

Investe: An Educational Application for Teaching Financial Investments to Beginners

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Abstract. Introduction: Financial literacy, especially knowledge about investments, remains a challenge for beginners and young learners. Educational digital games can help this learning process by combining interactive content, gamification and accessible mobile technologies. **Objective:** The purpose of this study is to present Investe, an educational quiz game designed to teach basic concepts of financial investments, covering topics such as cryptocurrencies and the stock market using accessible language. **Methodology:** Research was conducted in the fields of investments and gamification to ensure that concepts were presented in a simplified and contextualized manner, incorporating playful elements to maintain the target audience's attention. Design principles were also applied to create the user interface; the system architecture was updated and tests were conducted to ensure proper functioning. **Expected Results:** This initiative aims to help raise a generation that is more financially literate and capable of making safe decisions in the financial domain from an early age. **Keywords** Financial Education, Educational Games, Quiz Game, Investments, Gamification.

1. Introduction

Financial literacy is essential for enabling people to make informed decisions about their personal finances and investments. However, many young people and beginners still lack basic knowledge of financial concepts, which can negatively impact their long-term financial independence [OECD 2016]. A study by BlackRock [Valor Investe 2019] identified the main barriers that prevent Brazilians from investing: 61% cite insufficient financial resources and 37% point to lack of knowledge, with 30% reporting they do not know enough about the topic. This scenario highlights the urgency of initiatives that democratize access to investment education, especially among young people and beginners.

In this context, educational digital games (EDGs) have emerged as a promising approach to support learning by combining interactive content with gamification techniques. Quiz-based games, in particular, offer an accessible and engaging way to reinforce knowledge through repetition, immediate feedback and reward mechanisms, making them suitable for presenting complex topics such as financial investments in a simplified and motivating manner [Hamari et al. 2014, Ruiz-Carhuamaca et al. 2024].

Given this, this work proposes the creation of a mobile quiz-based educational game called *Investe*, focused on financial investment topics such as cryptocurrencies and the stock market. As a foundation, a *white-label* solution created for mobile quiz games [Oliveira 2023] was used to facilitate the development of the application.

2. Related Work

The use of EDGs for financial education has been explored in different contexts. Cavalcante et al. developed GRANA, a mobile game focused on basic financial education for children in rural schools in the northeastern Brazilian hinterland [Cavalcante et al. 2021]. The application used quiz mechanics with immediate feedback and reward systems, demonstrating the potential of EDGs for audiences with limited access to formal education.

[Ruiz-Carhuamaca et al. 2024] proposed a gamified mobile application for teaching financial literacy to young people, incorporating points, progression and interactive activities. Although the approach proved effective, the application was developed as a standalone system, with no provision for content reuse or adaptation to other domains.

In the context of games for programming and computing education, [Deterding et al. 2011] and works presented in previous editions of SBGames — such as Get Quizzfty [Silva et al. 2021], a quiz game for Afro-Brazilian and indigenous culture education — demonstrate that playful narratives and structured progression are relevant motivational factors in educational game design.

Unlike these approaches, *Investe* combines financial educational content with an adaptive architecture, demonstrating how a flexible infrastructure can support remote content updates [Oliveira 2023]. This setup allows educators to dynamically refresh quizzes and pedagogical scaffolding without modifying the game's core source code, sustaining long-term student engagement.

3. The Investe Game

Investe represents a direct evolution of the GRANA platform [Cavalcante et al. 2021], advancing the educational content to the financial investment domain while modernizing the underlying technology stack. The application incorporates the gamification principles highlighted in the literature (level progression map, coin reward system, explanatory videos and support items) adapted to the context of investment education for beginners [Deterding et al. 2011, Silva et al. 2021].

3.1. Educational Content and Level Design

The content of *Investe* was developed based on the guidelines established by the Brazilian Ministry of Education (MEC) through the National Common Curricular Base (BNCC) [Brasil 2018]. Initially, the investment topics were selected and translated into learning objectives. These objectives guided the development of multiple-choice questions and explanatory feedback, which were then organized into progressively more challenging levels. The resulting content is structured around three main thematic axes:

- **Basic concepts:** focuses on the three fundamental characteristics of any financial application: *risk* (the probability of loss), *return/yield* (the expected

remuneration) and *liquidity* (the ease and speed of converting an asset into cash) [Banco Central do Brasil 2013, Brasil 2018].

- **Types of Investment:** covers the study of fixed-income instruments (such as savings accounts, CDBs and Treasury bonds — *Tesouro Direto*), which have predetermined remuneration rules, and variable-income options (such as stocks and Real Estate Investment Trusts — FIIs), whose returns vary with market conditions [Banco Central do Brasil 2013]. It also encompasses an understanding of crypto assets (Bitcoin and Ethereum), exploring their underlying technology and volatility.
- **Decision-making:** explores the concept of intertemporal trade-off — the rational process of choosing between spending money now (consuming) or saving and investing it for future consumption [Banco Central do Brasil 2013]. It also highlights the importance of portfolio planning and diversification to minimize investment risks [Banco Central do Brasil 2021].

3.2. Gameplay and Gamification

The gameplay is structured into five progressive levels comprising 75 multiple-choice questions (15 per level, with five randomly selected for each playthrough) related to financial investment concepts, and five explanatory videos presented before each level to introduce the corresponding concepts and provide instructional scaffolding, preparing players for the subsequent questions. This organization makes the experience more dynamic, avoiding mechanical repetition of content while providing a structured and progressive learning path that guides players from fundamental financial concepts to investment decision-making.

Player progression occurs as they correctly answer all questions in a level. In the event of an error, the level must be restarted, encouraging content review and repeated retrieval of recently learned concepts, which contributes to knowledge consolidation rather than simple trial-and-error progression. Upon answering correctly, the player receives virtual coins that can be spent on four support items available in the store: **Hint** — displays a textual clue; **Skip** — advances the question without penalty; **Extra Time** — adds 30 seconds to the countdown; and **Eliminate Option** — removes one incorrect alternative. Correct answers are highlighted in green and incorrect ones in red, with an immediate explanation, reinforcing learning through feedback.

Questions follow a progression by difficulty level. Between levels, short explanatory videos introduce the topics of the upcoming questions, serving as gradual and contextualized pedagogical scaffolding. At the end of each level, the player is rewarded with coins and invited to decide between saving them or spending them in the store, reinforcing in practice the principles of financial decision-making.

Upon completing the final level, the user accesses a performance summary including the number of correct answers, errors and items acquired. Overall, the gameplay mechanics were selected to align established gamification principles with the educational objectives of the application. Progression, rewards, immediate feedback and instructional resources were integrated to encourage sustained engagement while supporting the gradual acquisition of financial investment knowledge [Deterding et al. 2011, Hamari et al. 2014]. This approach, which combines playful and interactive

elements with financial education, contributes to making learning more engaging and effective [Botelho et al. 2025].

3.3. Interface Implementation

The application was developed in Flutter [Ameen e Mohammed 2022], with Firebase [Google LLC 2023] providing Google authentication, asset storage and remote content configuration (Remote Config). This approach allows questions, rewards and assets to be updated without recompiling the application. The visual identity adopts a nocturnal cyberpunk style, with a dark blue background, neon effects, candlestick charts and a robot mascot inspired by the financial market universe. The images were created by the authors and subsequently refined with the support of generative tools. Figure 1 presents the main screens of the application.

The entry flow comprises the **Start** screen (Fig. 1a), which displays an animation with the application's visual identity; **Consent** (Fig. 1b), which requests agreement with the privacy policy; and **Login** (Fig. 1c), which offers Google authentication, enabling progress persistence between sessions. When starting a new game, the user is welcomed by the robot mascot on the **Introduction** screen (Fig. 1d), which presents general instructions. Next, the **Avatar** screen (Fig. 1e) allows character selection, creating a bond of identification, and the **Main Menu** (Fig. 1f) centralizes options to continue saved progress, start a new game, access the **Shop** (Fig. 1g) — where support items can be purchased with accumulated coins — or consult the **About** screen (Fig. 1h), with information about the game and the team.

Level navigation occurs through the **Level Map** (Fig. 1i), which displays a map of chests with visual distinction between completed and locked levels. Upon selecting an available level, the **Level Opening** screen (Fig. 1j) shows the coins at stake in that phase. Before the questions, the **Explanatory Video** screen (Fig. 1k) displays a short video contextualizing the upcoming concepts as pedagogical scaffolding. If the first access occurs without internet connection, the **No Connection** screen (Fig. 1l) informs the user of the need for internet to synchronize remote content.

The **Questions** screen (Figs. 1m and 1n) constitutes the interactive core of the game, displaying at the top the coin counter, current level and a countdown timer, and at the bottom the four support item buttons. Upon selecting an alternative, the correct answer is highlighted in green and the incorrect one in red, followed by an immediate explanation. Upon completing all questions in a level, the player is directed to the **Reward** screen (Fig. 1o), where they decide between saving the earned coins or spending them in the store, playfully reinforcing concepts of saving and conscious spending. At the end of the last level, the **Game Over** screen (Fig. 1p) presents the full performance summary: correct answers, errors and total accumulated value ¹.

¹ Access the list of important links related to the Investe game at: Investe Important Links URL

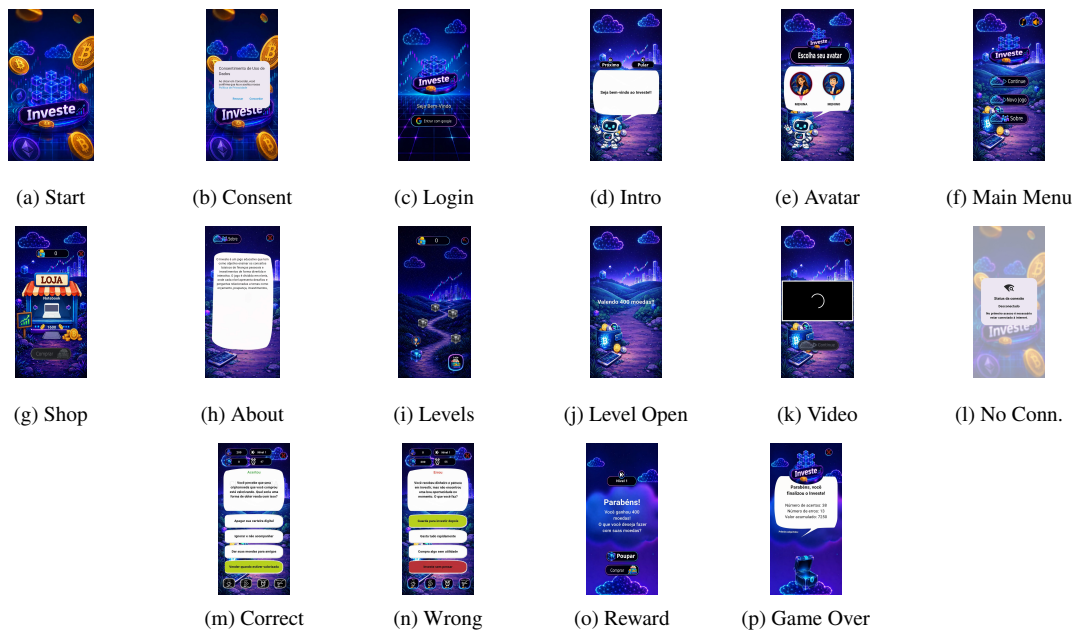


Figure 1. Main screens of the Investe application

4. Conclusion and Future Work

This work presented Investe, a mobile quiz-based educational game focused on teaching financial investment concepts to beginners. The application covers three progressive thematic areas (basic concepts, types of investment and financial decision-making) structured in levels with gamification mechanics including a coin system, support items, explanatory videos and immediate feedback. Its educational content is aligned with Brazilian MEC guidelines established in the BNCC [Brasil 2018] and grounded in official financial literacy references [Banco Central do Brasil 2013, Banco Central do Brasil 2021]. The visual identity, developed under a nocturnal cyberpunk theme aligned with the financial market universe, and content configuration managed remotely via Firebase Remote Config enable updates without recompiling the application.

Building on the modular quiz platform [Oliveira 2023] allowed development efforts to be concentrated on pedagogical design and user experience, resulting in a functional application with a cohesive visual identity and intuitive navigation flow. The complete screen cycle was designed so that the player's progression reflects, at each stage, the financial education principles the game aims to teach.

As future work, the following are proposed: (i) a usability study with users from the target age group to evaluate the game experience and identify interface improvement points; (ii) an empirical study with a pre-test/post-test design and a control group to evaluate the application's educational potential in the acquisition of investment knowledge; (iii) implementation of a stock market simulator allowing players to experience investment decisions using virtual coins earned in the levels; (iv) completion of the dynamic store system with remotely configurable prices; and (v) publication of the application on the Google Play Store and Apple App Store to enable broader access to the target audience.

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