	0.64	0.64
10	0.57	0.75	30	0.80	0.49
11	0.60	0.75	31	0.69	0.82
12	0.67	0.62	32	0.66	0.58
13	0.52	0.61	33	0.60	0.62
14	0.57	0.75	34	0.78	0.53
15	0.64	0.42	35	0.69	0.68
16	0.71	0.57	36	0.71	0.65
17	0.61	0.76	37	0.67	0.57
18	0.68	0.48	38	0.58	0.80
19	0.79	0.56	39	0.74	0.64
20	0.72	0.51	40	0.62	0.69
Total				0.66	0.57

*Questions marked with an asterisk have been removed from the test.

According to the literature, items with a discriminant index below 0.20 are considered to have very low discriminant validity and should be excluded from the test. Items with indices between 0.20 and 0.29 can be revised and reused in the test, while items with indices of 0.30 and above are considered good and can be used without modification (Baykul, 2015). Looking at the discrimination index of the items in Table 2, the index value of question 1 is less than 0.20, while questions 3, 6, and 8 are between 0.20 and 0.29. According to the literature, these questions can be used after correction. Since there were enough questions in the test measuring the same achievement, these four questions were removed from the test. As a result of this adjustment, 36 questions remained. According to Table 2, the item

discrimination indices range from 0.35 to 0.82, and the test's average discrimination index (r) is 0.57, indicating that the test has a good level of discrimination. The item difficulty indices range from 0.44 to 0.80, and the average difficulty index is 0.66. The difficulty index varies between 0 and 1, with questions becoming easier as the index approaches 1 and more difficult as it approaches 0 (Gömleksiz & Erkan, 2010). The reliability coefficient (KR-20) of the test was found to be 0.92, indicating that the test has high reliability (Büyüköztürk, 2014).

Financial Literacy Scale for Elementary School Students

The exploratory factor analysis (EFA) of the Financial Literacy Scale for Elementary School Students (Özer & Ersoy, 2022), developed to determine the financial literacy attitudes and behaviors of elementary school students, was conducted with 294 fourth-grade students attending public schools in District A of Province A. As a result of the reliability analysis, the overall Cronbach's alpha coefficient of the scale was calculated as 0.77. The Cronbach's alpha coefficients for the subscales of the scale ranged from 0.65 to 0.67. In this context, considering that the acceptable lower limit for reliability is determined as 0.60 according to Özdamar (2016), both the scale as a whole and its sub-dimensions can be considered sufficient in terms of reliability. As a result of the EFA, 40.9% of the total variance was explained, and a 3-subdimension scale consisting of 17 items was obtained: *Planned Individual*, *Thrifty Individual*, and *Wasteful Individual*. The scale is a 3-point Likert type, and the score for each question ranges from 1 to 3. The *Planned Individual* sub-dimension consists of 5 items, the *Thrifty Individual* sub-dimension consists of 4 items, and the *Wasteful Individual* sub-dimension consists of 8 items. The score that can be obtained from the *Planned Individual* subscale ranges from 5 to 15, from the *Thrifty Individual* subscale from 4 to 12, and from the *Wasteful Individual* subscale from 8 to 24. High scores reflect individuals' more planned, thrifty, and wasteful behaviors. Sample items are as follows: "I prepare a weekly plan when making my expenses" (*Planned Individual*), "I save the pocket money I collect during holidays or special occasions" (*Thrifty Individual*), "I want to buy a product I want even if it is expensive" (*Wasteful Individual*). Possible score ranges for the *Planned individual* sub-dimension are: 5-7 Points (Low level of planned individual), 8-11 Points (Medium level of planned individual), 12-15 Points (High level of planned individual): Students in this score range are individuals who plan their spending regularly and in detail. For the *thrifty individual* subscale: 4-5 points (low level of thriftiness), 6-8 points (moderate level of thriftiness), 9-12 points (high level of thriftiness): Students in this score range place great importance on saving and carefully managing their financial resources. For the *wasteful individual* subscale: 8-12 points (Low level of wastefulness), 13-18 points (Moderate level of wastefulness), 19-24 points (High level of wastefulness): Students in this score range are individuals who cannot control their spending and generally consume wastefully. After EFA, confirmatory factor analysis (CFA) was performed on 273 fourth-grade students attending public schools in District A of Province A. The χ^2/df value was found to be 1.38 (Ideal Fit: ≤ 2.00 , Good Fit: 2.00-5.00), the RMSEA value was 0.023 (Ideal Fit: 0-0.05, Good Fit: 0.05-0.08), the SRMR value was 0.049, and the CFI value was 0.98 (Ideal Fit: 1.00, Good Fit: 0.95-1.00), and TLI value 0.97 (Ideal Fit: 1.00, Good Fit: 0.90-1.00). These values indicate that the model shows ideal fit and provides high fit (Özdamar, 2016). The item factor load values obtained from EFA ranged from 0.439 to 0.840, while the factor load values obtained from CFA analysis ranged from 0.31 to 0.82.

Qualitative data collection tools

In this study, the following qualitative data collection tools were utilized: semi-structured interviews, observations, video and audio recordings, student journals, and researcher journals. These tools were employed to determine students' financial literacy skills, the impact of educational digital games on the development of these skills, students' interactions with the games, and the role of games in the learning process. When preparing the semi-structured interview questions, the literature was consulted, taking into account the purpose of the research. The questions were designed to gain an in-depth understanding of students' financial literacy skill development processes, the impact of educational digital games on these processes, and their knowledge and thoughts. Therefore, sub-questions were also included to ensure the questions were fully understood and to obtain more detailed data. The five questions prepared include experience, knowledge, and opinion questions. For example, the question "Which game(s)/application(s)/activity(ies) did you like the most in financial literacy

courses? Can you give an example? Why?" aims to understand students' experiences of learning financial literacy through games. The draft questions were submitted to experts (two experts in the field of primary education and two classroom teachers) for their opinion. Based on the feedback received from the experts, the necessary adjustments were made to the questions, which were then used in student interviews. In addition, observations, video and audio recordings, student journals, and researcher journals were used as qualitative data collection tools. Observations were made to understand students' interactions with educational digital games, their behavior while playing games, their interest in the games, and their level of focus. Audio recordings were used to record student interviews, ensuring that student statements could be accurately analyzed. Video recordings were used to provide more detail about the observations and to support the interview analysis. Student journals allowed students to express in writing their experiences with the games, the financial concepts they learned, and how the games helped their learning by giving them a form containing three questions. The researcher's journal was used to record the researcher's observations, analyses, and comments throughout the process, with detailed notes taken on the interviews conducted with students and the behaviors observed. These tools enabled an in-depth analysis of the qualitative data.

Process and Implementation

Course plans for the lessons to be taught were prepared prior to the implementation. The necessary permissions were obtained from the Anadolu University Social and Human Sciences Scientific Research and Publication Ethics Committee prior to the implementation. Prior to the implementation, a pilot study was conducted with 28 elementary school students in the 4th grade at an elementary school located in the center of A District, A Province. The pilot study was conducted over a period of four weeks after obtaining the necessary permissions from the school administration and the classroom teacher. The study was conducted using 8 computers in the school's computer lab. When planning the implementation, an environment reflecting the school environment was created, and possible problems were identified in advance. The games were designed to last an average of three to four minutes each, and a course plan was prepared so that three students would play the games in turn on each computer. No problems related to the internet connection or computers were encountered during the pilot implementation, but high data usage was observed during the implementation. To address this issue, measures were taken to check the internet speed at the school where the experimental implementation would take place and to ensure there were no problems with data usage. A temporary solution using a mobile internet connection was planned in case of any negative circumstances. While teaching the course with educational games and at the end of the course, students were asked for their opinions and feedback was recorded. The feedback received indicated that the time was insufficient in two games, objects falling from above were too fast in one game, the instructions at the bottom of the screen were difficult to read in another game, and one game was very difficult to play. Necessary adjustments were made based on this feedback, and the games were finalized for the experimental implementation.

Digital Game-Supported Instruction Program

The educational digital games used in this study were designed in accordance with the analysis, design, development-implementation, and evaluation stages of the "Spiral Educational Game Design Model" developed by Akgün et al. (2011). During the educational analysis phase, the financial literacy-related learning outcomes included in the 4th grade Social Studies Course Curriculum were identified. Based on a literature review, the financial literacy knowledge that 4th grade students should possess, the purpose of the game, and its content were determined. Accordingly, the content to be used in the game was created. When moving on to the game analysis phase, considering the data obtained from the educational analysis and the limited digital gaming experience of elementary school students, as indicated by, a two-dimensional, individually playable game style was preferred. During the educational design phase, decisions were made on how components such as motivation, interaction, narrative context, motivation, and adaptation would be incorporated into the game. The design process was carried out in collaboration with three social studies education experts and two computer and instructional technology education experts. After deciding on the game design based on the experts'

opinions, the platform on which the game would be developed was determined. In this research, Web 2.0 tools such as Wordwall and Scratch were used in the development of digital games; activities such as matching, object finding, and Jigsaw puzzles were designed on Wordwall, while Scratch was used to create original game content through block-based coding. In addition, ready-made recycling-themed digital games available on the Cevkococuk.org website were also used. The games are available on these sites under the name Production, Distribution, Consumption unit for 4th grade. The stage designs for the games designed during the development phase were created. The developed games were subjected to internal evaluation by taking into account the opinions of primary education, social studies education, and classroom teacher experts. In line with the opinions, adjustments were made regarding issues such as the appropriateness of the visuals and objects used in the game to the level and achievements. As explained above, in the implementation phase, a pilot implementation study of the games was conducted, and the researcher observed how the students played the games and identified any overlooked or errors found by the students. In the evaluation phase, it was decided to use the educational digital games developed based on expert opinions and pilot implementation results in the implementation phase of the research, as the game content was found to be appropriate for the learning outcomes and student level. After the pilot study, the necessary changes were made to the educational digital games, and the implementation process began.

The implementation lasted six weeks. The researcher conducted the educational digital game-supported teaching implementation prepared to impart financial literacy skills to the 4th graders in the experimental group. The courses were conducted in accordance with the prepared lesson plans, with three lessons per week for a total of 18 lessons over six weeks. The last three lessons were conducted for evaluation purposes. The implementation was planned so that two games would be played in each lesson. Which student would play which game on which computer was indicated by a compass hung on the front of the computers. Before playing the games, each game was introduced to the students via the interactive whiteboard. Eight students played the games at each stage. The remaining students waited their turn in their seats. The games were played in a competitive environment, and at the end of the course, small prizes were given to the winners of each game. This motivated the students who were waiting for their turn to play. The students did not find it difficult to play the games in class. Only a few students had problems using the mouse. The researcher took on the role of a guide in the course and intervened when necessary. The setup of the computers in the classroom and the seating arrangements of the students while playing the games are shown in Figure 2. In the control group, courses were conducted in accordance with the existing curriculum for six weeks. The control group followed their courses with their own teachers. Every week, regular meetings were held with the control group's teacher to gather information about how the courses were conducted and the teaching methods used. Courses in the control group were conducted by the teacher using teaching methods that did not include educational digital games. During this process, student participation in the course was ensured through strategies such as lesson narration, question-and-answer activities, and the use of interactive whiteboards. In addition, visual and auditory materials were presented to students in relation to the content of the courses, with the aim of contributing to the understanding of the courses. Visuals from the educational digital games used in the study (Figure 3 and Figure 4) are presented below.

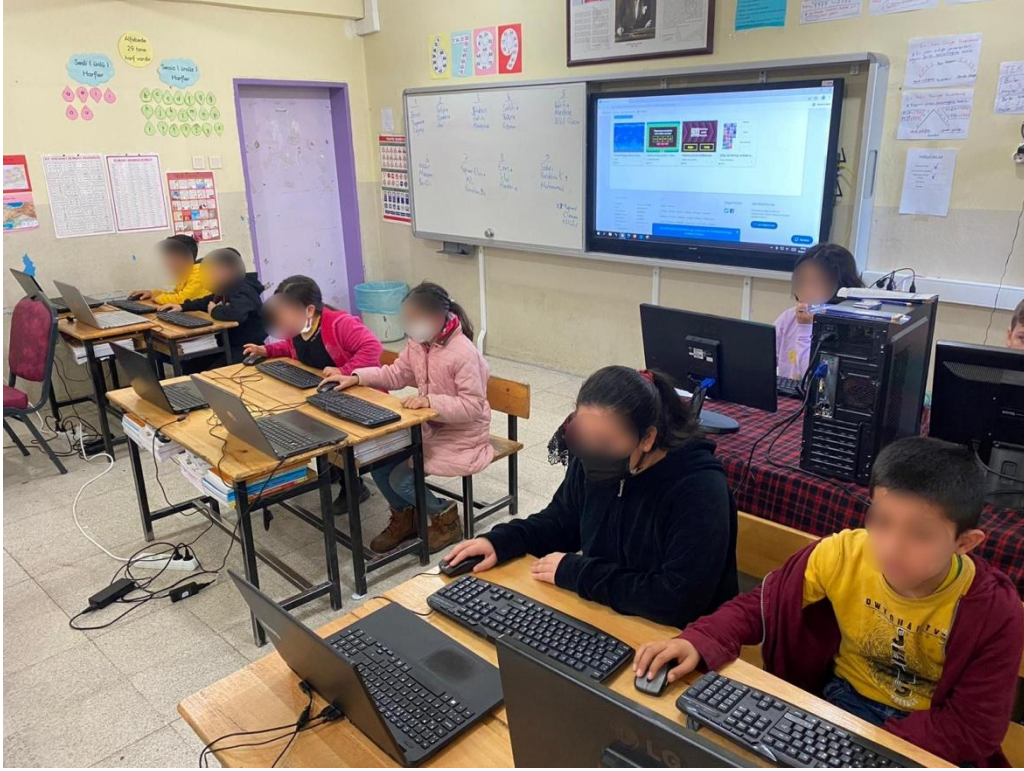


Figure 2. Students' Seating Arrangements at Computers



Figure 3. I'm Getting My Needs Game



Figure 4. Recycling Game

Measures Taken Regarding Validity and Reliability

Since a mixed method was used in the research, both quantitative and qualitative data were utilized. The validity and reliability data for the quantitative data collection tools, namely the Financial Literacy Academic Achievement Test and the Financial Literacy Scale for Primary School Students (Özer & Ersoy, 2022), are presented above under the heading of quantitative data collection tools. For qualitative data, credibility, transferability, consistency, and confirmability studies were conducted (Erlandson et al., 1993). *Credibility*: To ensure credibility in the study, various data collection tools such as pre-implementation, during-implementation, and post-implementation achievement tests, scales, observations, interviews, student journals, and researcher journal were used. This method ensured that data was collected from different sources and that multiple types of data were included in the process. Since the researcher was also the implementer, he spent a long time in the research environment, thus obtaining contextually rich data and conducting comprehensive observations. A systematic approach was adopted in the stages of preparing data collection tools, analyzing data, and finalizing themes. To prevent data loss, courses were recorded on video and audio, and computer screens were also recorded using screen recording software. To increase the credibility of the research, sample excerpts from classroom and screen images are presented in Figure 5.



Figure 5. Images from the Implementation

Transferability: The research process has been described in a detailed and transparent manner. Code names were used to protect the privacy of participants, and direct quotations were presented using these code names. All stages of the research, including details about the pre-research, implementation, and post-research phases, were conveyed with an unbiased approach. *Consistency:* The data obtained from the data collection tools used in the research have been structured in a way that supports each other, and content consistency has been ensured between data sources. Visual and auditory data have been carefully analyzed for accuracy; in particular, video recordings have been watched by the practitioner to confirm the accuracy of the analysis process and prevent possible data loss. Thus, methodological consistency was ensured among the data obtained during the research process, increasing the reliability of the findings. *Verifiability:* In the research, which used both qualitative and quantitative data collection tools, the findings obtained from different data sources were evaluated through comparative analysis. In this context, the existence of meaningful relationships between the themes obtained from qualitative data (interviews, observations, journals, etc.) and quantitative findings (scale and achievement test results) was examined; overlaps, similarities, and differences between the findings were systematically analyzed.

Data Analysis

Both quantitative and qualitative data were collected during the data collection phase of the research. Therefore, both quantitative and qualitative analysis techniques were used in the analysis of the data.

Analysis of quantitative data

The Statistical Package for the Social Sciences 2024 (SPSS) program was used to analyze quantitative data in the study. To determine the tests to be used in analyzing the quantitative data obtained from the pre-test, post-test, and retention test conducted before and after the implementation, the normality assumption of the data was first tested. At this stage, the kurtosis, skewness coefficients, and standard errors of the data groups were examined. In addition, the Shapiro Wilk hypothesis test was used to examine the data. According to Büyüköztürk (2014), the Shapiro Wilk test can be used to test hypotheses indicating whether data obtained from sample groups smaller than 50 are normally distributed. The pre-test, post-test, and retention test mean scores for the Social Studies course "Production, Distribution, and Consumption" learning domain Financial Literacy Academic Achievement Test and Financial Literacy Scale for Elementary School Students (Özer & Ersoy, 2022) show a normal distribution. Due to the normal distribution of the collected data, the parametric dependent and independent sample t-test and one-way ANOVA test were used to compare the experimental and control group data.

Analysis of qualitative data

In this study, qualitative data were analyzed using inductive content analysis. The purpose of content analysis, which can be performed using inductive and deductive methods, is to discover patterns, themes, and categories within the data (Patton, 2014). The video recordings collected during the research process, the interviews conducted with the students, and the data obtained from the researcher and student journals were analyzed using inductive content analysis. After all qualitative data were collected, the open coding process was initiated, and the data were examined repeatedly. Data obtained from student interviews and student journals were analyzed as primary data. Audio recordings obtained from student interviews were converted into written texts and transferred to a digital environment. Subsequently, qualitative data obtained from student journals and interview transcripts were systematically coded. Following this process, the researcher's journals were also analyzed, leading to the identification of categories and themes from the coding. To ensure the validity of the identified themes and the holistic evaluation of the data, video recordings of the implementation process were examined in detail and used as a source to support the analysis findings. The analysis resulted in the identification of the theme "Educational Digital Game-Based Learning Experience" and 6 sub-themes related to this theme. Findings related to the acquisition of financial literacy skills were grouped under the theme "Financial Literacy Awareness," and 9 sub-themes were identified within this main theme.

Findings

Financial Literacy Academic Achievement Test and Financial Literacy Scale for Elementary School Students One-Way ANOVA Test Pre-test Results

The Financial Literacy Academic Achievement Test prepared by the researcher and the Financial Literacy Scale for Primary School Students developed by Özer and Ersoy (2022) were administered as pre-tests. The pre-test results are presented in Table 3 and Table 4.

Table 3. Social Studies Course "Production, Distribution, and Consumption" Learning Domain Financial Literacy Academic Achievement Test One-Way ANOVA Test Pre-Test Results

Grade	n	\bar{X}	S	Source of Variance	Sum of Squares	Mean Squares	F	p
4/A Branch	27	19.78	6.84	Inter-group	369,435	123,145	2,301	.082
4/B Branch (E)*	27	18.93	7.58	Within Group	5,565.481	53,514		
4/C Branch	27	20.44	8.00	Total	5,934.917			
4/D Branch (C)*	27	15.63	6.74					
Total	108	18.69	7.44					

*(E: Experimental Group, C: Control Group)

Table 4. One-Way ANOVA Test Pre-Test Results for the Financial Literacy Scale for Elementary School Students

Grade	n	\bar{X}	S	Source of Variation	Sum of Squares	Mean Square	F	p
4/A Branch	27	43.70	4.49	Inter-group	73,667	24,556	1,290	.282
4/B Branch (E)*	27	42	3.93	Within Group	1980.296	19,041		
4/C Branch	27	43.89	5.13	Total	2,053,963			
4/D Branch (C)*	27	42.33	3.75					
Total	108	42.98	4.38					

*(E: Experimental Group, C: Control Group)

According to the pre-test analysis results presented in Table 3 and Table 4, it is seen that the responses of all classes to the academic achievement tests and scales are equivalent in terms of academic knowledge ($p > .05$). A lottery was held among these four branches to determine the experimental and control groups. According to the lottery results, class 4/B (14 girls, 13 boys) was determined as the experimental group, and class 4/D (15 girls, 12 boys) was determined as the control group.

Findings and Interpretations Regarding Quantitative Research Questions

Findings regarding the post-test scores of the experimental and control groups on the financial literacy academic achievement test

The post-test scores of the experimental and control groups on the academic achievement test were compared using an independent samples t-test. Table 5 presents the results of the independent samples t-test for the post-test scores of the experimental and control groups on the academic achievement test.

Table 5. Results of the Independent Samples t-Test Analysis of the Post-Test Scores of the Experimental and Control Groups on the Financial Literacy Academic Achievement Test

	n	\bar{X}	ss	sd	t	p	d
Experimental Group	27	28.33	5.40	52	6.19	.001*	1.68
Control Group	27	18.11	6.65				

* $p > .05$

Looking at Table 5, according to the results of the independent samples t-test conducted to determine whether there was a significant difference between the post-test scores of the experimental and control groups on the academic achievement test, a significant difference in favor of the experimental group was found between the experimental group's post-test score mean ($\bar{X} = 28.33$) and the control group's post-test score mean ($\bar{X} = 18.11$) ($p > .05$). The effect size value (Cohen's d) between the experimental and control group averages was found to be 1.68. This value indicates that the difference between the experimental and control group post-test scores has a large effect. According to Pallant (2017), if the effect size value is between $0.2 < d < 0.5$, it is considered a "small" effect; if it is between $0.5 < d < 0.8$, it is considered a "medium" effect; and if $d > 0.8$, it is considered a "large" effect.

Findings regarding the financial literacy academic achievement test retention scores of the experimental and control groups

The analysis of the experimental and control groups' financial literacy academic achievement test retention scores is presented in Table 6.

Table 6. Results of the Independent Samples t-Test Analysis of the Experimental and Control Groups' Financial Literacy Academic Achievement Test Retention Test Scores

	n	\bar{X}	ss	sd	t	p	d
Experimental Group	27	27.81	5.77	52	6.53	.001*	1.77
Control Group	27	17.00	6.36				

* $p > .05$

Table 6 shows the results of the independent samples t-test conducted to determine whether there was a significant difference between the experimental and control groups' Financial Literacy Academic Achievement Test retention test scores. The mean retention test scores for the experimental group were $\bar{X} = 27.81$, while the mean retention test scores for the control group were $\bar{X} = 17.00$. A significant difference in favor of the experimental group was found ($p > .05$). This significant difference indicates that educational digital game-based instruction related to financial literacy has a lasting effect on students' academic achievement in financial literacy. The effect size between the experimental and control group averages was found to be $d=1.77$. This value indicates that the effect between the experimental and control group retention test scores is large.

Findings regarding the comparison of the post-test and retention test scores for financial literacy academic achievement in the experimental group

A dependent samples t-test was conducted to determine whether there was a significant difference between the scores obtained by the experimental group on the post-test and the scores obtained on the retention test. Table 7 shows the dependent samples t-test results for the experimental group.

Table 7. Results of the Dependent Sample t-Test Analysis for the Experimental Group's Financial Literacy Academic Achievement Test Final Test and Retention Test Scores

		n	\bar{X}	ss	sd	t	p
Experimental Group	Retention test	27	27.81	5.77	26	1.92	.065
	Final test	27	28.33	5.40			

$p > .05$

When Table 7 is examined, no significant difference was found between the mean final test scores of the experimental group students on the financial literacy academic achievement test and the mean scores on the retention test ($p > .05$). In the achievement test conducted after the experimental implementation, the average score of the students on the test was 28.33 ($\bar{X} = 28.33$), while the average score on the test conducted three weeks after the implementation ended decreased to 27.81 ($\bar{X} = 27.81$).

Findings regarding the comparison of the control group's financial literacy academic achievement test post-test and retention test scores

A dependent samples t-test was conducted to determine whether there was a significant difference between the control group's scores on the post-test and the retention test. Table 8 shows the results of the dependent samples t-test for the control group.

Table 8. Results of the Paired-Sample t-Test Analysis of the Control Group's Financial Literacy Academic Achievement Test Post-Test and Retention Test Scores

		n	\bar{X}	ss	sd	t	p	d
Control Group	Retention test	27	17.00	6.36	26	4.50	.001*	.17
	Final test	27	18.11	6.65				

* $p > .05$

When Table 8 is examined, a significant difference was found between the mean final test scores of the financial literacy academic achievement test administered to the control group students and the mean retention test scores ($p > .05$). In the academic achievement test conducted after the experimental implementation, the average score of the students on the test was 18.11 (\bar{X}), while the average score on the test conducted three weeks after the implementation decreased to 17.00 (\bar{X}). The effect size value between the mean scores of the post-test and the retention test was found to be $d=.17$. This value indicates that the retention level has a statistically low effect.

Findings regarding the comparison of the post-test scores obtained by the experimental and control groups on the overall scale and sub-dimensions of the Financial Literacy Scale for Elementary School Students

The final test scores obtained by the experimental and control groups on the overall scale and sub-dimensions of the Financial Literacy Scale for Elementary School Students were compared using an independent groups t-test. The results of this analysis are presented in Table 9.

Table 9. Results of the Independent Samples t-Test Analysis of the Final Test Scores on the Overall Scale and Subdimensions of the Financial Literacy Scale for Elementary School Students in the Experimental and Control Groups

Scale	Groups	n	\bar{X}	ss	sd	t	p	d
Overall Scale	Experimental Group	27	47.44	2.48	52	5.36	.001*	1.45
	Control Group	27	43.04	3.46				
Planned Individual sub-dimension	Experimental Group	27	13.37	1.21	52	3.03	.004*	.82
	Control Group	27	12.04	1.93				
Thrifty Individual Subscale	Experimental Group	27	11.74	.44	52	4.43	.001*	1.20
	Control Group	27	10.67	1.17				
Wasteful Individual sub-dimension	Experimental Group	27	22.33	1.54	52	4.41	.001*	1.19
	Control Group	27	20.30	1.83				

* $p > .05$

Looking at Table 9, according to the results of the independent sample t-test conducted to check whether there was a significant difference between the post-test scores of the experimental and control groups on the overall scale and sub-dimensions of the Financial Literacy Scale for Primary School Students (Özer & Ersoy, 2022), the mean post-test scores of the experimental group on the overall scale were $\bar{X} = 47.44$, while the control group's mean post-test score was $\bar{X} = 43.04$. This indicates a significant difference in favor of the experimental group ($p > .05$). Furthermore, when the experimental group's subscale post-test scores were compared with the control group's subscale scores, a significant difference in favor of the experimental group was found in all subscales. This significant difference indicates that educational digital game-based instruction related to financial literacy significantly increased students' attitudes and behaviors towards financial literacy. The effect size value between the experimental and control group averages was found to be $d = 1.45$ for the scale as a whole. The effect

size values for the scale subdimensions were found to be $d=0.82$ for the *Planned Individual* subdimension, $d=1.20$ for the *Thrifty Individual* subdimension, and $d=1.19$ for the *Wasteful Individual* subdimension. The results for the overall scale and subdimensions show that the difference between the final test scores of the experimental and control groups has a large effect.

Information regarding the comparison of pre-test, post-test, and retention test scores obtained from the scale overall and sub-dimensions of the Financial Literacy Scale for Elementary School Students in the experimental and control groups

Under this heading, graphical data comparing the pre-test, post-test, and retention test scores of the scale's overall score and sub-dimensions of the Financial Literacy Scale for Elementary School Students (Özer & Ersoy, 2022) applied to the experimental and control groups are presented in Figure 6.

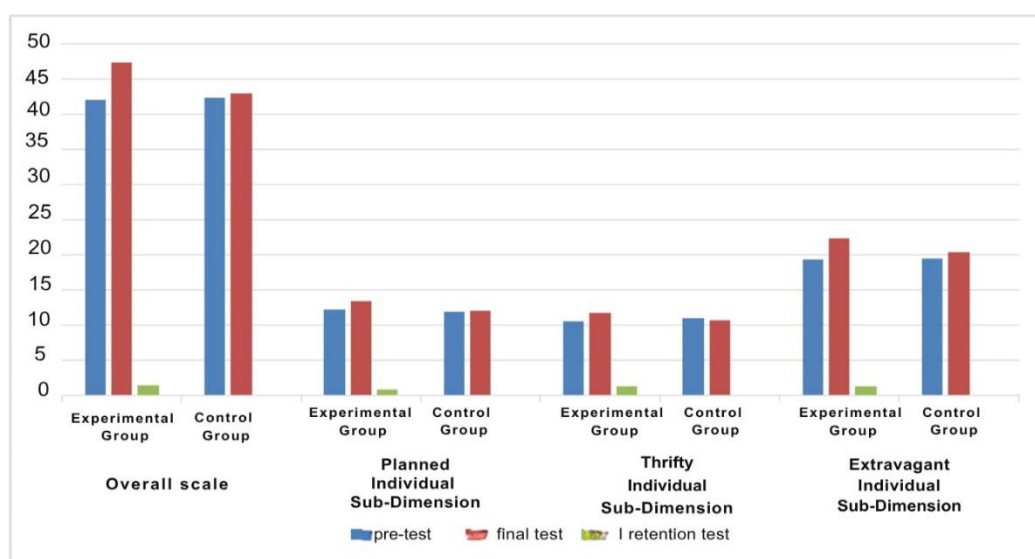


Figure 6. Graphical Representation of the Comparison of Pre-test, Post-test, and Retention Test Scores Obtained by the Experimental and Control Groups on the Overall Scale and Sub-dimensions of the Financial Literacy Scale for Elementary School Students

When examining Figure 6, the analysis of the pre-test and post-test scores of the experimental and control groups shows that the experimental group demonstrated a significant increase across the entire scale and each sub-dimension. In particular, the improvements achieved in the *Planned Individual*, *Thrifty Individual*, and *Wasteful Individual* sub-dimensions reveal the impact of the implementation on the students. The effect size values, evaluated as a persistence test, also show that these gains are not only short-term but also sustainable.

Findings and Interpretations Related to the Qualitative Research Question

The findings obtained from the qualitative data in the study were analyzed under two headings: findings related to students' opinions on the use of educational digital game-based teaching activities in imparting financial literacy skills and findings related to the imparting of financial literacy skills. The analysis of the data obtained regarding the participants' thoughts on teaching with educational digital games revealed the theme "Educational Digital Game-Based Learning Experience" and six sub-themes related to this theme. The analysis of the data regarding the acquisition of financial literacy skills revealed the theme "Financial Literacy Awareness" and nine sub-themes under this main theme. Figure 7 provides information about these themes and sub-themes.

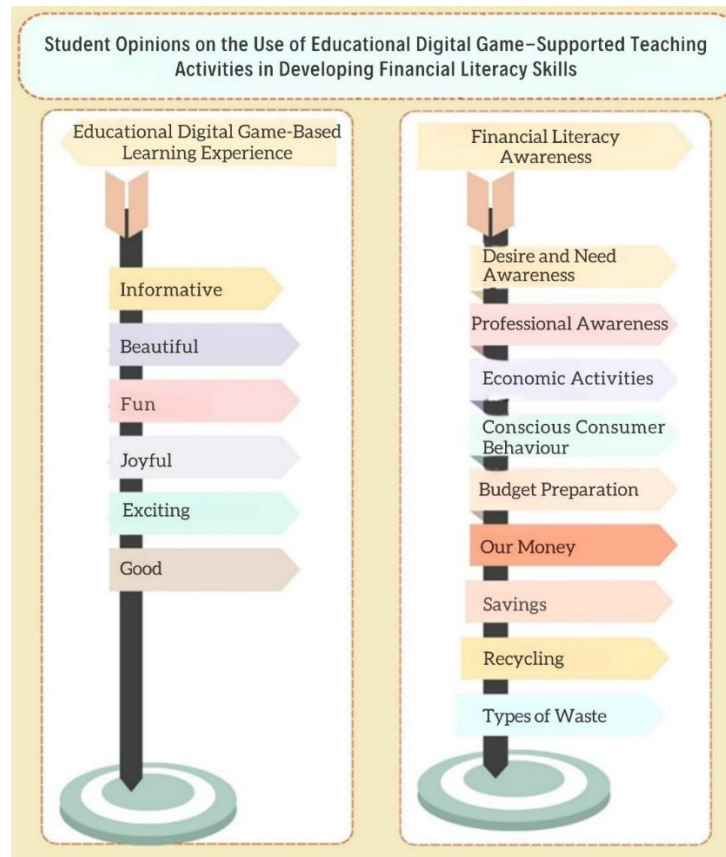


Figure 7. Themes and Sub-themes Identified Through Qualitative Data Analysis

Figure 7 presents the themes and sub-themes that emerged based on the findings obtained from the analysis of the qualitative data of the study. The sub-theme "informative" obtained from the findings of the qualitative data coincides with the findings of increased academic success obtained from the quantitative data of the study. Within this theme, findings regarding students' acquisition of knowledge on the subject as a result of courses conducted with educational digital games are presented. Students stated that they understood the subjects better and were more eager to learn in digital game-supported courses. Regarding this situation, the student named Ela stated: "*We understand better when we play games in our courses. We concentrate more on our courses.*" Within the theme of conscious consumer behavior, the findings obtained regarding students' development of skills in recognizing their rights in consumption processes, conscious shopping, and critical evaluation as a result of courses conducted with educational digital games are presented. For example, a student named Yaren said: "*Today in class, I learned that we should prepare a shopping list before going shopping and ask for a receipt or invoice when leaving. We should buy products with the TSE [Turkish Standards Institute] stamp and that are not past their expiration date. I learned that the consumer helpline number is 175.*" Within the scope of the savings theme, the findings obtained regarding the students' awareness of efficient use of resources, avoidance of waste, and energy savings in daily life as a result of course conducted with educational digital games are presented. The student named Gökçe said: "*We learned about saving, we learned about saving money. If we have extra money, we will put it in our piggy bank. We learned about the types of waste. We learned about recycling. We don't need to buy a new notebook when we have one. We should recycle our used notebooks.*" Within the scope of the recycling theme, courses conducted with educational digital games included findings that students gained awareness about the importance of recycling, learned to distinguish between recyclable and non-recyclable materials, and developed environmental responsibility. The student named Tarik stated: "*In class, we learned that bread waste is food waste. We learned which foods can be recycled. We learned that meatballs can be made from stale bread. We learned about saving and waste. We learned that glass, metal, cardboard, and paper can be recycled.*" Furthermore, the sub-themes of conscious consumer behavior, saving, and recycling obtained from the qualitative data are consistent with the quantitative findings of the study, which are the awareness of planned and thrifty behavior. These findings reveal that the qualitative and quantitative data overlap.

Findings related to educational digital game-based learning experiences

Students participating in the study were asked what they thought about learning courses through educational digital games. Regarding the teaching of social studies courses through educational digital games, a student named Yaren stated her thoughts as follows: *"It was very nice; each game had a different concept. I learned more than I did when we covered the topic in the usual way. Every game was very nice. I had a lot of fun."* Similarly, a student named Ela expressed her thoughts as follows: *"Social studies classes are very enjoyable when we play games. We understand better when we play games during our courses. Our concentration in class increases."* Looking at the students' statements, they indicated that they understood the course better and learned a lot in courses supported by educational digital games, that they had a lot of fun in class, and that the courses were more enjoyable. One of the most important features of educational digital games is that they make learning fun. A student named Ömer expressed how much he enjoyed learning in class: *"I had so much fun today and I was very happy. I had a lot of fun in the production, consumption, and distribution game. I thought I lost in the raw material and product game, but I won and I was very happy. Even though I lost the next game, I was still very happy."* A student named Nida also expressed her happiness, saying, *"The games we played were very nice, I was very happy."* A student named Mustafa expressed his love for the class, saying, *"I loved it very much, I'm sure my other friends loved it too. I wish we could do it every day because it's a great way to pass the time."* A student named Nida said, *"I was very excited in class, all the games were beautiful. I'm sure my friends loved it too. I had a great time today and was sad when it ended."* Mehmet explained his appreciation for the games: *"I really liked the airplane game, and everyone really liked the quiz game; I think it was very nice."*

Findings related to fostering financial literacy awareness

Regarding the acquisition of financial literacy skills through educational digital games, a student named Yaren expressed her thoughts, saying, *"I learned to distinguish between wishes and needs. I learned that we must first meet our needs. What are our needs? What are our wishes? I learned these things and had a lot of fun."* From the student's statement, it is understood that she learned what wishes and needs are and grasped which one to prioritize. Similarly, a student named Tarık stated, *"In social studies class, we learned about wishes, needs, and social needs. I learned that going to the movies, theatre, and reading books are social needs."* He also gave examples to explain what a social need is. The student named Gökçe said the following about career awareness and economic activities: *"We learned about raw materials and economic activities. We learned about production, distribution, and consumption, and we learned about different professions. We should choose professions that suit us. Buying bread from the bakery is consumption. We should choose professions that suit us, not those with high salaries."* The student emphasized that individuals should choose professions that suit them. Similarly, a student named Yaren said: *"We learned about products and raw materials. We learned about production, consumption, and distribution. We learned about economic activities: agriculture, animal husbandry, and industry. We learned about professions: products and services. We learned about professions. We learned why we should choose a particular profession. As an example of a product, we can take a cup or a table; as an example of raw materials, we can take iron or steel; as an example of production, we can take the production of wheat; as an example of distribution, we can take the distribution of bread; and as an example of consumption, we can take eating toast."* In this way, she explained the importance of choosing a profession and what economic activities are. The student named Esra talked about conscious consumer behavior: *"Today, we learned about recycling. We learned to pay attention to the expiration date (ED) and production date of foods, and we learned about recyclable materials. We learned that we should buy local products. We learned about products with TSE quality certificates, we learned to prepare a shopping list, we learned about the consumer arbitration board, and we learned that we should save our extra pocket money."*

The student named Nida said, *"We learned about income, expenses, budget, and coins. I learned how to balance my budget. We learned about Turkish coins, and I learned that receiving a salary is income. I learned that buying a coat for myself in winter is an expense, and I learned that fifty kuruş is a coin."* The student named Yaren said, *"Today in class, we learned about the types of waste, that we can borrow when our income is less than our expenses, that we can save when our expenses are less than our income, and about recyclable and non-recyclable materials. We learned that water waste, bread waste, clothing waste, paper waste, and time waste are all types of waste, and so much more. Glass, plastic, paper... etc."*

Discussion, Conclusion, and Recommendations

Discussion and Conclusion

In this study, which examined the effect of educational digital games on the acquisition of financial literacy skills in social studies courses, since there was no significant pre-test difference between the groups in the primary school where the implementation would be carried out, the experimental and control groups were determined by drawing lots from the 4th grade branches. After the 6-week implementation process, an academic achievement test was administered to both groups as a post-test. As a result of the 6-week experimental implementation, a statistically significant increase was observed in the mean success and attitude scores of the experimental group students.

One of the important findings of this study is that there was a statistically significant increase in the financial literacy achievement and attitude scores of students in the 4th grade social studies course taught with educational digital games in favor of the experimental group. In other words, it has been revealed that the financial literacy knowledge and attitudes of elementary school students can be developed in social studies courses taught with educational digital games. In the literature, there are studies on the effect of educational digital games on academic achievement in different subjects at the primary education level. These studies include science (Ağırçöl et al., 2022; Bağ, 2020; Ivgin & Akçay, 2024), mathematics (Boussaha et al., 2025), social studies (Doğan & Koç, 2017; Erkan, 2019; Koka, 2018), and life skills (Kaynar, 2020). This research was conducted in social studies. However, there are also research results in the literature indicating that educational digital games increase academic achievement in different subjects. For example, Ivgin and Akçay (2024) determined that the combined use of educational games and educational digital games significantly increased the science achievement of 5th grade students, but that the use of the games separately had no effect on academic achievement. The finding that the use of educational digital games alone increases academic achievement partially coincides with the results of Ivgin and Akçay's (2024) study. In the research conducted by Boussaha et al. (2025) with 2nd and 3rd grade elementary school students in mathematics courses, the effect of educational digital games on the development of students' arithmetic gains was experimentally demonstrated. Boussaha et al., (2025) conducted their study with 2nd and 3rd grade elementary school students in mathematics course, while this study was conducted with 4th grade students in social studies course. As a result, using educational digital games, Boussaha et al., (2025) determined an increase in arithmetic skills in elementary school, and this study determined an increase in financial literacy knowledge and attitudes. According to the results of both studies, it is a common finding that educational digital games statistically demonstrate a significant increase in students' academic achievement. Chuang and Chen (2009) found that computer-based video games showed a significantly high level of performance in elementary school students' knowledge recall and problem-solving skills. This result is consistent with the finding that educational digital games in this study increased students' academic achievement. Bağ (2020) revealed in their research that educational digital games improved 4th grade students' conceptual understanding levels, scientific thinking habits, and argumentation skills in science courses. This result is similar to the result of the conducted research. Ağırçöl et al. (2022) determined in their research that educational digital games in science courses were statistically significantly higher in terms of both academic achievement and retention of information. There are various similarities and differences between this study and the research conducted. Both studies show similarities in terms of increased academic achievement and lasting learning. Doğan and Koç (2017) found that educational digital games in social studies courses were effective in improving academic achievement. In this respect, the results of both studies coincide. Erkan (2019) found that educational digital games in social studies classes showed a significant increase in academic achievement, but this result was not statistically significant between groups. The result of this study is similar to the result of the research conducted in terms of the increase in academic achievement, but differs in terms of statistical significance. Koka (2018) found that computer-based educational games in 4th grade social studies classes increased students' academic achievement levels and learning retention. The results of both studies coincide in terms of increasing academic achievement and ensuring learning retention.

One of the important findings of the study is that the digital tools used in the development of educational digital games are consistent with similar studies conducted in the field. In this study, Web 2.0 tools such as Wordwall and Scratch were used in the development of digital games; in addition, ready-made recycling-themed games available on the Cevkococuk.org website were also used. Boussaha et al., (2025) used a digital platform called GAME-calcul, which they developed themselves, in their research. The study conducted by Ivgin and Akçay (2024) included both educational and digital games; various ready-made games (Catch a Mole, Space Attack, Space Sale, Recyclebuse, Falling) were used as digital games, along with content from the Cevkococuk.org website. Chuang and Chen (2009) included the three-dimensional digital game Fire Captain in their study on ready-made commercial games. Bağ (2020) used a game he developed himself called Unity in his study. PowerPoint was used in the preparation of educational digital games in the research by Ağırgöl et al. (2022). Digital games were developed in the Adobe Captivate program by Doğan and Koç (2017). Scratch-based digital games were included in the study by Erkan (2019). PowerPoint was used in the preparation of educational digital games in the research by Koka (2018). As a result, the literature review revealed that researchers either developed the games themselves, preferred ready-made commercial games, used both together, or had experts develop the games for them. Most of the digital games used in this study were originally developed by the researcher; in addition, three games were implemented through the Cevkococuk.org website.

In addition to their effects on academic achievement, educational digital games have also been observed to have a significant impact on students' attitudes. In this context, various studies examining the effect of educational digital games on students' attitudes are found in the literature. The research conducted by Dursun (2024) examined the effect of educational digital games on the attitudes of second-grade elementary school students towards learning mathematics. The research findings reveal that the use of educational digital games in mathematics courses has a significant effect on students' attitudes compared to traditional teaching methods. In the experimental group, a significant increase in students' attitudes towards mathematics courses was observed with the use of educational digital games, while in the control group, a decrease in attitude was observed. In a study conducted by Çankaya and Karamete (2008), students' attitudes towards educational digital games in mathematics courses were examined. The results of the study revealed that students had a positive attitude towards educational computer games. A study conducted by Erkan (2019) examined the effect of educational digital games on students' attitudes in social studies. While there was no significant difference between the pre-test and post-test scores of the experimental and control groups, a significant difference in favor of the experimental group emerged between the post-test scores of the experimental and control groups. In their research, Ağırgöl et al. (2022) examined the effect of educational digital games on students' attitudes in science courses and found no significant difference between the experimental and control groups. These findings are similar to the results of our study and show that the effect of educational digital games on students' attitudes may vary depending on factors such as the duration of implementation and content.

One of the qualitative findings of the study is that students reported understanding financial literacy topics better in social studies courses taught using educational digital games. Students also stated that they found the courses very enjoyable and liked them very much. Similar qualitative findings to those of this study have been reported in primary education research in the field. For example, in his study with 6th grade students, Aksoy (2014) reported that students involved in digital game-based mathematics instruction indicated that their interest in learning had increased, that the courses were enjoyable, and that learning had become easier. Avcı et al., (2009) stated that students found courses taught with educational computer games more enjoyable, their participation in the courses increased, and their learning motivation was positively affected. In a study evaluating educational digital games by Bozkurt (2013), it was emphasized that educational digital games attract students' attention, make the learning process effective and enjoyable, and increase students' interest and participation in the course. The qualitative results of the study show that financial literacy topics taught through educational digital games in social studies courses are better understood, more enjoyable, and that

students like the courses, which are informative. These results are consistent with the findings in the literature (Aksoy, 2014; Avcı et al., 2009) and evaluations (Bozkurt, 2013).

In the study, a retention test was administered to the experimental and control groups three weeks after the end of the implementation to understand the effect of educational digital games on the retention of academic achievement, in addition to their effect on academic achievement. The analysis revealed that there was no significant difference between the post-test and retention test scores for the experimental group, while there was a significant difference between the post-test and retention test scores for the control group. This result can be interpreted as indicating that teaching with educational digital games has a positive effect on the retention of learning. This result is consistent with the findings of similar studies examining the effect of teaching with educational digital games on the retention of academic achievement. For example, educational games in English teaching (Donmuş, 2012), teaching English vocabulary (Günel, 2019), teaching the learning domain of Systems in Our Body and Health in science courses (Ağırçöl, 2020), and other disciplines related to educational digital games (Bayat et al., 2014; Karamustafaoğlu & Kaya, 2013; Yapıcı & Karakoyun, 2017; Yiğit, 2007) have found that they have an effect on the permanence of academic success. In this respect, it is understood that the permanence test results of the study are consistent with the results of some studies in the field.

Another important finding of the study is that educational digital games significantly improved students' financial literacy compared to the control group. For this purpose, the Financial Literacy Scale for Elementary School Students (Özer & Ersoy, 2022) was administered as a pre-test to the experimental and control group students, and no significant difference was found between the experimental and control groups. After the 6-week implementation period, the scale was administered as a post-test, and the analysis revealed a significant difference between the experimental group's pre-test and post-test scores on the scale overall and its sub-dimensions. In the control group, a significant difference was found only in the "sub-dimension". Based on this result, it appears that teaching with educational digital games is more effective in developing financial literacy. Among the qualitative results of the study, the students expressed their views on the financial literacy topics covered in educational digital games, including: they were able to better understand their desires and needs, learned what to consider when choosing a profession, learned about economic activities, conscious consumer behavior, how to save, what a budget is and how to make one, and learned about recycling and types of waste. When the quantitative and qualitative results achieved in this context regarding financial literacy are examined together, it is understood that the results are similar and overlapping, and that teaching through educational digital games is confirmed to be effective in imparting financial literacy skills. There are studies on financial literacy in social studies and other subjects in the literature. In Arıkan's (2021) study, which examined the effect of the context-based learning approach in social studies on financial literacy, it was concluded that students learned the importance of budgeting, the distinction between wishes and needs, and how to spend and save. Similarly, Çelikten (2020), in his study examining the impact of the Marmara Financial Literacy Program he developed on financial literacy, determined that students learned what their wishes and needs were; the importance of budgeting, waste, saving, planning, and conscious consumer behavior. The results of the studies by Arıkan (2021) and Çelikten (2020) are particularly consistent with the qualitative results of the present study.

Blue et al. (2018) found that financial education provided in mathematics classes resulted in positive developments in the financial decision-making processes of fourth-grade students. This result is similar to the findings of the present study, particularly in terms of identifying students' wishes and needs and determining that needs should be met first. Kandak and Mertol (2021) found that before receiving financial education, most elementary and middle school students did not know what taxes were or what receipts and invoices were used for. After the education provided, it was concluded that students' awareness of taxes increased and that they learned concepts such as receipts and invoices. This result is similar to the statements in the conducted research that students learned concepts such as receipts and invoices.

There are studies in the literature on financial literacy with elementary school students (Çarıkçı, 2019; Çelikten, 2020; Şimşek, 2023). Since this study attempts to impart financial literacy skills to elementary school students through educational digital games, it is thought that the research results could contribute to the literature. The study is limited to students in two 4th grade classes at an elementary school in a district center, examining the effect of teaching with educational digital games in social studies courses on financial literacy. At the same time, the activities prepared to impart financial literacy are based on the learning outcomes of a learning domain included in the 4th grade Social Studies Course Curriculum. By overcoming these limitations, learning outcomes based on retention and academic achievement can be observed in other grade levels and different learning domains.

Recommendations

This study investigated the use of educational digital games to develop financial literacy skills. Given the limited number of similar studies in this field, it can be said that this research fills an important gap. The results of the study show that educational digital games are an effective tool for improving the financial literacy levels of elementary school students. Considering the limitations of this study, it is important for future research to address this gap by conducting studies at different grade levels and in different learning domains. Furthermore, longitudinal studies can be conducted to track the sustainability of financial literacy skills and their impact on academic achievement over a longer period. Again, more comprehensive studies are needed to investigate the role of different educational methods, primarily educational digital games, in financial literacy education. Such studies can assist educators and policymakers in determining the most effective strategies for financial literacy education. During the research, it was observed that students learned while having fun playing educational digital games. Educational digital games designed for courses can be encouraged to be played by students at home. Teachers can use Web 2.0 tools and free game platforms to develop educational digital games and improve their teaching, especially in imparting skills in different subjects.

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